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An Analysis of Green Financing Methodologies in Islamic Countries and the Preparation of a Green Finance Handbook

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Foreword

In today's world, climate change and environmental erosion have become one of the fundamental challenges of the global economy. Population growth, excessive consumption of resources, and irresponsible industrial activities have put increasing pressure on the environment. In the face of these challenges, the concept of "green economy" has been proposed as a new and necessary approach to combine economic growth with preserving natural resources and reducing negative environmental effects.

A green economy can play a role in reducing emissions and preserving biodiversity by sustainable exploitation of renewable resources and reducing the consumption of non-renewable resources. This approach, in addition to improving the environmental situation, provides valuable opportunities to create employment, reduce poverty, and improve the quality of life in communities. Especially in sectors such as renewable energy, sustainable transportation, and smart agriculture, the green economy can lead to sustainable economic growth and social justice.

Green financing is one of the tools to achieve these goals. This type of financing is made possible by directing capital to environmentally friendly projects. Financial resources can be used in various ways, such as issuing green bonds, environmental loans, and investing in renewable energy and water resource management, and play a key role in achieving sustainable development.

Islamic countries with rich and cultural resources based on justice and responsibility have great potential to develop green projects and deal with climate change. These countries can play an effective role in this field by using renewable energy sources such as solar and wind energy, as well as relying on religious teachings about environmental protection.

This research, with the topic of "An Analysis of Green Financing Methodologies in Islamic Countries and the Preparation of a Green Finance Handbook" investigates the role of governments, financial institutions, and the private sector in facilitating green financing and highlights the challenges and opportunities of Islamic countries' progress in this field.

The contents of the plan can be implemented as a tool for policymakers and economic activists in Islamic countries, especially in banks and financial institutions, to develop new and efficient policies for the development of the green economy. It is hoped that this research will draw a worthy horizon for the development of international and regional cooperation in the field of green economy and help to achieve the goals of sustainable development so that Islamic countries can take effective measures in the direction of destructive climate changes and promote sustainable development.

Mr. Samad Hasan Zadeh

The President of ICCIMA,

The Chairman of ICRIC Board of Directors

Introduction

Based on the designed model for ranking countries in the field of green financing and according to the latest available data, 15 selected countries were examined based on the IGEI index, which was explained in Chapter Six. Initially, the policies, strategies, instruments, and methods of green financing in these 15 selected countries—including countries ranked 1 to 10 in the ranking of Islamic countries and 1 to 5 in the overall global ranking—were reviewed (the full report is available in the Persian version of the project). Finally, the green financing instruments used by the selected countries were identified and categorized. Alongside this review, the experience of multilateral and international financial institutions in selected countries was also examined in the field of financing, and ultimately, this section of the project was prepared as a green financing guidebook for Islamic countries.

The top ten Islamic countries in this study are Qatar, United Arab Emirates, Islamic Republic of Iran, Kuwait, Algeria, Tunisia, Oman, Gambia, Côte d'Ivoire, and Egypt, while the top five countries globally are Belgium, Malta, Greece, Italy, and Germany.

Section 1

Green Financing Tools and Methods

Chapter One

Green Finance Platform:
Key Element to Sustainable Development

1. General Information on the Green Finance System in the World

1-1. Importance of Sustainable Development and Green Economy

Sustainable development is defined as a combination of economic, social, and environmental goals to maximize human well-being without compromising the ability of future generations to meet their own needs.[1] The above definition was first introduced by the World Commission for Environment and Development. The development that meets the needs of the present time without compromising the needs of those who come in the future. Based on this definition, two concepts of "needs", particularly the basic needs that are prioritized and the concept of "limits" that are imposed based on economic, social, and environmental status, are referred to, which in itself indicates that the sustainable development goals should be defined and tailor-made by each country. Meanwhile, one of the concepts introduced to the economic literature in 70s was "green economy or green growth" and "green product". The Green Economy is used versus the Brown Economy[2]. If fossil and non-renewable resources are used excessively, the economy is called the Brown Economy.

1 United Nations
2 Verreault

So far, various definitions and interpretations of the green economy have emerged. The green economy can be examined at two levels: micro and macro. At the micro level, it refers to an economy where factories and small enterprises produce green products. At the macro level, however, the situation is more complex. It's not enough for these industries to simply produce green products; their production must also be evaluated in relation to the use of non-renewable resources. According to the European Union, a green economy fosters growth, creates jobs, and alleviates poverty through investments in nature, with the goal of ensuring the long-term sustainability of the Earth. The United Nations Environment Program (UNEP) states that the green economy aims to further promote the integration of the three dimensions of sustainable development. The goal of this economic system is to enhance and preserve natural capital while boosting economic productivity and reducing social inequalities. Based on these definitions, the green economy can be seen as essential for sustainable development. In other words, achieving sustainable development is reliant on the transition to a green economy.

1-2. Importance of the green finance system and its costs

Green finance is a set of policies, institutional arrangements, and infrastructures that direct financial resources towards the green industry through loans, private shares, issuing bonds and debentures, insurance, and other financial services, leading to expansion of productive economic investments and increasing income, thereby resulting in economic growth and reduction of income inequality. As a general rule, green finance includes the following:

- Public and private finance of green investments in the following areas:
    - Environmental goods and services, including water management or protecting species diversity and nature
    - Prevent, minimize, and make up damages to the environment and climate, including improvement of energy efficiency or construction of dams and water barriers
- Financing public policies that cover projects and measures aimed at reducing environmental damage and compliance with the standards.
- Components of the financial system related to green investment, such as the Green Climate Fund or financial tools for green investment, including legal, economic, and institutional frameworks.

So far, no all-inclusive yet clear-cut definition of green finance has been introduced, due to the lack of definitions in most publications as well as significant variance among those provided in the literature on effective financial systems. However, it seems that Lindenberg (2014) has offered a comprehensive definition of green finance based on the definitions provided by Hohne et al. (2012), Zadek and Flynn (2013), and Bunke et al.

Financing private and public green investments (including capital and preparation costs) is discussed for environmental services and goods (such as water management and biodiversity protection), prevention, minimizing and compensating damages to climate and environment, and financing public policies (including operational costs) that encourage innovations and projects for the adjustment and reduction of losses to the environment. The benefits and challenges of green finance are provided in Table 1-1 and 2-1:

Table 1-1: Benefits of Green Finance

Title	Description
Promoting the spread of environmentally friendly technology and infrastructure	**Investing in environmentally friendly technologies, such as clean energy, may help reduce costs and accelerate widespread technology dissemination. It provides an opportunity at the national level to reach environmentally friendly infrastructures. Thereafter, the governments are responsible for infrastructure development leading to better long-term resource management, which in turn increases the competition in the country and directs the private capitals to the domestic green market.**
Creating a comparative advantage	**Low carbon green growth, inescapable from the current voluntary nature, changes to a mandatory strategy in response to the pressures caused by Climate changes and other environmental and economic crises. Today, when environmental standards become stricter, the expansion of green finance means a comparative advantage.**
Creating value	**Businesses, organizations and companies can create added-value by promoting and raising awareness about green finance in their portfolio. Therefore, they can make their business green and, as a result, attract investors who have knowledge about-The environment and like-minded customers.**
Expanding economic prospects	**Governments expand their economic prospects by breaking into new markets that have a high potential to create employment. Since governments are mainly interested in promoting the welfare of different generations, green financing mechanisms are attractive, especially in supporting projects and developments that bring sustainable benefits, particularly in medium and long-term arrangements.**

Given the broad range of estimates regarding the needs for green investment finance, public financial resources alone will be insufficient for green development. Consequently, a significant amount of public capital is necessary. However, public green finance continues to face numerous economic chal-

lenges. Despite some progress, the development of green finance is still encountering significant obstacles.

Table 1-2: Green Finance Challenges

Challenges				Experiences
	Banking	Market Bonds	Institutional investors	Experience of countries to face challenges
Foreign impacts	Insufficient compensation for positive externalities of green projects; Inappropriate punishment for the negative externalities of polluting projects Inadequacy of price signals			In addition to financial and environmental policies: guarantees, special loans, acceptance of risk management principles, green labeling, etc.,
Mismatch of accrual dates	Lack of suitable financial tools for long-term green projects			Green bonds, transforming into bonds and securing loans
Ambiguity of green definitions	Lack of green loan definition	Lack of green bonds definition	Lack of green asset definition	Developing green definitions and indicators
Information asymmetry	lack of information about borrowers; high risk aversion	lack of information and Monitoring use of income	Lack of information about assets (environmental impacts and risk)	Guidelines on Voluntary Disclosure of Environmental impacts and related financial risks, credit approval Green bonds, risk reduction, policy signals, experimental projects, key investments (Langar)
Lack of analytical capacities	Lack of capacity to assess impact on credit risk	Lack of capacity to assess impact on credit risk	Lack of capacity to assess impact of asset evaluation	Risk modeling, training, ranking, indicators

Inappropriate pricing and failure to price risks, market deviations and defects/shortcomings, competitive goals, limited capital and inadequate awareness are legal gaps.

1-3. Process of greening the finance system in different countries, relevant needs and opportunities[1]

To achieve the ambitious goals of the Paris Climate Agreement's 2030 Plan, we must align the financial world with green growth. Given that financial pressure is a persistent issue in many regions, mobilizing private capital is

1 United Nations Environment Programme, 2016

essential to meet the global investment needs of $5 to $7 trillion per year. International politics is always evolving. In 2016, China launched the Green Finance Studies Group (GFSG) during its G20 presidency, and Germany has since continued to support this initiative, as well as other G20 projects. Recently, Argentina, as the current G20 president, announced its intention to build upon the efforts of its predecessors. To facilitate this, the Financial Stability Board and the Task Force on Climate-Related Financial Disclosures (TCFD) are working to implement its recommendations for analyzing potential risks. The TCFD's mandate has also been extended for one additional year to support capacity building and effective implementation.

The concerns and relevant initiatives on sustainable development finance could be examined in three areas in which green finance solutions are developed:

A) Preventing finance in illegal actions or to use a feeble implementation

The ineffective implementation of environmental, economic, and social policies and regulations can lead to social conflicts and market disruptions, resulting in financial losses for lenders and investors, as well as ongoing economic risks. In this context, green finance is viewed as a critical component of effective governance and integration. It is essential to adopt necessary legal requirements to address the weaknesses in environmental laws and regulations.

B) Opening opportunities for green investments

In many countries, opportunities for green financing, such as renewable energies, energy efficiency, agricultural development, and productivity of small and medium enterprises (SMEs), as well as insurance markets, are potentially acceptable from a business point of view. However, due to the obstacles of demand for investments (unpreparedness of enterprises, absence of assets registration, lack of sufficient knowledge, corruption, political uncertainties) or obstacles in supply (lack of accountability by finance institutions, short-term, lack of credit information, failure to seize the opportunities), they are not satisfied in terms of finance.

C) Solutions to business problems

Many developing countries are under tension due to the need to expand electricity supply and reduce fossil fuel intensity. Also, the financial sector of small and medium enterprises is an area in which unnecessary approaches may lead to a reduction in total loans, higher rates of non-performing loans, and financial instability.

1-4. Green Finance in Islamic Countries

The primary objective of the Islamic financial sector is to promote sustainable development by upholding principles of fairness, equality, and ethics, while also focusing on long-term benefits and engaging in activities that serve the public good (Karina, 2019). Given concerns about environmental pollution and damage, the Islamic financial industry is increasingly seen as a viable solution for fostering sustainability. Its potential to attract new sources of financing, particularly those not fully utilized by traditional green finance, is gradually becoming recognized as a significant value proposition. This strengthens the rationale for incorporating green elements into Islamic financial resources.

In light of Islamic finance's commitment to supporting sustainable development, the Supreme Security Council, in collaboration with the World Bank and the IOSCO Asia and Pacific Group, recently held a one-and-a-half-day meeting titled "Harnessing Islamic Finance for a Green Future." This meeting focused on solutions for leveraging Islamic finance to address environmental changes while promoting moderation and diversity. Discussions included utilizing Islamic financial tools to finance sustainable power and energy proficiency. This event marked the second collaboration between the Supreme Security Council, the World Bank, and the International Organization of Securities Commissions (IOSCO) as co-organizers (Pathan et al., 2023).

1-5. Role of Government and Private Sector in Financing Green Economy

Government

Governments should establish effective, predictable, and environmentally proactive policies to minimize market failures and promote accelerated green finance. They can implement comprehensive policy packages that include environmental regulations, pricing mechanisms, and financial policy adjustments. Additionally, interventions that support the greening of financial markets are achievable through:

A) Creating smart and efficient motivational systems to hasten green finance

B) Applying limited effective public facilities

C) Supporting coordination, capacity building, and provision of information.

Private Sector

The private sector is the most important mechanism in national and local economies, enjoying high-quality facilities and high potential, playing a key

role in creating business in the transition to a green economy. The growth of green financial markets is an emerging opportunity for private sector investors and project developers. Billions of dollars of additional capital are needed to fill the financing gap in order to safeguard the world's valuable ecosystems; in such a context, private sector investment could be the main source of such funding.

Public Private Partnership

Developing platforms of economic growth is inevitable for all countries; nevertheless, limited resources and an ineffective public sector are barriers to achieving the desired development. Therefore, governments nowadays try to make policies, to direct and supervise in their governance, and entrust the management of a variety of affairs to the non-public sector. Also, the experience of world countries shows that Government and private sector partnership programs, which are generally referred to as "cooperation between the government and economic enterprises for development," are a suitable option. There are various methods for the partnership of the private and public sectors. Private sector's partnership in operation and maintenance, design and construction, turnkey delivery of project, implementing development and operation plan, hire purchase, gradual privatization, leasing, development, operation or purchase, construction, transfer, commissioning; construction, ownership, commissioning, transfer, and construction, ownership and commissioning are among public-private partnership methods in supplying public goods.

Chapter Two

The Role of Banks in The Economy and Green Financing

2-1. Green banking

The banking sector can play a prominent role in the relationship between economic growth and environmental protection by promoting environmentally sustainable, socially responsible, and responsive institutions. Green banking is a tool to achieve sustainable development. By formulating and directing credit policies to prevent the destruction of natural resources, reduce industrial pollutants, support rare ecosystems, increase the productivity of all production factors, and reduce greenhouse gas emissions, banks can be part of the set of economic and monetary policies in the path of sustainable development, which is referred to as "green banking" in banking literature today. The term "green banking" was first introduced in 1970. Its significance grew alongside the emphasis on sustainable development in the 1990s, highlighting both human and environmental aspects while addressing the needs of future generations. However, green banking officially began in 2003, with the goal of protecting the environment. Considering the importance of the topic, the first chapter of this project, which is dedicated to green banking, first explains the concept of green banking and also briefly introduces services, products, and tools. In the following, it also studies the advantages and challenges of green banking and then examines the experiences of Islamic countries such as Bangladesh in this field.

2-1-1. The concept of green banking and its implementation steps

Today, every organization and company adopts a friendly approach to environmental considerations in their activities. The banking sector, in particular, plays a vital role in job creation, wealth generation, poverty eradication, and the promotion of entrepreneurial activities through various social and economic initiatives. In recent years, green banking has garnered significant attention from researchers as a method of providing financial support to conserve energy and protect the environment. The term "green" in green banking primarily reflects a bank's commitment to environmental responsibility and performance in its business operations. Therefore, "green banking" generally refers to banking processes that consider the funding of environmentally friendly projects. In essence, green banking is a type of banking that emphasizes both environmental and social factors in its operations. It signifies the adoption of banking strategies aimed at ensuring sustainable economic development.

Marcel Jeucken (2001) has introduced four stages in the transition of banking to green banking. These stages include defensive banking, preventive banking, offensive banking, and finally green (sustainable) banking, which is discussed in Table 2.1:

Table 2-1: Steps of green banking implementation

Steps	Description
Defensive banking	At this step, banks are not active and resist environmental laws and requirements because they affect the interests of banks. At this stage, paying attention to environmental issues and related costs is one of the avoidable costs.
Preventive banking	Due to various forces such as pressure from governments, non-governmental organizations, society, etc., banks includes environmental issues and risk management activities in their daily business activities.
Offensive banking	At this step, in addition to internal activities, banks also consider environmental issues in their external activities. At this stage, banks are marketing environmental projects and developing them.
Green banking (sustainable)	At this step, all bank activities are stable. Despite the high profits, banks do not invest in environmentally destructive businesses. The main motive of banks is not to obtain the highest rate of return, but the most important motive is to obtain the highest sustainable rate of return. Some examples of these banks are: Triodos Bank in the Netherlands and Co-operative Bank in England.[1]

1 KANAK,etc (2015)

2-1-2. Indicators of a green bank

A bank can take various paths to preserve the environment, some of which are given below.[1]

- Paying attention to the preservation of the environment in the payment of facilities

Among the types of facilities in the field of environment, it is possible to provide facilities and loans for production units in compliance with environmental issues, provide facilities and loans for the provision of standard cars in order to prevent the entry of non-standard cars, provide facilities for the provision of public vehicles, and provide facilities for the reconstruction of buildings over 25 years old.

- Creating bonuses for green depositors

Every economic activity requires a bank deposit. By creating special services, banks can provide facilities to depositors who somehow provide their deposit balance while preserving the environment. For example, if a large organization places its deposit with the bank and this organization pays attention to preserving the environment in its activities, the bank can motivate other organizations that have not yet put environmental protection on their agenda by providing special services to encourage the environmentally friendly organization.

- Investing in environmental projects

Banks, among the leading industries, have moved towards green banking by making appropriate arrangements. Meanwhile, one of the main missions of banks is to collect small deposits and make large investments. If the bank considers the preservation of the environment during the analysis of an investment, this investment will benefit the environment in addition to the bank's profit.

- Informing about environmental protection

Big banks have branches in all streets, cities, and villages, and many people visit bank branches, bank websites, etc., so banks, due to their presence in all areas of society and communication with all people, can inform and affect many people in the field of environmental issues. Since people's relationships with banks are formed on the basis of "trust," this work can make positive use of people's trust in the bank to increase their awareness, while increasing people's trust in the bank by observing the bank's participation in informing about a positive matter.

1 Lalon, Raad Mozib. (2015)

- Creating a culture of environmental protection in all branches of the bank

Banks should make environmental protection a culture by creating environmental protection thinking among their managers and employees and going beyond paper instructions. In fact, the ideal state for a green bank is a state where there is a culture of environmental protection among all people and departments in such a way that there is no need for laws and guidelines. Among the measures taken by banks, we can mention the culture of green banking. Among these cases, we can mention the reduction of fees in case of using banking services in electronic form, advertising of green banking, and promotion of green life in other dimensions to customers.

2-1-3. Advantages and challenges of implementing the green banking system

Today, in the world, the banking system, along with other institutions, is responsible for the restoration and protection of the environment, and the expectations of the environmental groups in the world from the banking system have emerged not as a voluntary action but as a mandatory social duty. In general, the benefits of green banking can be studied in three areas, as shown in Figure 1-2.

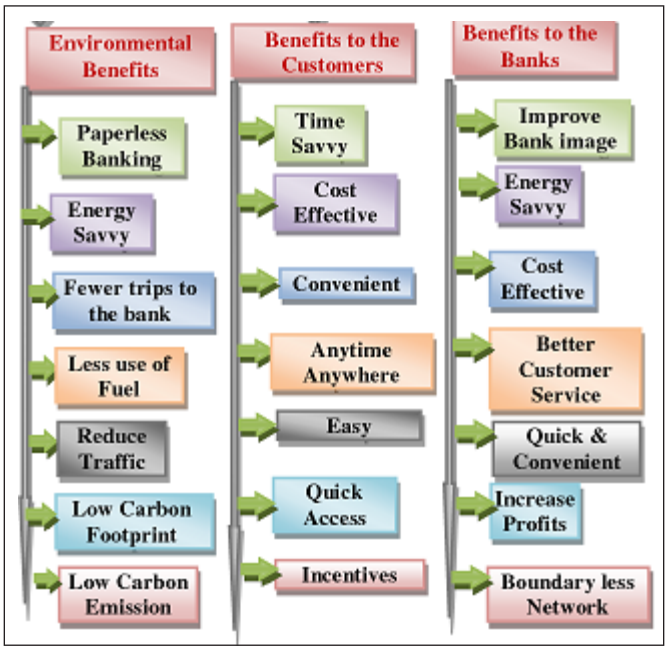


Figure 2-1: Benefits of green banking

Source: Gobinda Deka (2015)

In general, green banking operations in different countries have faced significant success. However, it faces problems and challenges, the most important of which can be summarized as follows:

- Green banking and environmental risks

Banks are always exposed to risks related to the environmental process, which can put them at risk of losing reputation and profit. Banks may not be able to recover the money they have paid to finance their customers; consequently, they may face credit risk or risks related to the bank's reputation. Therefore, the risk to banks from commercial lending activity is high. In addition to the debts arising from the bank's own operations, banks face significant risks related to their lending activities. These risks include the possibility that borrowers may default on their loans, a reduction in the value of collateral, market fluctuations due to environmental concerns, and a decrease in the banks' creditworthiness.

- Negative environmental effects of banks

Banks and the environment are closely related. On the one hand, environmental risks can create challenges for banks and lead to economic losses. On the other hand, banks can directly or indirectly have positive effects on the environment. It may seem that banks have no direct impact on the environment, but this is not true. The important role of banks in developing financial projects and their environmental impacts should not be overlooked. The types of environmental effects of banks are divided into two categories:

A) Internal environmental effects of banks

The direct effects of banks are related to their internal operations that may lead to increased greenhouse gas emissions, such as energy consumption from lighting, use of computers, ATMs, water, waste disposal, and business trips. The direct effect of energy, waste, and paper of banks on the environment is much less compared to other sectors, but since the size of the banking sector is large, their effect on the environment as a whole sector cannot be ignored.

B) Environmental external effects of banks

2-1-4. Green banking services and products

In the green banking system, there are efficient and effective tools that minimize the impact of negative effects on the environment. Among these tools, the following can be listed:

A) Green credit

If banks promote green credit as a strategy and thereby promote concepts related to green credit, including resource efficiency, environmental protection, and sustainable development; support green growth economies, low-carbon economies, recycled models, and businesses through innovation; and manage environmental and social (E&S) risks, the result will be optimizing the credit structure and strengthening credit policies and related processes, improving services, and contributing to the transformation of the economic growth model.

B) Green loan

A green loan means giving a loan to a project or business that is environmentally sustainable. Of course, providing banking facilities for the creation and expansion of green projects requires the creation of a specialized banking network to cover the cost of financing green projects and reduce the risk of green financing by providing targeted services.

C) Green mortgage

The green loan for the purchase of housing, or the loan for the purchase of housing with the ability of productivity and energy management, with an interest rate significantly lower than the market rates, is given to bank customers as an incentive factor. This loan is given to customers who buy houses with energy efficiency and take measures to strengthen the houses and provide equipment with energy efficiency and renewable energy. Banks can also pay green loans for housing purchases by taking into account the costs of changing the energy consumption technology of homes from conventional systems to renewable methods.

D) Green car loan

A green car loan is another part of green banking activity, which can bring many benefits to the environment by encouraging customers to buy dual-fuel vehicles or vehicles with environmentally friendly fuel and powered by solar batteries. Green car loans are primarily used in Europe and Australia, offering lower interest rates compared to traditional car loans.

E) Green Certificates of Deposits

Green Certificates of Deposits are new certificates that use money invested in energy efficiency in professional environmental projects. Most of the money from certificates of deposit is used to finance various solar energy projects. The maturity of these certificates of deposit is between one and two years, and they pay a higher interest rate than regular certificates of deposit to attract new investors.

F) Green credit card

The green credit card, which is issued by many credit card companies to environmental non-governmental organizations, takes about 1.5 percent of each transaction, whether money transfer or a cash purchase made by the cardholder, as financial aid for associations. Credit cards typically have an annual percentage rate (APR) of 15 to 22 percent, and many have an annual subscription fee. The Visa Green Credit Card, which is only available in the Netherlands, is the first credit card in the world that offers a unique program to clean up environmental pollutants. The goal of this program is to clean up all the greenhouse gases caused by production.

G) Green personal deposit account

Another activity related to environmental benefits is the innovation of providing annual financial assistance to programs for maintaining environmental stability and energy based on the deposit accounts of individuals. For example, in Australia, a green deposit account has been created, which is of special interest and support. Customers of a bank in Australia called Westpac are encouraged to directly support local farmers and the Sustainable Agriculture Program by opening a Land Conservation Deposit Account.

H) Online banking

Online banking is the easiest tool for green banking and helping the environment. Online banking saves money. In this way, customers can save money and pay their expenses on time, avoid standing in line, and save time by paying bills from home through the Internet.

2-2. Reviewing the experiences of different countries in greening the banking system

Taking advantage of the experiences of Islamic countries can have a useful and major contribution in modeling and implementing solutions to make the best possible use of the country's potential. Therefore, in this section, after examining the experience of different countries regarding green banking based on various indicators presented in the table below, the experience of green banking in Bangladesh as a developing Islamic country, which according to a certain rule in its vision and mission, has played a special role in green banking with the aim of moving towards low-carbon green development without harming economic growth and social development, is investigated. In the field of green banking, the group of Islamic countries that are members of the Sus-

tainable Banking Network (SBN), including five emerging nations, are active in promoting green banking with the aim of improving social and environmental conditions. In short, the experience of these countries shows that countries active in the field of green banking face challenges in formulating their strategies, including defining and measuring sustainable banking, obstacles to sustainable banking in the way of the main business of banks, creating business drivers for sustainable banking, and improving the flow of information to create banking. Also, based on these experiences, it was stated that in order to successfully implement green banking, it is necessary to consider the issue of risk management in terms of environmental and social indicators (E&S) in the lending operations of banks, as well as how banks lend to environmentally friendly businesses, so that the financial stability of the country does not suffer in this process.

In general, it can be stated that in order to select Islamic countries to examine their experience in implementing green banking, according to table 2.2, the green banking system of 5 countries, Bangladesh, Indonesia, Morocco, Nigeria, and Türkiye, n terms of environment, society, risk management, lending process, policy (regulatory instruction), industry leadership, and mixed leadership (industry leadership and policymaking) have been studied. The results show that 5 countries considered factors such as environment, society, risk management, and lending processes in greening the banking system, but in terms of policy (regulatory instructions), only Bangladesh, Indonesia, and Morocco succeeded.

In terms of industry leadership, Türkiye was also active, and in the mixed field (industry leadership and policy making), only Nigeria was active. In this regard, there are also scales for the performance of green banking, including banking, expanding the financial sector, improving information and consultation, a national sustainable financial development roadmap, developing a specific roadmap for sectors, inter-firm cooperation, capacity building and coordination, capacity building for FIS, information disclosure requirements, supervision by the regulatory body, monitoring and evaluation, marketing incentives for green lending, and incentive awards, examined in these countries.

In a general summary, it can be said that most of these countries have used the mentioned scales, and only Türkiye has performed poorly compared to other countries. Finally, on this basis, among the emerging and developing Islamic countries, the experiences of Bangladesh and Pakistan were further investigated.

Table 2-2: Summary of dimensions and indicators included in the implementation process of green banking in different countries

	Bangladesh	Indonesia	Morocco	Nigeria	Türkiye
environmental	X	X	X	X	X
social	X	X	X	X	X
Risk management	X	X	X	X	X
Lending process	X	X	X	X	X
policy (regulatory instruction)	X	X	X		
Industry leadership					X
Mixed (leadership in industry and policy making)				X	
Scale					
Banking	X	X	X	X	X
Expansion of the financial sector		X	X		
Improving information and advice	X	X	X	X	X
National sustainable financial development roadmap	X	X	X	X	X
Development of a road map specific to the departments	X	X		X	
Inter-firm collaborations	X	X	X	X	
Capacity building and coordination	X	X	X	X	
Capacity building for FIS	X	X	X	X	X
Disclosure requirements	X	X	X	X	X
Supervision by the regulatory body	X	X	X	X	
Monitoring and evaluation	X	X	X	X	X
Marketing incentives for green lending	X	X	X	X	
Incentive awards		X		X	

2-2-1. The experience of Bangladesh

A) Status of green banking in Bangladesh

Among the countries, Bangladesh is the most vulnerable to climate change and faces many environmental problems, such as air pollution, water pollution, water shortage, deforestation, and loss of biodiversity. For this reason, environmental sustainability and resilience are essential for a developing country like Bangladesh. Climate change is a key element of socio-economic development; that's why Bangladesh Bank started green banking activities in 2011.

This bank is the first central bank in the world to play a special role in green banking, according to a specific rule in its vision and mission. The authorities of this bank developed a green banking policy on February 27, 2011 through the application of various innovations in green activities. The purpose of which is to provide detailed guidelines for all commercial banks to adopt green banking policies to protect the environment and ensure sustainable banking activities. Considering the adverse effects of climate change and advanced measures around the world, the Bangladesh Bank has shown a deep commitment to the vision of a green world through green initiatives. Bangladesh Bank's green activities focus on domestic and non-domestic activities. The term "in-house activity" refers to internal or office building-bound activities related to network expansion, office automation, green day-to-day activities, etc. In the field of e-commerce, in order to provide services to customers, banks have covered online banking facilities, including bill payment, money transfer, and exchange at the local level through the Internet. On the other hand, the Bangladesh Bank has taken a major step in encouraging and implementing IT-based advancement in the overall banking sector. The movement in green banking has been noticed since 2013. This year, nine new green banks were introduced, which are known as the fourth generation of banks. According to the studies, Bangladesh Bank is expected to be among the leading Asian countries in 2050 in terms of financial well-being and social and environmental responsibility.

B) Objectives of Bangladesh Green Banking

The main objectives of green banking in Bangladesh are to move towards low-carbon green development without compromising rapid economic growth and social development. The aim of the Central Bank of Bangladesh in green banking is to provide financial support in efforts to increase energy efficiency, reduce carbon emissions, and other environmental pollution caused by energy

consumption. In addition, it is expected that this institution will take measures to reduce the country's dependence on foreign energy sources, combat climate change, and create more jobs by providing clean energy production facilities.

Other goals of this institution are:

- Avoiding the creation of waste and prioritizing the environment and society

- Focus on environmentally friendly initiatives through financial innovation and ensuring sustainable development.

- Using organizational resources by accepting their responsibility

- Minimizing the use of paper as much as possible inside and outside the bank.

C) adopting policies in the field of green banking

According to the experiences of green banking in the country, the strategic framework and policy of green banking for banks have been designed in the following way:

Stage I

Policy-making and governance rules

The bank should set general rules and adopt green banking strategies and policies through the board of directors. In the case of Bangladeshi banks, a powerful committee including some of the directors of the board of directors has been formed, and in the case of foreign banks, a powerful committee including the regional head of the global office and members of senior managers, including the CEO, can take the responsibility of reviewing environmental policies, strategies, and plans. Banks are required to establish a separate green banking unit or a unit that takes responsibility for designing, evaluating, and managing green banking matters. The senior executive officer must take responsibility for the administration of the unit. This unit periodically submits its report to the main committee (a powerful committee).

- Including environmental risks in the core risk management

In order to comply with green banking policies, banks must follow the guiding principles of environmental risk management (ERM). The bank should use environmental risks and climate change as part of the existing credit risk method to evaluate the borrower. This includes considering environmental risks in checklists, audit guidelines, and reporting templates. This helps to be checked in the Environmental Due Diligence Checklists (EDD) for environmental hazards caused by its sources, such as climate change (storms,

droughts), animal diseases/pathogens such as bird flu, solid wastes such as food waste, animal waste, animal carcasses, sediments, sewage discharge, hazardous materials, etc.

- Implementation of environmental management inside the bank

Banks must provide data on how much water, paper, electricity, energy, etc. is consumed by their offices and branches. Then they should take the necessary measures to save electricity, water, and paper. In order to efficiently use electricity, water, paper, and recycling equipment, a "green office" manual or at least a set of general instructions should be provided to employees. Instead of relying on printed documents, online communication should (where possible) be used extensively for administrative management, and ensure that printers are set up for double-sided printing to save paper. Banks should use small fonts and waste paper for drafts to reduce ink consumption and avoid disposable cups. They should also install electronic equipment such as lamps, coolers, fans, and automatic computer switches with high energy efficiency and plan solar energy in their place to save electricity. They should also replace natural lamps with energy-saving lamps in bank branches and offices. For optimal use of energy and reducing fuel consumption, the bank should encourage employees to use low-consumption cars.

- Introduction of green financing

For the bank, financing eco-friendly economic activities and industries with high energy efficiency has a higher priority. Environmental infrastructure, such as renewable energy projects, clean water supply projects, wastewater treatment facilities, solid and hazardous waste disposal facilities, biomass-based power plants, and biofertilizer production plants, should be encouraged and financed by the bank. It can also be used to encourage customers to give loans in cases of environmentally friendly performance.

- Establishment of a climate risk fund

The bank should finance economic activities in areas prone to storms, floods, and droughts at normal interest rates without charging additional fees. However, to establish a climate change risk fund, banks must assess environmental risks when financing sectors in different regions. This measure is intended for emergency situations. In this way, the bank ensures a steady financial flow to these vulnerable areas and sectors. The fund can be regarded as part of the bank's corporate social responsibility expenses.

- Introduction of green marketing

Green marketing is the marketing of products that do not seem to harm the environment. Green marketing includes a wide range of activities, including product modification, production process changes, packaging changes, and advertising modifications. This refers to the process of selling products and/or services based on their environmental benefits. The product or service may be environmentally friendly in itself, or its production or packaging may be environmentally friendly. Green marketing is expected to help develop awareness among the common people.

- Online banking

Online banking makes it possible to conduct banking transactions or bill payments through the Internet in a secure environment. Banks help the environment by eliminating paper waste, reducing fuel consumption and carbon emissions, and reducing printing and postage costs.

- Supporting employee training, consumer awareness, and green events

Developing employees' awareness and training them in the field of environmental and social risks and related issues should be a continuous process and part of the bank's human resources development. Developing the awareness of consumers and customers should also be placed in the public relations department as a continuous activity of the bank.

- Report on green banking activities and disclosure

Banks should report initiatives/activities to the Bangladesh Bank and publicize them on their respective websites.

Stage II

- Environmental policies specific to each economic sector

Banks need to prepare strategies for designing specific policies for environmentally sensitive sectors such as agriculture, leather, fisheries, textiles and clothing, renewable energy, paper, sugar, and dairy factories, construction and housing, engineering and basic metals, materials, chemicals (fertilizers, pesticides, and pharmaceuticals), rubber and plastic industries, hospitals and clinics, chemical trading, brick production, etc.

- Green strategic planning

The bank should determine the goals that it wants to achieve through strategic

planning. The bank should determine the set of achievable goals and strategies and publish them in the annual reports and websites of green financing and operation of the bank's environmental management department. For the operation of the bank's environmental management, the goal should include the amount of energy efficiency in the form of using renewable energy, reducing electricity, gas, and gasoline consumption, reducing greenhouse gas emissions (GHG), issuing electronic declarations, electronic payment of bills, saving paper, environmentally friendly buildings, etc. Regarding green financing, the goal should include reducing loans for some activities harmful to the environment, as well as allocating a certain percentage of loans to environmentally friendly activities and providing environmentally friendly financial products.

- Creating green branches

The green branch should make maximum use of natural light, renewable energy, energy-saving lamps, etc., and reduce water and electricity consumption, and use recycled water. Such a branch of a bank is called a "green branch." A green branch will be allowed to display a special symbol approved by the Bangladesh Bank. The criteria for issuing "Green Branch" certification will be announced by Bangladesh Bank within a certain period of time.

- Improving the performance of the environmental management department

The strategies of reuse, recycling of materials and equipment, resource reduction, and waste reduction and resource use should be part of the environmental management of the second phase. Banks should conduct more virtual meetings in the form of video conferences (instead of physical travel) in order to save money and energy.

- Setting up the environmental risk management plan and guiding principles

In order to evaluate and monitor working capital projects and loans, the bank must follow the environmental risk management guidelines. In addition to complying with national regulations, the bank may even consider higher environmental standards that are internationally acceptable. In this regard, the green initiatives of a group of banks will not only be effective but will also bring a competitive advantage. The consensus of banks can lead to the creation of standards and guiding principles to improve green banking methods.

- Detailed programs for training customers

Customers should be encouraged and influenced by environmental laws and perform environmental activities in line with the efficient use of resources. Banks should implement detailed programs to educate customers.

- Disclosure and reporting of green banking activities

Banks should publish independent green banking reports regarding past performance, current activities and future plans. Detailed and up-to-date information on banks' environmental activities and the performance of major customers should be disclosed.

Stage III

- Designing and introducing innovative products

In addition to avoiding the negative effects on the environment caused by banking activities, banks are expected to introduce innovative green products that are friendly to the environment in order to solve the main environmental challenges of the country.

- Report in standard format with the approval of the supervisor outside the bank.

In order to report to their shareholders, banks should prepare their independent annual green report based on internationally accepted formats, such as the format prepared by "Global Report Initiatives." Arrangements should also be made for the verification of these publications by an independent institution or an acceptable third party.

D) Green banking areas in Bangladesh

Success in innovation and product flow of green banking and facilitating the provision of demand-based services depends on 4 factors: operational area, business perspective, technological advancement, and customer acceptance. These factors are shown in Figure 2-3:

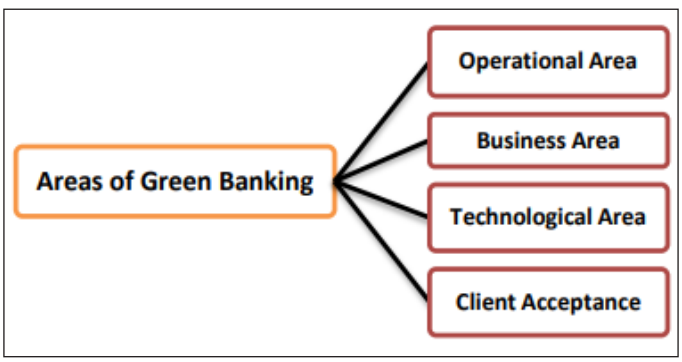


Figure 2-2: Areas of green banking in Bangladesh

Source: Sanjoy Pal, Aminul Haque Russel (2015)

§ Operational area

This area includes maintaining the internal policy of green banking and implementing this issue in its operational processes, such as using the back of printed pages, which minimizes the cost of the branch.

§ Business area

This area is for supporting banks and other non-banking financial institutions. Therefore, supporting other business organizations creates a stronger business community to make the country a better place to live. Business initiatives can be highly regarded by the international community.

§ Technology field

The whole world today is moving in the direction of technology. Technological advancements of different dimensions have brought different nations together under one roof. Green finance is the right hand of industrialization. The industry leads to river pollution by creating a lot of toxic waste, just as brick making creates a lot of smoke, green banking makes it possible to produce bricks using advanced technologies.

§ Receiving customers

Customers accept products that are not harmful to them. Green banking is trying to reduce the consumption of paper that is associated with cutting down trees, reducing oxygen, and increasing carbon dioxide. Therefore, the activity of green banking is through raising public awareness in matters that customers accept more.

D) Green banking experience in Bangladesh

The chart below shows the actual performance of Bangladesh. Green banking is currently being used internally and service-oriented by financial institutions. Services in one category include online banking, internet banking and mobile banking, and in another category, in the form of loan payments. Internal methods are used in the form of ATM systems and branches using solar energy to generate electricity for official and service purposes.

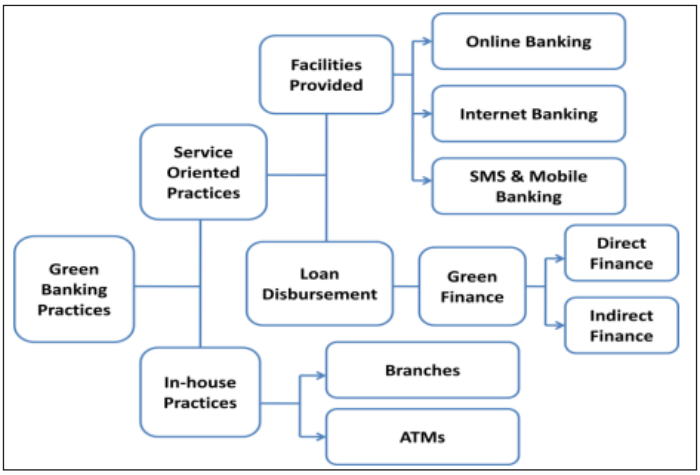


Figure 2-3: Application methods of green banking in Bangladesh

Source: Sanjoy Pal, Aminul Haque Russel (2015)

o Indicators to analyze the trend of green banking in Bangladesh

Based on the latest information from the Central Bank's[1] 2023 quarterly reports on green banking, five indicators have been selected to analyze the trend of green banking, which are classified as follows[2]:

1) Total number of branches

2) Number of online branches

3) Number of branches with solar energy

4) Number of accounts using internet banking

5) Number of ATMs with solar energy

Based on this, in the following, the mentioned indicators will be explained in six banks of Bangladesh:

1) Total number of branches

In general, banks are service-oriented and focus on customer demand. Cus-

1 Quarterly Review Report on Sustainable Finance of Banks & Finance Companies 2012-2023

2 In order to better evaluate the development process of banking institutions in the path of green banking, in the mentioned report, the process was examined with the help of participants. For this purpose, the participants were selected as follows from six categories of financial institutions in order to achieve the best results: § State Commercial Banks (SOCB)
§ Stock Commercial Banks (SCB)
§ Specialized Development Banks (SDB)
§ Private Commercial Banks (PCBs)
§ Foreign Commercial Banks (FCB)
§ Islamic Sharia-based banks (ISB)

tomers deposit their money in the bank to withdraw it whenever they need it. According to the information of Bangladesh Green Banks, Chart 2.1 shows the total number of branches in quarterly form in 2023 and the first quarter of 2024. Private commercial banks have the most branches. The total number of branches of this bank in July to September 2023 was 5,986, which, of course, faced a decrease in the first quarter of 2024 and reached 4,223 branches. Meanwhile, state-owned commercial banks are in the next rank in terms of the number of branches. Throughout the entire period under review, foreign commercial banks maintained the fewest branches, totaling 69.

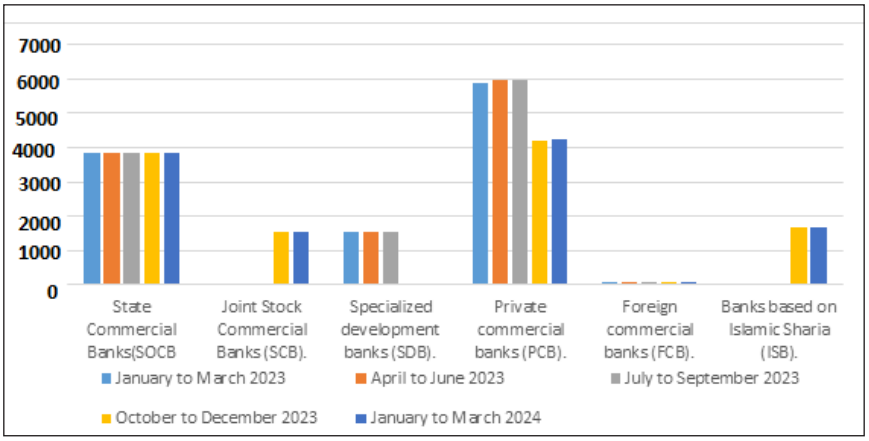


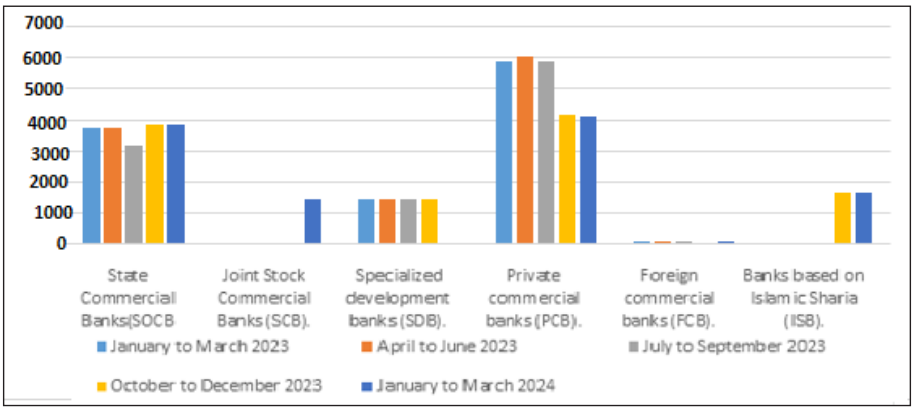
Figure 2-4: The total number of branches in the green banking system of Bangladesh 2023 to the first quarter of 2024 (Quarterly)

Source: Quarterly Review Report on Sustainable Finance of Banks & Finance Companies 2023&2024

The comparison of the total number of bank branches between the first quarter of 2023 and the first quarter of 2024 indicates that state commercial banks and private commercial banks have a higher total number of branches than other types of banks during the review period. Notably, private commercial banks showed the strongest performance. They had 5,881 branches from January to March 2023, which marked an increase from 4,223 branches during the same period in 2014. Meanwhile, state commercial banks had 3,824 branches in January to March 2023, which increased slightly to 3,833 branches in January to March 2024. Foreign commercial banks are in a weaker position, as evidenced by their branch numbers. Overall, the total number of bank branches rose from 11,297 in the first quarter of 2023 to 11,345 in the first quarter of 2024.

2) Online branches

Today, with online banking, people can deposit money at any time and withdraw it from any ATM. Online banking has also reduced the use of paper and the need for human resources. Chart 2.2 displays the number of online branches of Bangladesh Green Banks by quarter for 2023 and the first quarter of 2024. Both private commercial banks and public commercial banks performed significantly better than other types of banks. Notably, private commercial banks had their highest performance between April and June 2023, with a total of 6,032 online branches. In contrast, foreign commercial banks had the lowest number of branches during the third quarter of 2023, totaling just 56 branches. Meanwhile, the number of specialized development bank branches remained steady at 1,421 branches during this period.



Figurre 2-5: The number of online branches in the green banking system of Bangladesh from 2023 to the first quarter of 2024 (Quarterly)

Source: Quarterly Review Report on Sustainable Finance of Banks & Finance Companies 2023&2024

In the green banking system of Bangladesh in the period under review, the number of online branches has increased from 11,107 in 2023 to 11,073 in 2024, which shows a decrease of 34 branches. In the meantime, according to Chart 2.2, private commercial banks have performed best in online banking. However, it has increased from 5,865 branches in the first quarter of 2023 to 4,110 branches in the first quarter of 2024. After that, state-owned commercial banks allocated 3,752 branches out of 3,824 branches to online banking in 2023 from January to March, reaching 3,838 branches in the first quarter of 2024, which is equal to the total number of branches in this period. In 2024,

the share of online banking branches has increased greatly and shows a great performance in providing online facilities to customers.

3) Branches with solar energy

Solar energy is known as one of the most widely used energy sources in the world, and it reduces greenhouse gas emissions and reduces dependence on non-renewable energy sources. For this reason, many countries, including Bangladesh, use it in the green banking system. Chart 2.3 shows the solar-powered branches seasonally in Bangladesh Green Banks in 2023 and the first quarter of 2024. Private commercial banks had a remarkably high performance compared to other banks, and during the period under review, with 624 branches, they had the most solar energy branches in the second quarter of 2023. Still, foreign commercial banks had the weakest performance.

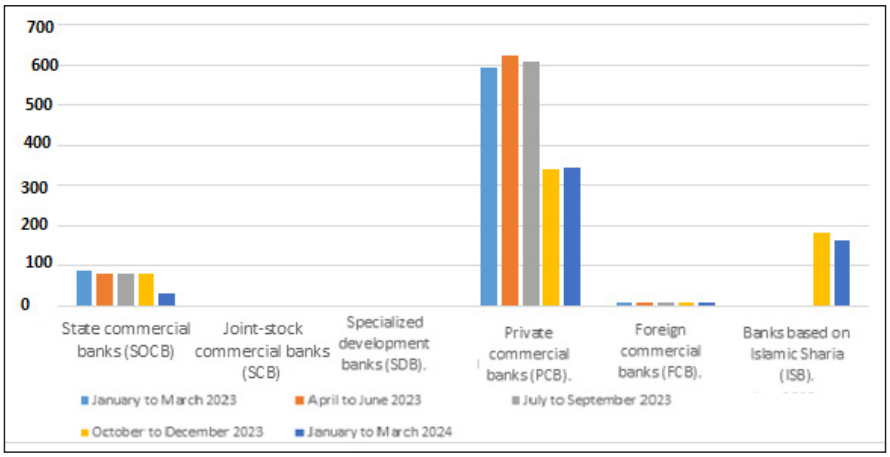


Figure 2-6: The number of branches with solar energy in the green banking system of Bangladesh from 2023 to the first quarter of 2024 (Quarterly)

Source: Quarterly Review Report on Sustainable Finance of Banks & Finance Companies 2023&2024

The number of bank branches that work with solar energy has increased from 688 branches in the first quarter of 2023 to 548 branches in the first quarter of 2024.

4) Internet banking

Internet banking is slightly different from online banking. This difference is in providing "banking facilities using the client's personal computer."

The password is given to the customer, and They can change the password without going to the branch. They can view the daily balance and print the relevant invoice. This facility minimizes the use of paper and time.

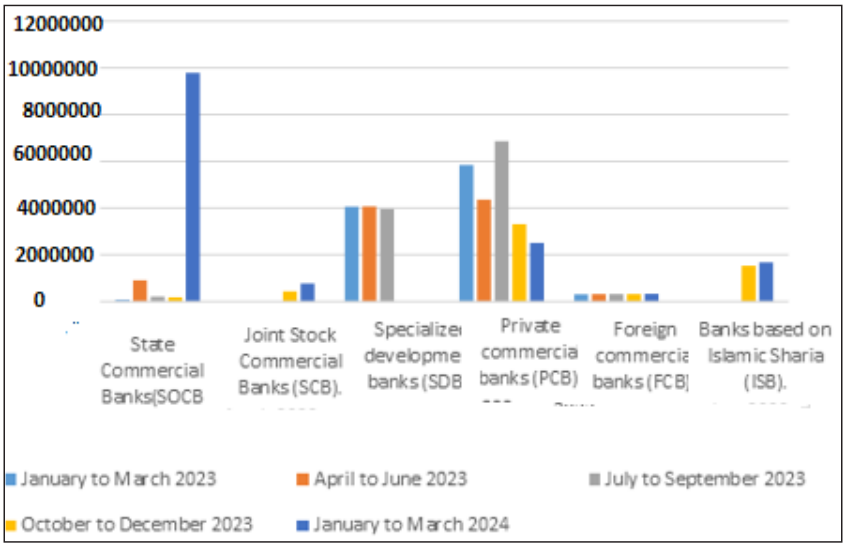


Figure 2-7: Total number of bank accounts with internet bank accounts in Bangladeshi banks from 2023 to 2024

Source: Quarterly Review Report on Sustainable Finance of Banks & Finance Companies 2023&2024

In the first quarter of 2023, there were 910,066 user accounts utilizing internet banking in state-owned commercial banks. By the first quarter of 2024, this number had risen to 9,785,972 accounts. Notably, private commercial banks accounted for the majority of internet banking accounts during this period, although there is a clear downward trend in the creation of such accounts.

Solar ATMs

Chart 2.5 illustrates the number of ATMs powered by solar energy from the first quarter of 2023 to the first quarter of 2024. In the fourth quarter of 2023, state-owned commercial banks operated 571 solar-powered ATMs, which was the highest count of such devices during the review period. Throughout the nine months of 2023, private commercial banks utilized 63 solar-powered ATMs. This number increased to 141 between October and December 2023, and further rose to 150 in the first quarter of 2024.

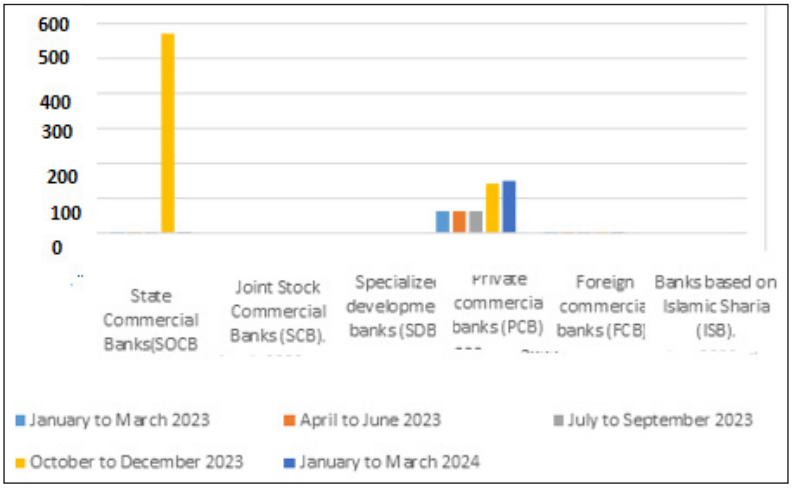


Figure 2-8: Number of ATMs with solar energy source from the first quarter of 2023 to the first quarter of 2024

Source: Quarterly Review Report on Sustainable Finance of Banks & Finance Companies 2023&2024

F) Proposed Initiatives for Bangladesh Banks to Enhance Sustainable Green Banking

1. New and emerging opportunities

1.1. Green commercial properties

The purpose of this department is to enhance the range of products and services in line with the growth of the green commercial building sector in Bangladesh, particularly during this period of significant expansion. Currently, the real estate sector in Bangladesh is one of the most attractive investment opportunities. However, increasing urbanization presents a serious challenge for the country. It is projected that by 2025, approximately 50% of the Bangladeshi population will live in urban areas, leading to a substantial shortage of housing in these regions. To address this issue, when new buildings are needed, the Bangladesh Bank can offer incentives for the development of approved green buildings. The "Energy Management and Environmental Design" institution has announced construction criteria that are more appropriate for the economic and social conditions of the country. It is essential to maintain the policy lever of voluntary building production, which is responsible for the green construction rating system, the approval of new constructions, and the provision of educational and research programs that align with the institution's criteria.

1.2. Entering the carbon market

Investment in carbon markets is growing. Carbon market products and services are developing rapidly. Especially among Asian, European, and Japanese banks, many banks consider climate change to be the most important environmental issue they face.

If someone is willing to take risks and engage in market-making, Bangladesh offers a promising opportunity to invest in both regional and global emissions trading markets. Understanding how to identify and evaluate future revenue streams from greenhouse gas trading will enable Bangladeshi groups to better capitalize on suitable project financing opportunities. Additionally, a bank that educates its shareholders and employees about the complexities of the carbon market can enhance its reputation while effectively identifying and pursuing future opportunities in this market.

1.3. Clean technology

In the coming decades, leveraging opportunities in clean energy and environmental technology will require innovative financing solutions. Global investment in clean-tech companies saw rapid growth in 2006, driven by an increased focus on the environmental sector. Clean technologies encompass a wide range of areas, including recycling, renewable energy sources (such as wind, solar, biomass, hydropower, and biofuels), information technology, green transportation, electric motors, green chemistry, and energy-efficient lighting, among others. These technologies aim to generate electricity and fuel while minimizing environmental impact and reducing pollution.

2. The opportunity to be a pioneer

Considering the value of carbon neutrality is essential when selling products and services to customers. Carbon neutrality, or having a zero carbon footprint, refers to achieving zero carbon emissions through the measured amount of carbon released with an equivalent amount of compensation or the purchase of enough carbon credits to offset the difference. Neutralization is used in carbon dioxide emission processes related to transportation, energy production, and industrial processes such as carbon neutral fuel production. Carbon neutrality, in the case of a product or level of activity, has become an accepted practice for many organizations and individuals, while representing unparalleled opportunities for product development in the retail banking space.

3. Opportunities arising from stakeholder coordination

3.1. Producers

Banks' cooperation with contractors and manufacturers to provide green financing products introduces them to the entire product value chain, from beginning to end. This enables the bank, while strengthening the relationship between the customer and the institution, to design the product according to the needs and long-term goals of its customers.

3.2. Government

The bank should regulate the development of green financing products and services according to the country's environmental or energy policies, goals, or incentives. Collective government/private sector environmental and economic goals will help share risk and resources between the government, the bank, and solar energy manufacturers and contractors. At the same time, in the participation process, the presence of these different groups will help to spread the key messages of the environment and related products to a wide range of audiences.

3.3. Non-governmental organizations

Banks should collaborate with credible non-governmental organizations or academic groups involved in environmental efforts to create sustainable financial products and services. This can be done through creating friendly relations, contracting complementary items in product packaging, setting up group lessons and training workshops for customers, or developing environmentally friendly criteria in lending.

4. Marketing opportunities and strategies

4.1. "Green" brand

Banks should consider a business structure for green financing products and services. Historically, a number of financial institutions have weakened their brand power. However, this is changing as top executives uncover the intangible brand values. According to the CEO of UniCredit, the brand name is very important and is capable of inducing some internal and external attitudes and behaviors towards the stakeholders (employees, customers, shareholders, suppliers, and local communities). A structured "green" brand approach where global business and brands are on one side and a local brand strategy on the other, while providing confidence in local communities that products are tailored to their needs and desires, plays an important role. It also plays a role in obtaining customer loyalty and attraction. A suitable and consistent brand

name for innovative products and services can play an important role in overcoming knowledge limitations and perceptual barriers that sometimes arise from being "green."

4.2. Stakeholder research

This area is concerned with conducting market research and analysis on environmental issues, as well as customer segment needs and wants. This information is used to ensure which segment of customers is most likely to consider environmental products as a complement to their lifestyle, interests, and financial goals. This data can also be used in a database that is able to provide green options/recommendations (based on customer profile) for those looking for different financial solutions.

4.3. Maximum attraction of stakeholders and marketing

Overcoming perceived barriers and stimulating demand for "green" products is done through creative and educational marketing campaigns. Stakeholder participation and marketing are important to sustain green banking in Bangladesh. The ways of attracting participation and marketing are as follows:

1) Announcing the nomination of the annual green leadership award;

2) sustainable superiority in green power;

3) Market Development Award;

2-2-2. The experience of Pakistan

Green banking, an umbrella term for sustainable banking practices, is particularly notable in Pakistan due to the country's vulnerability to climate change. Integrating environmental responsibility into all banking operations, including lending and resource management, is critical to mitigating climate risks in Pakistan. Green banking in Pakistan is aligned with societal preferences, as customers in the country tend to patronize banks that support eco-friendly initiatives. However, despite these benefits, there are risks associated with reduced attractiveness among customers who are less enthusiastic about green banking activities (Khan et al., 2024). To achieve this, banks in this country offer green financial services such as green credit financing and loans to support environmental companies and projects. Additionally, digitalization and new technologies play a crucial role in reducing environmental impacts by enabling paperless transactions. Given the significance of this issue, we will introduce some prominent and active banks in the field of green banking in Pakistan below:

- State Bank of Pakistan (SBP)

In Pakistan, despite lower CO2 emissions per capita, environmental challenges persist. The role of the State Bank of Pakistan (SBP) in promoting green banking practices and addressing these challenges is very important (Khan et al., 2024). SBP introduced the Green Banking Guidelines (GBG) in 2017, which reflect the banking industry's shift towards climate resilience. The GBG defines responsibilities, management structures, and frameworks for implementation. In this regard, three key issues of environmental risk management, supporting green businesses, and reducing the environmental effects of the banking sector appear (Waqas & Khan, 2024). SBP has made significant progress in understanding the importance of greening Pakistan's financial system (Akram and Rappai, 2023). SBP mandates commercial banks to set environmental exposure limits and works with international bodies to develop standardized green banking frameworks, demonstrating its commitment to environmental sustainability.

- Habib Bank Limited (HBL)

HBL introduces its green products in consulting sessions or customer meetings. The bank shows special attention to certain customers, especially those interested in green savings, such as green funds. Customers' familiarity with HBL's green banking and financing is increasing over time. In terms of technology adoption and digitization, most of HBL's customers have a positive attitude towards digital developments. However, some young and old customers may face challenges in adapting to these changes. Considering the importance of green banking for the main actors of the financial sector, such as HBL, the evolution and adoption of sustainability are emphasized to create wider social changes. Green offerings increase HBL's appeal to existing and potential customers.

- Allied Bank (ABL)

Allied Bank has significantly integrated sustainability into its savings division, using sustainable tools to select investments and offer environmentally friendly products. Although the bank is developing green mortgage and green bond products, these products are yet to be launched (Khan et al., 2024).

Although the customer shows interest in sustainability, awareness of the bank's green offerings remains low. To address this, the bank is enhancing its marketing efforts across various platforms. The business plan includes establishing local offices throughout Pakistan to serve customers who prefer in-person services for convenience and security. Additionally, in areas where

digital solutions are more viable, Allied Bank is expanding its digital services. Recognizing the increasing significance of sustainability, the bank is also strengthening its internal expertise in this field.

- Askari Bank Limited (AKBL)

Askari Bank demonstrates a strong commitment to sustainable and environmentally friendly practices, supported by its dedicated Group Sustainability Team. This team is responsible for overseeing sustainability-related projects and initiatives both within and outside the bank. Their primary focus is to align the bank's operations with environmentally friendly practices, actively working to minimize greenhouse gas emissions and transition towards sustainability. The bank serves three main customer categories: larger companies, smaller companies, and private individuals. Larger companies typically have a higher awareness of sustainability issues. In contrast, smaller businesses may lack the same depth of knowledge and expertise regarding sustainability. However, increasing pressure to adopt sustainable practices is pushing these smaller operations toward greener methods. Private customers generally exhibit some awareness of sustainability; however, they may not proactively seek greener financial options, such as sustainable savings, loans, and investments, unless they inquire about them. This lack of engagement can result from a limited understanding of the banking sector and its connection to sustainability. Askari Bank offers green financial products such as green mortgages and green funds, which are recognized to varying degrees among different customer segments. Larger companies, because of their deeper knowledge, are usually more interested in these offerings compared to smaller businesses and individuals who may be less aware of the breadth of green products available. Sustainability is of considerable importance in Askari Bank. The bank's greener initiatives are primarily aimed at meeting the demands of customers and investors and aligning with global sustainability requirements.

Askari Bank faces various challenges in interpreting green banking and sustainability, but it is committed to actively reducing the greenhouse gas emissions of its customers. Bank employees remain optimistic about Askari Bank's potential to support greener initiatives both locally and globally, leveraging its role as a leading financial institution and investor.

2-2-3. The experience of Türkiye

In Türkiye, banks play an important role in sustainable financing. Addressing climate change and the financial sector was the main focus of the 5th Sustainable Development Forum, which took place on September 29, 2017. Such voluntary organizations demonstrate that the Turkish business and financial sectors have heightened awareness of sustainability. In the field of "sustainable development" banking, these organizations carry out activities such as financing energy efficiency, taking into account environmental and social impacts during lending processes, financial inclusion, financing sustainable agriculture, supporting women's entrepreneurship, etc. Seven banks[1] operating in Türkiye have signed the United Nations Global Compact and agreed to include environmental and social risk assessment as part of the loan evaluation process and include it in their respective policies, as well as projects valued at $50 million and above. For example, Türkiye Sustainable Energy Financing Facility (TurSEFF) is a program created to provide financing for sustainable energy and resource efficiency investments by the public and private sectors. The project was developed by the European Bank for Reconstruction and Development (EBRD).

Conclusion

The Green economy is one of the new approaches in dealing with environmental challenges that can facilitate the realization of sustainable development. The goal of implementing the green economy is to design new and innovative policies based on economic knowledge in order to improve human living conditions. In line with the move towards the green economy, green financing is considered a strategy for the financial sector, which includes the financing of private and public green investments in the fields of environmental services and goods, prevention, minimization and compensation of damages to the climate and environment, ultimately the financing of public policies, and today it has been noticed all over the world. In line with the goals of sustainable development, tools are considered to create a green financing mechanism, and one of these tools is green banking, which plays a vital role in improving the level of environmental sustainability. Considering the importance of this issue, the experiences of different Islamic countries in greening the banking system were reviewed. To select countries and examine their experiences in implementing green banking, the green banking systems of

1 Akbank, Garanti Bankası, ING Bank, Türkiye İş Bankası, Yapı Kredi Bankası, an Türkiye Sinai ve Kalkınma Bankası.

five countries, Bangladesh, Morocco, Nigeria, Indonesia, and Türkiye, were analyzed. This examination focused on various aspects, including the environment, society, risk management, the lending process, policy (regulatory guidelines), industry leadership, and the intersection of leadership in both industry and policy-making. In summary, it appears that most of these countries have utilized the aforementioned criteria, although Türkiye has performed poorly in comparison to other Islamic countries. Additionally, the experiences of Bangladesh and Pakistan were further explored among emerging and developing Islamic nations. Among the effective strategies in the implementation of green banking in Bangladesh is the development and expansion of the financial market and the creation of specialized institutions. Including environmental risks in the core of risk management, reporting green banking activities and disclosing them, and creating green branches are among the important programs and actions in these areas. Also, the experience of the Islamic countries that are members of the Sustainable Banking Network (SBN) in the field of green banking also shows that active countries in formulating their strategies face challenges such as defining and measuring sustainable banking, obstacles to sustainable banking in the way of the main business of banks, creating business drivers for sustainable banking and improving the flow of information to create sustainable banking. In this context, it is essential to consider topics such as risk management related to environmental and social indicators (E&S) within the lending operations of banks. Additionally, the ways in which banks support environmentally friendly businesses should be prioritized, particularly by drawing on the experiences of Islamic countries as a benchmark for lending practices. This framework can be defined and established using a checklist that incorporates both the financing ecosystem and the monitoring of companies involved.[1]

1 In the discussion of the green financing system, the components of the financing ecosystem that are directly present in financing have been taken into consideration. In the meantime, organizations such as the Association of Investment and Financing Consultants, which are considered as an intermediary link for financing and facilitate communication between investors and financiers, are not considered part of the financing ecosystem. Also, the energy audit companies and the energy optimization association and like that, which are in some way to help the private sector and determine the criteria and standards, are actually considered complementary to green projects and are not considered part of the financing ecosystem.

Chapter Three

The Role of the Financial Market in The Green Economy

3-1. The role of the capital market (green sukuk) in green financing

Financial markets are at the core of the current globalized economy through which banks and investors allocate capital to different sectors. The capital allocated in the present will shape the ecosystems and patterns of production and consumption in the future. The capital market offers a cheaper and longer-term source of financing. Sukuk is considered as an Islamic financial bond issued in accordance with the laws of Islamic Sharia, which is used as an important financial tool for equipping and managing resources in Islamic countries.

Meanwhile, green sukuk is considered as a new source of climate financing for cities, municipalities and infrastructure projects with less carbon in different sectors and offers an opportunity for the private sector to pay attention to development priorities. Green financing refers to the positive transition of the global economy towards sustainability through the financing of public and private green investments and public policies that support green actions. In the following, the concept of sukuk, common types of sukuk, benefits of green sukuk, challenges of issuing green sukuk, and the experience of the Islamic

country of Malaysia in issuing green sukuk and the mechanisms used to issue green sukuk are examined.

3-1-1. Concept of sukuk and its structure

Sukuk, which is the plural term for "Sak" in Arabic, refers to a document that signifies ownership of an asset. The Accounting and Auditing Organization for Islamic Financial Institutions (AAOIFI) defines sukuk as financial securities with a duration of one year. These securities represent common ownership of the assets related to a specific project or investment activity, along with the contractual rights that sukuk holders possess[1].

One of the significant innovations in Islamic finance over the past decade is the issuance of Islamic securities, which are grounded in Islamic contracts. These securities offer an alternative to interest-bearing securities, particularly bonds. The main goals of issuing Islamic securities include providing interest-free financing, supplying capital, enhancing liquidity, and converting assets into securities. Below is a summary structure of Islamic securities[2]:

Table 3-1: Structure of Islamic securities (Sukuk)

New Islamic financial instruments based on sukuk	Non-profit instruments	No returns	Endowment bonds- loan bonds
	Profit-based instruments	Instruments with certain returns	Lease bonds - Murabaha bonds - Istisnaa bonds - Salvage bonds - Interest bonds - Ja'ala bonds - Power of attorney bonds
		Instruments with expected returns	Corporate Bond, Mudarabah Bond, Muzara'ah Bond, Musaqat Bonds

Each type of sukuk is based on various Islamic contracts such as rental contracts, Murabaha, Istisnaa, Ja'ala, Power of attorney, sale, Mudarabah, partnership, etc. In designing a type of sukuk, several contracts are usually used at the same time.

The meaning of the basic contract is the type of legal relationship between the sukuk holders and the borrower, and basically, the name of the sukuk is also from this point of view. The period of issuing Islamic securities means the same period or interval between the time of issuing the securities and the maturity date.

1 Green Sukuk for Financing Renewable Energy Projects,Turkish jurnal of Islamic Economics,2018
2 Mojtaba Kavand, Classification of Islamic Financial Instruments (Sukuk), Islamic Research, Development and Studies Center, Securities and Exchange Organization

3-1-2. Definition of green sukuk

A green sukuk is an Islamic financial instrument used by issuers to finance investments in renewable energy and other environmental assets. This includes projects such as solar parks, biogas facilities, wind energy developments, and infrastructure projects related to the transmission of electricity generated from renewable sources. This certificate shows ownership or income from that property. This financial asset should bring environmental benefits (ASEAN Green Financial Instruments Guide (2019), Climate Bonds Initiative). Despite the wide potential, the green sukuk market has not accelerated mainly due to reasons such as the lack of knowledge at the levels of issuers and investors about the process and benefits of bond issuance, complexities and pricing, lack of framework, lack of consensus among government units regarding policy coordination, lack of bankable green projects, and so on. The issuance of the world's first green sukuk by 3 energy companies in Malaysia has led to the growth of the green sukuk market and has significantly promoted clean technology flows (ASEAN Green Financial Instruments Guide (2019), Climate Bonds Initiative). These actions are in line with Malaysia's agenda to achieve the goal of "Green Technology Pole" by 2030.

3-1-2-1. Benefits of green sukuk

Islamic financial instruments can play a great role in the growth and development of banking and the Islamic capital market, and a significant contribution in achieving the lofty goals that the Holy Islamic Shari'ah has considered for the economic and living areas of Islamic societies. They offer several benefits, including an effective means of providing capital for large-scale economic projects and activities. They serve as an excellent solution for investing surplus financial resources of investors, assist in liquidity management for Islamic banks and financial institutions, and are well-suited for managing risk and uncertainty. Additionally, they promote fair distribution of wealth and revenues, and facilitate access to financial resources from traditional investors interested in green projects as well as from Muslim investors.

3-1-2-2. Countries' experience and case studies in the field of using green sukuk

A) Malaysia's experience in using green sukuk

Malaysia has been undergoing political reforms for a long time in the direction of sustainable development. The greening of the Malaysian economy began in the early 1970s when regulations were introduced to manage pollution from the palm oil industry. Since then, the importance of environmental protection in Malaysia's economic development has been recognized as a goal in the country's five-year development plan (World Bank, 2019).

An analysis of green bonds and sukuk, especially in Malaysia, reveals their vital role in supporting sustainable environmental projects that are in line with Shariah principles. These tools are vital not only for establishing conventional and Islamic financial relationships but also for addressing the wider socio-economic challenges caused by climate change (Ahmed Naseri, 2024).

The growth of green sukuk has helped promote the Islamic finance sector in Malaysia and strengthened Kuala Lumpur's position as an innovative center for Islamic banking and financing (Liu and Lai, 2021).

Meanwhile, factors such as legitimacy, competitiveness, and environmental responsibility play an important role in issuing green sukuk in Malaysia (Abdullah and Kashminder, 2022). Proceeds from the issuance of Malaysia's green sukuk have been used to finance renewable energy projects, including the construction of large-scale solar photovoltaic power plants and the implementation of energy efficiency initiatives in government buildings. These projects not only helped reduce greenhouse gas emissions but also created job opportunities and supported the development of the sustainable energy sector in the country (Bin Zulkafli, 2024). Figure 3-1. explains the process of green sukuk structure.

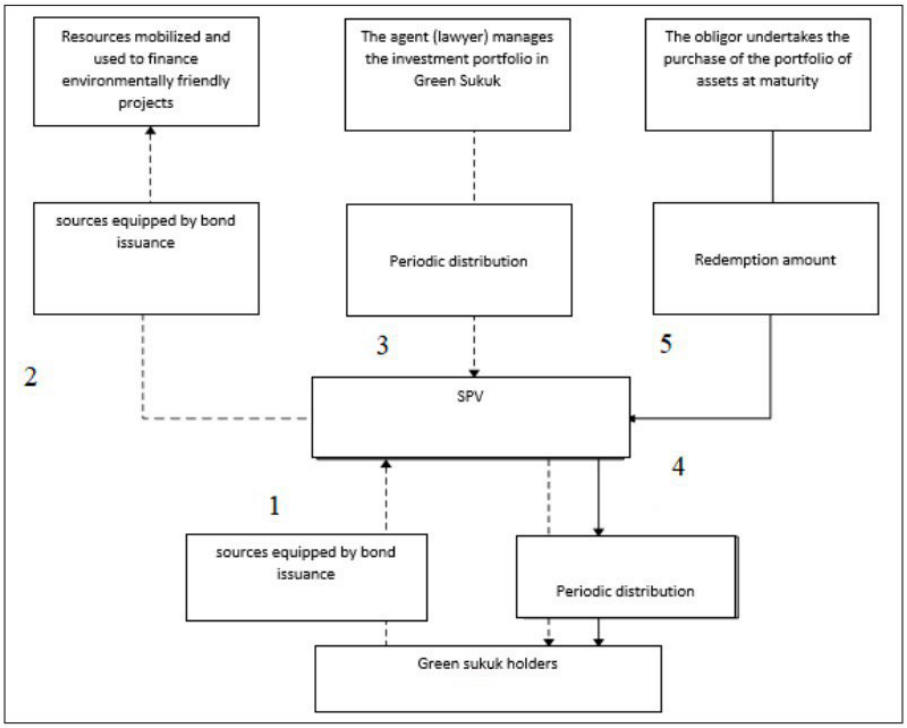


Figure 3-1: Green Sukuk structure process

The growth of green sukuk in Malaysia is in line with Securities Commission Malaysia's (SC) vision and objectives. The SRI Socially Responsible Investment Sukuk Framework was developed by the Securities Commission of Malaysia in 2014 to facilitate the financing of socially responsible investment (SRI) projects. In July 2017, Malaysia marked a new milestone in green finance and the global sukuk arena with the issuance of the world's first green SRI sukuk by Tadau Energy Co. As of April 2018, there were five green sukuk with an approved issuance volume of RM3.7 billion, of which RM2.4 billion was issued to finance renewable energy and green building projects (Table 3.1).

Table 3-2: Issuance of green sukuk in Malaysia until April 2018

Issuer	Program size (Million RM)	Date of issue	Issued amount (Million RM)	Use of proceeds
Tadau Energy	250	July 27, 2017	250	Financing of 50 megawatt (MW) solar power plants in Sabah
Quantum Solar Park	1000	October 6, 2017	1000	Financing three 50 MW solar power plants in Kedah, Melaka and Terengganu
Merdeka PNB investment	2000	December 29, 2017	690	Financing of an 83-storey office space, which is part of the PNB118 Merdeka Tower project in Kuala Lumpur
Sinar Kamiri	245	January 30, 2018	245	Financing of 49 MW solar power plant in Perak
UiTM solar energy	240	April 27, 2018	222.30	Financing of 50 MW solar power plant in Pahang

Source: SC

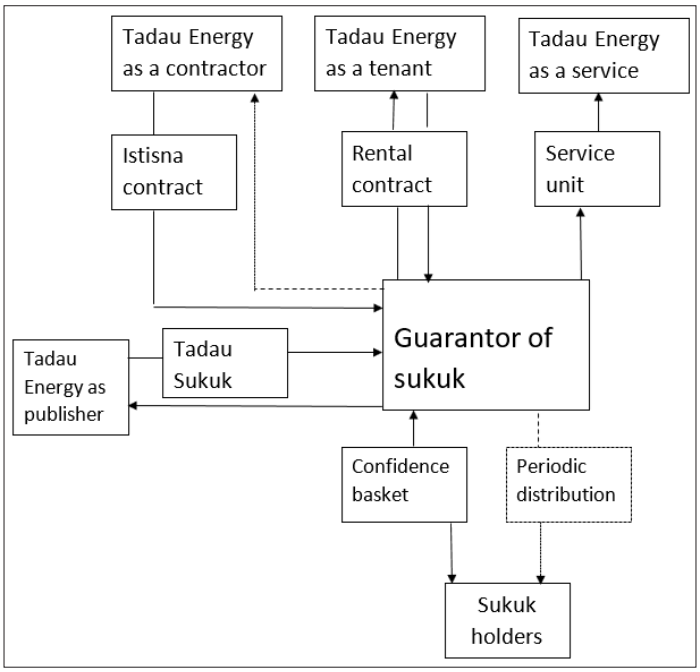
A) Tadau Energy Sdn. Bhd. (Solar Photovoltaic)

On 27 July 2017, TADAU Power Company issued 250 million ringgit sukuk under SRI sukuk. The completion of this project took 10 years. Tada Energy Company used financial resources to finance the construction of a 50 MW solar electric power generation plant. Tadau Energy signed the electricity purchase contract with Sabah Electricity Company. In addition, Tadau Energy was responsible for the financing, design, installation, testing, and commissioning of solar power plants (PV). The first bond redemption was valued at RM14 million, 2 years after the Power Purchase Agreement (PPA) entered into on 12 December 2016 between TADAU Energy (the sukuk issuer) and Sabah Electricity Company (SESB). Tada Energy acts as a sukuk issuer, and investors as sukuk holders refer to underwriters or to sukuk buyers in the secondary market at the time of issue. Hybrid sukuk is operational in two different stages:

1) At the time of starting and during the construction of the asset
2) After the completion of the asset and at the time of exploitation

Istisnaa sukuk agreement is used in both stages. The Istisnaa agreement is primarily used for infrastructure and development projects that require advance payment of funds in full or in installments for asset construction. While the sukuk rental agreement is used for the structure of sale and rent after sale, and payments are made based on rental rates. In addition, rental agreements are

classified into purchase agreements, rental agreements, service agreements, and purchase commitment agreements.



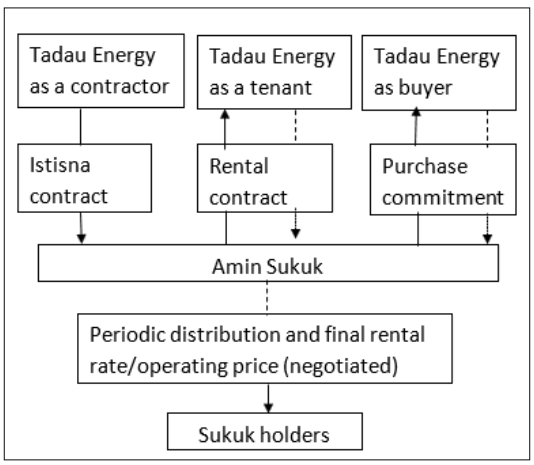


Figure 3-2: Completion of assets at maturity

B) BEWG Private company

The second case study focuses on BEWG, a subsidiary of Blue Group LTD. Recognized as one of the leading companies in the water-related industry, BEWG provides comprehensive solutions to a wide range of clients, particularly government projects. Currently, BEWG is undertaking a water treatment project aimed at purifying and improving the quality of water to address the issue of water scarcity in unsafe areas. This project includes services such as water treatment engineering, wastewater treatment, water sanitation, and water recycling.

To finance this project, BEWG issued 400 million ringgits in sukuk wakalah, which has a maturity of 8 years. The initial construction cost of the project was 79 million ringgits, funded through the company's internal resources. Of the remaining 21 million ringgits, 8% was raised through the issuance of sukuk, while 20% was provided by the capital owners.

- Application of sukuk wakalah by BEWG company

BEWG has chosen the sukuk wakalah model, so based on this model, BEWG acts as an investment attorney for sukuk holders (figure below). In practice, the duty of the "investment attorney" is to invest sukuk as a proxy for the relevant investment portfolio or any proxy investment. In this regard, the investment lawyer agrees to lend his skills and management for a certain period. The relationship between the manager and the investor must be in accordance with the basic conditions explained in the contract. Attorney's fees must be determined at the time of signing the contract. Based on the investment rate of return, Sukuk holders can only receive the expected interest. Surplus amounts are kept by the "investment lawyer" as his profit.

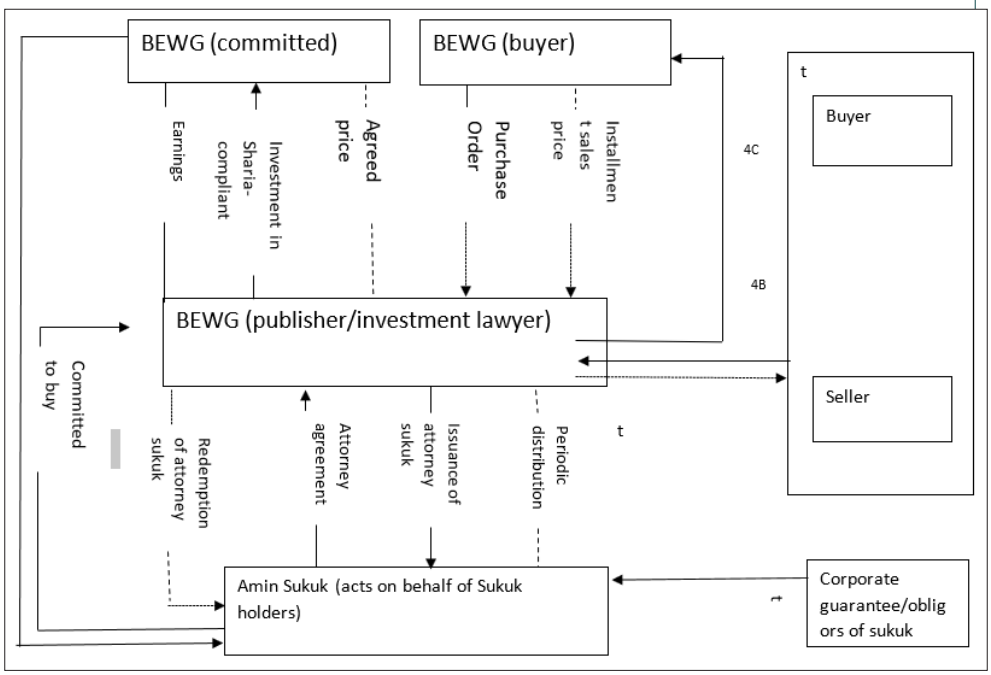


Figure 3-3: Application of sukuk wakalah

C) Application of Murabahah sukuk of Sarawak Hidro Sdn. Bhd.

Murabahah sukuk refers to trading contracts that are based on the sale and purchase of goods at a predetermined cost and profit margin. The details concerning the Murabahah sukuk of Sarawak Hidro Sdn. Bhd. are illustrated in the accompanying figure. In this scenario, the company needs to acquire an expensive product. It does this through credit sales, agreeing to pay for the product in installments. As the seller, the company amortizes the cost and the profit margin over a designated period via these installment payments. At the same time, Sarawak Hydro Company, as the publisher, publishes Murabahah Sukuk documents based on specific payment dates. Each document has a maturity date and shows the owner's right to own the sukuk and can transfer his right to another person.

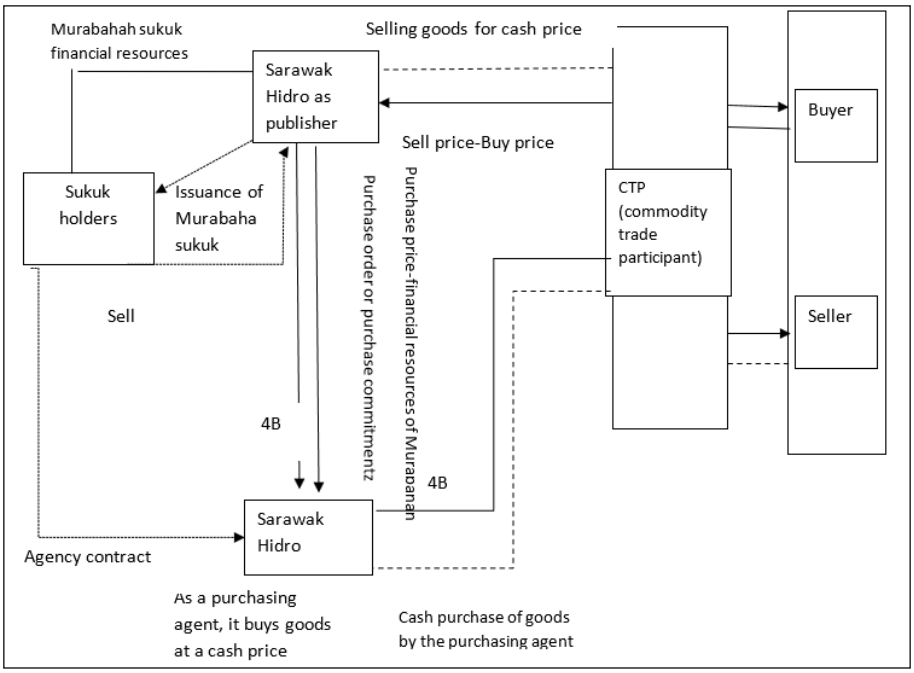


Figure 3-4: Application of Murabahah sukuk of Sarawak Hidro Sdn. Bhd.

B) Malaysia's experience in sustainable bonds or green bonds (ESG)

Sustainability bonds have also gained acceptance in Malaysia. The classification of these bonds as green bonds, social bonds, or sustainability bonds is determined by the issuer based on the primary objectives of the underlying projects. Notably, Malaysia issued its first Sustainability Sukuk, denominated in US dollars, which is a significant milestone for a single country. The proceeds from this sukuk were allocated to eligible social and green projects in alignment with the United Nations Sustainable Development Goals.[1] In 2021, sustainability bond[2] issuance expanded significantly, led by the Malaysian government's $1.3 billion sustainability sukuk issuance. In Malaysia, the market for social bonds (the proceeds of which were for educational purposes) is relatively small compared to the market for green bonds and sustainability bonds (Asian Development Bank, 2022).

1 Some social projects may also have environmental co-benefits and some green projects may have social co-benefits.

2 Most Malaysian issuers prefer the sustainability label for their bonds and sukuk as this gives the issuer more flexibility on how to use the proceeds. According to the Sustainable Bond Guidelines published by the International Capital Markets Association, sustainable bonds are bonds whose proceeds are used exclusively to finance or repay green and/or social projects.

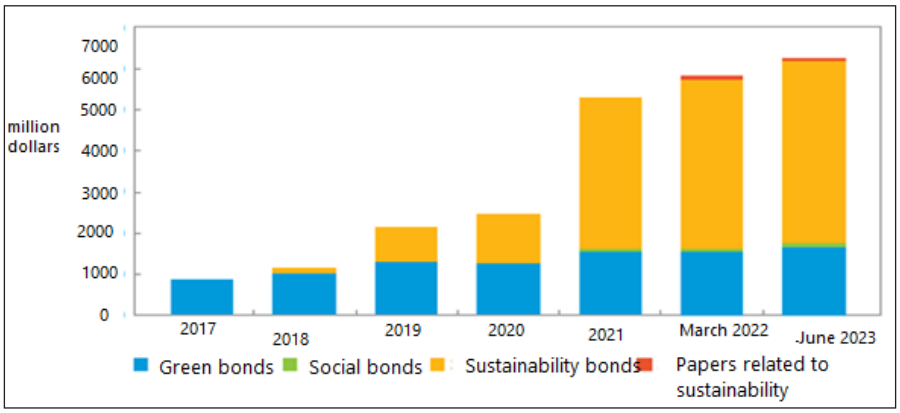


Figure 3-5: Types of bonds used in Malaysia during 2017-2022

Source: ADB, 2022

C) Indonesia's experience in using green sukuk

Indonesia has established its place in the global sukuk market. The country first issued a sovereign green sukuk worth $1.25 billion in 1990. The proceeds of the five-year sukuk wakalah were used exclusively for expenditure in the form of budget allocations, subsidies, or financing of eligible green projects, which covered a wide range of sectors promoting the transition to a low-emission economy and climate-resilient growth, including climate mitigation, adaptation, and biodiversity. In late 2007 and early 2009, the sukuk market faltered due to the Sharia compliance debate and the current crisis in world economies, rising borrowing costs, and declining investor confidence. However, the rapid growth of the global sukuk market has created green energy and safe environmental initiatives in developed Islamic countries.

Therefore, since 2016, the Indonesian Ministry of Finance has started implementing funding for climate change mitigation and adaptation projects through green sukuk funds. In addition, the Indonesian government also issued green sukuk, which received a moderate green rating from the Center for International Climate and Environmental Research (CICERO) (Alam et al., 2023). The value of Indonesia's green sukuk declined in financial markets until November 2018. In early February 2019, the price trend started to rise above the average. The Indonesian government issued the second green sukuk in 2019, and according to the expectations of many investors, the second sale was also successful. Also, the performance of Indonesia's second green sukuk was superior to the first sukuk (Siswantoro, 2018). The figure shows the in-

crease in the number of green sukuk issuances over time from 2015 to 2023. Based on this figure, the number of green sukuk issuances increased until 2019, but decreased in 2020. In 2021 and 2022, it increased again.

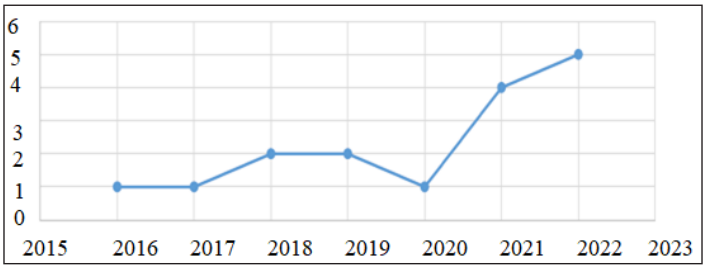


Figure 3-6: Green sukuk issuance trend 2015-2023

3-2. Green insurance

Green insurance is an important component of the green financing system, helping to advance a green economy. It serves multiple purposes in managing environmental risks by making implicit costs clear and integrating the negative externalities of pollution. Beyond covering cleanup expenses, green insurance also addresses costs associated with environmental crimes and damages, as well as legal and medical expenses. Green insurance can also play a role as an incentive and supporter in the green financing system. The implementation of a green financing system is recognized as one of the requirements of the transition to a green economy. However, this is not possible without participation and interaction with the private sector. The private sector directly participates in the green financing system; moreover, it gains benefits by identifying the opportunities that arise from implementing this system.

Insurance companies stand to gain from the market's expansion, but this also presents an opportunity to achieve environmental and social objectives. By mandating this type of insurance, businesses engaged in polluting activities are made aware of the costs associated with future pollution. This awareness, in turn, diminishes their incentive to invest in products that carry a high environmental risk.

Therefore, environmental liability insurance plays a crucial role in a green financing system and is regarded as one of its essential components. In this section, we will introduce various green insurance products, with a detailed examination of environmental liability insurance, along with recommendations for its effective application.

3-2-1. Green insurance opportunities and obstacles

The insurance industry plays a significant role in sustainable development and the green economy, which can be categorized into three main areas: attracting financial risks, reducing real risks to assets, safety, and health, and investing in the economy. Additionally, the implementation of green insurance can serve other important functions. Nowadays, insurance companies are not only addressing the threats associated with global warming but are also actively engaged in a wide range of Environmental, Social, and Governance (ESG) issues. These include reducing biodiversity loss, combating ecosystem destruction, addressing water scarcity, alleviating poverty, managing human health risks, responding to population aging, opposing child labor, and preventing corruption. Another solution that has been noticed in the insurance industry in recent decades is the issuance of insurance-linked securities (ILS), such as catastrophic bonds, in which the benefits and risks of covering the risk of catastrophic events are shared with the capital market. The most significant issues related to insuring risks can be categorized into supply-side and demand-side barriers. Supply-side barriers include fluctuations in the frequency of accidents, which lead to varying damage claims from insurers, challenges in the insurance monitoring process, and high administrative costs. On the demand side, barriers stem from low awareness of risks, particularly concerning incidents that are rare but can have a severe impact.

In general, the insurance industry has unique capacities that should be identified while using its mechanisms and approaches to manage emerging ESG risks. The industry acts as an early warning system for society by amplifying risk signals. Improving risk knowledge, including better use of technology for more accurate risk measurement and more consumer education to promote demand for sustainable insurance products, can help the insurance industry overcome limitations and become a major player in directing financial flows towards a green economy (PSI, 2012).

3-2-2. Green insurance products

Sustainable and green products are those that, while generating economic benefits, take into account their social and environmental impact throughout their life cycle. Green insurance can generally be divided into two categories. The first category includes products that offer lower premium rates for standard insurance policies based on features or behaviors that align with environmental sustainability goals. The second category comprises products specifically

designed to promote green initiatives, such as clean technologies or activities aimed at reducing emissions. In the following sections, we will introduce various types of green and sustainable insurance products that are currently utilized in different countries around the world.

§ Renovation of green properties

This type of insurance coverage is for use in the following cases:

- Environmentally friendly materials that prevent energy wastage
- Home appliances and more energy efficient equipment

In this regard, discounts are offered to policyholders for their insurance premiums.

§ Real estate renewable energy coverage

This type of insurance is intended to protect homeowners who use an alternative energy system. Compensation is paid by the insurance company in situations where property owners face losses such as the following:

- Lost income from selling excess energy to local energy companies
- Additional costs for purchasing alternative energy

§ Discounts for the use of damage reduction devices

Property owners who utilize specific materials or construction techniques that mitigate storm damage in disaster-prone areas receive premium discounts. For instance, the installation of shutter windows protects buildings against severe storms.

§ Pollution liability or environmental liability insurance

This insurance covers a wide range of risks and incidents. It includes legal liabilities related to pollution and environmental responsibilities, as mandated by binding regulations and laws. Environmental damage can arise from various activities or risks[1].

1 Others include: pay-as-you-go, low-emission vehicle discounts, commercial fleet greening, renewable energy project insurance, renewable energy equipment insurance, green building insurance, energy saving insurance, carbon capture and storage insurance (reduction projects publication), green building insurance against public disfavor, perishable food insurance, global weather insurance, political risk insurance for carbon trading, architects and engineers professional liability insurance discount for building inspection (Cx),

3-3. National environmental funds

Today, the consequences of human interference in the environment are more evident than ever. To effectively tackle these issues, we must adopt new development approaches that establish compatibility between development and the environment's carrying capacity. This new approach, referred to as sustainable development, focuses on meeting the current needs of the world without compromising the ability of future generations to meet their needs.

3-3-1. Necessity of providing financial resources to protect the environment from crimes and taxes

Financial institutions and environmental funds are established in many countries, particularly in developing nations, to address environmental destruction. They are considered a viable solution for systematizing and optimally allocating financial resources in support of environmental protection programs. Among the most important reasons and necessities for creating financial institutions for environmental protection, the following can be mentioned:

• Complementary role for the implementation of environmental activities in the conditions of limited financial resources of the government

• Acceleration and better allocation of financial resources for environmental protection

• Accumulation of resources resulting from crimes of pollution and destruction, taxes and environmental charges and the possibility of allocating credit resources in a coherent and systematic way.

In summary, among the most important effective factors in increasing the efficiency of environmental funds, the following can be listed:

- Existence of favorable banking and financial skills and compatible with economic and political conditions

- Existence of coordination of environmental policies of the country and the credit policies of the Environmental Fund.

- Existence of clear environmental laws and regulations in the country and compatibility of environmental laws with each other.

3-3-2. The importance of financial institutions (national funds) for environmental protection and the reasons for their creation

The National Environment Fund was established to offer specialized financial services to skilled and innovative entrepreneurs, as well as to NGOs and industries. The fund aims to support research, scientific, and technological activities in the non-governmental sector, enabling them to play an effective role in protecting the environment.

Environmental financial institutions have the opportunity to offer low-interest loans to polluting industries, enabling them to invest in environmental protection initiatives and improvement projects. On an international scale, environmental funds can play a crucial role. These funds can help alleviate international pressure on governments, facilitate the provision of resources for environmental protection activities, and clarify the evaluation of government subsidies. Additionally, they can define the process for international aid within the framework of various conventions.

The development of environmental protection financial institutions in many countries, especially in developed countries, has caused the rapid expansion of environmental industries and technologies, which has also made this field profitable.

Environmental protection financial institutions are established in most developing countries in the form of funds in order to direct financial resources towards environmental goals and policies. The following are the most important reasons for establishing such institutions in developing countries:

- Limitation of the government's financial resources for the implementation of environmental plans and projects

- Reducing internal and international political and legal pressures in the field of environmental considerations

- Developing financial markets and laying the groundwork for the spread of environmental industries

- Compilation of crimes, tolls and environmental taxes and coherence in policy-making in line with environmental prevention and improvement activities.

3-3-3. Types of environmental funds

Usually, based on the nature and function, there are three types of environmental funds in the world:

A) Earmarked Tax Funds

These funds are generally established by governments and are provided from environmental taxes, penalties, costs resulting from product taxes, and costs of using the environment in the form of taxes.

These funds are responsible for providing financial resources for environmental improvement activities, allocating cheap loans to polluting industries and activities, and providing grants to deal with the environment.

B) Directed credit funds

These funds are established by international organizations such as the World Bank or by national governments for the purpose of mediation and financial agency. The aforementioned funds are established to finance small businesses and projects related to municipalities and avoid direct financing of projects.

C) Green Fund

Green funds are mainly formed by environmental non-governmental organizations (NGOs), and their financial resources are also established by members and environmentalists. The nature and function of these funds are such that they are mainly used to provide financial resources for the protection of national parks, biodiversity protection activities, or similar projects.

In another division, funds are classified into three groups according to whether they are governmental or non-governmental:

a) National environmental funds:

Most of the financial resources for these funds come from the government. They support a variety of environmental activities, and their scope is quite broad. These funds operate in many countries around the world.

b) Environment and natural resources protection funds:

These funds are mostly established to protect natural resources and protected areas, especially in developing countries. One of the mechanisms of providing financial resources from these funds is the “debt-for-nature swaps,” which has been developed since 1980.

c) Support funds for non-governmental organizations protecting the environment.

These funds are established to support non-governmental organizations and local communities in implementing environmental protection and sustainable development projects. The primary goal of these funds is to strengthen and

empower civil societies to safeguard the environment. The financial resources for these funds mainly come from taxes, voluntary contributions from members, and other voluntary donations.

3-3-4. A review of financial institutions dedicated to environmental protection, highlighting selected countries

In the last few years, environmental protection and sustainable development organizations have come to believe that the prerequisite for achieving environmental protection and sustainable development is the existence of sustainable financial resources without relying on government resources.

For this reason, the creation of environmental protection funds as a mechanism that can provide sustainable financial resources to the custodians of the environment and sustainable development has been in the spotlight. In recent years, particularly following the Rio Conference in 1992, numerous funds have been established in both developed and developing countries. These funds aim to provide the financial resources needed to protect the environment and achieve sustainable development goals.

As the number of funds and their activities increases in various countries, many nations have implemented mechanisms to strengthen and empower these funds.

Among the national environmental protection funds, the following can be mentioned:

1. National Environmental Protection Fund of Bulgaria
2. National Environmental Fund of the Czech Republic
3. Central Fund for Environmental Protection of Hungary
4. National Environmental Protection and Water Management Fund of Poland
5. Slovak National Environmental Fund
6. National Environmental Fund of Kyrgyzstan
7. Federal Environmental Fund (FEF) of Russia
8. National Environmental Protection Fund of Ukraine
9. Environmental Fund of China

Conclusion

One of the key challenges in transitioning to a green economy is financing climate change initiatives and adaptations while providing the necessary investments to reduce emissions and foster a low-carbon economy. A significant obstacle in mobilizing capital is encouraging the financial system to invest in plans and projects that yield long-term returns. Given the importance of this issue, the role of the financial market in the green economy has been examined through three distinct sections: "green sukuk," "green insurance," and "national environmental funds.

Green sukuk has emerged as a new source of climate financing for cities and municipalities, as well as an Islamic financing tool for funding green projects aimed at environmental protection. This provides an opportunity for the private sector to focus on development priorities. Malaysia, which introduced the first international Islamic finance tool, offers valuable experience in using green sukuk to finance solar photovoltaic (PV) power plants, water treatment projects, and hydroelectric power plants. This demonstrates that green sukuk can effectively expand government financial support, serving as a legal, acceptable, and efficient mechanism for both government and private sector entities. Establishing a transparent process for issuing and rating green sukuk bonds, including the creation of rating institutions, represents a significant step forward in this field. Furthermore, utilizing green sukuk as a financing tool can address many challenges related to the green financing of economic enterprises, fulfilling the responsibilities of Islamic governments in pursuing sustainable development.

Green insurance has been explored as a tool within the green financing system to manage environmental risks. Therefore, it is essential to establish mandatory pollution liability insurance regulations aligned with environmental standards. This can be achieved through the creation of new environmental laws or by utilizing the existing legal framework. Additionally, the establishment of financial institutions, such as "national environmental protection funds," has been proposed as a crucial solution for reducing environmental damage. These funds have demonstrated favorable performance in various countries, depending on their specific economic and social conditions. Consequently, many developed and developing nations have established national environmental protection funds in recent years. These funds serve as vital executive bodies, providing financial resources to support environmental goals and initiatives throughout the countries.

Chapter Four

International Institutions and Green Economy Financing in Developing Countries

As global awareness of environmental protection issues continues to grow, discussions have increasingly focused on the urgent need for action to prevent rising global temperatures and the resulting climate change. Additionally, there is a strong emphasis on making economies resilient to climate change through various measures to mitigate its effects. Consequently, the topic of green financing, particularly for developing countries, has become a central point of attention and debate among activists at both bilateral and multilateral levels.

International and multilateral financial institutions play a crucial role in financing green growth and development. This includes a variety of organizations that operate under market and investment mechanisms, such as development banks, as well as multilateral and international financial institutions that utilize non-market approaches. Among the most significant of these are non-market funds, alongside development banks and funds that provide various forms of financial support, including loans, grants, investments, and bonds. These institutions not only provide funding but also play a key role in policymaking.

They establish criteria and standards for financing initiatives related to green economy growth. In this context, we will examine the role of development banks, particularly the World Bank, and other funds in international financing for the green economy. Before doing so, it is essential to review the multilateral proposals that outline the rules, principles, criteria, and decision-making frameworks for the international financing of the green economy.

4-1. International policy-making institutions in the field of green economy financing

4-1-1. Financial initiative of the United Nations Environment Program (UNEP FI)

The United Nations Environment Program Financial Initiative is an international partnership and cooperation program between the United Nations Environment Program and the financial sector, which was established in 1992 following the meeting of the Earth Summit in Rio de Janeiro and with the proposal of commercial banks. The mentioned financial initiative has 215 members from financial institutions, and 41 supporting institutions, which include banks, investors, and insurance companies. In fact, the main goal of UNEP FI is to bring in the private sector and the global financial sector, especially commercial and investment banks, and to encourage the mentioned sectors to implement the principles of sustainable development, especially in the environmental and social dimensions, at all operational levels in the financial sector.

4-1-2. European Union

The European Union, as one of the most important multilateral institutions in the world, has announced and implemented extensive initiatives, programs, and policies in the fields of environmental protection, sustainable development, energy efficiency, and moving to green and low-carbon economies. In such a way that the European Union can be considered a pioneer in the field of sustainable development and green economy.

The policy of the European Union in the field of green economy and green financing is mainly designed, compiled, and implemented by the European Commission.

4-1-3. The Group of Twenty (G 20)

The Group of 20 is an assembly of the world's major economies that formulates and implements global policies, especially in response to global challenges in the economic and development fields. This assembly consists of 19 countries (Argentina, Australia, Brazil, Canada, China, Germany, France, India, Indonesia, Italy, Japan, Mexico, Russia, Saudi Arabia, South Africa, Türkiye, Britain, and the United States) and the European Union (European Commission together with the European Central Bank). The Group of 20 is the initiative and proposal of the Ministers of Economy and Finance and the heads of central banks of seven industrial countries in 1999.

4-1-4. OECD Center for Green Financing and Investment

Since 1972, when the Polluter Pays Principle was conceptualized, the Organization for Economic Cooperation and Development (OECD) has encouraged countries to adopt environmental approaches and green growth. According to the OECD, transitioning to a green, low-carbon, and climate-resilient economy necessitates extensive structural reforms that must be implemented internationally. This transition cannot succeed without comprehensive interaction and cooperation among governments, public sector authorities at various levels, all private sectors, and civil society.

4-1-5. Clean Development Mechanism (CDM)

The Clean Development Mechanism (CDM), defined in Article 12 of the Kyoto Protocol, allows a country with commitments to reduce or limit emissions under the Kyoto Protocol (Annex B countries) to implement emission reduction projects in developing countries. Such projects can earn saleable certified emission reduction (CER) credits. Each credit is equal to one ton of CO2 reduction, which can be calculated in achieving the goals of the Kyoto Protocol.

4-1-6. The capital adequacy requirements for banks (Basel III)

In December 2010, the Basel Committee on Banking Supervision (BCBS) published the text of the international regulatory framework for banks known as Basel III. This guidance framework oversees international regulatory standards for banks' capital resources. This document was approved by the leaders of the Group of 20 at the summit meeting in Seoul, South Korea. This

framework document aims to enhance the capital risk coverage of banks and provide support against systemic risks. This is especially important given the globalization of the financial system and the growing interactions among activists on a global scale.

4-1-7. United Nations

It has been compiled based on the general framework of the Third UN Financing for Development agreement, based on three documents: the UN Sustainable Development Goals, the Sustainable Development Goals agenda document, and the approvals of conferences to the Parties of the UN Framework Convention on Climate Change (UNFCCC). The United Nations documents in the field of greening and sustainability of the financial sector are voluntary and non-mandatory, and their purpose is to reduce the damage to the environment and society.

4-1-8. UN Environment

The United Nations Environment Program Financing Initiative, known as UNEP FI, is a partnership between UNEP and the global financial sector that was established in 1992 after the Summit. Over 230 institutions and financial organizations, including banks, insurance companies, and investors, are part of this initiative. The initiative primarily emphasizes policy development. The main objective of the UNEP Finance Initiative is to promote the declaration of commitment by financial institutions towards sustainable development.

4-2. International policy-making banks in the field of green economy financing

4-2-1. World Bank

The World Bank has two primary goals in its mission: 1. Reducing absolute poverty by decreasing the number of people living on less than one dollar and ninety cents a day; 2. Increasing prosperity by raising the income of the lowest 40% of the population in each country. Additionally, the World Bank plays a crucial role in financing development and providing assistance to developing countries through five subsidiary institutions that make up the World Bank Group. The five institutions of the World Bank are:

1- The International Bank for Reconstruction and Development (IBRD), which

provides loans to the governments of middle-income developing countries,

2- The International Development Association (IDA), which provides interest-free loans to the governments of very poor countries,

3- The International Finance Corporation (IFC), which is the largest international financial institution for financing and investing in the private sector of developing countries,

4- The Multilateral Investment Guarantee Agency (MIGA), which guarantees foreign direct investments in developing countries for investors.

5- The International Development Association (IDA) which has provided mechanisms for the settlement of claims related to investments through conciliation and arbitration.

4-2-2. Asian Development Bank (ADB)

The Asian Development Bank was established in 1966 based on the World Bank model (with a weighted voting system) at the regional level, with its headquarters in the Philippines. Asian Bank has 31 branches around the world. The aim of the bank is to promote social development and economic development in Asia. The members of the Asian Development Bank are member countries of the United Nations Economic, and Social Group for Asia, and the Pacific and developed countries outside the region.

4-2-3. European Investment Bank (EIB)

The European Investment Bank is a European non-profit financial institution that provides long-term interest-free loans under the Treaty of Rome. The shareholders of this institution are European countries. This bank aims to enhance cultural convergence and interdependence across Europe. The policies are set by the shareholder governments through the board of directors and the executive board. It is recognized as the largest public (government) lending financial institution.

4-2-4. Islamic Development Bank (IDB)

As a multilateral development bank with 57 members, Islamic Development Bank seeks to help the economic and social development of Islamic countries and societies around the world. The bank has defined its mission based on the following principles:

- Economic growth through getting out of poverty,

- Creating the necessary infrastructure for economic growth,

- Participation based on cooperation, especially between the private and public sector,

- Sustainable solutions to face the world's major challenges within the framework of the United Nations Sustainable Development Goals.

4-2-5. European Development Bank (EDB)

The European Development Bank has explained the policies and approaches of the European Development and Reconstruction Bank (EBRD) in a document titled "The Approach to the Transition to the Green Economy (2021-2025)". The bank's activities are primarily focused on promoting sustainable environmental development. Its approach to transitioning to a green economy is grounded in comprehensive and principled policies that emphasize transition impact, sound banking practices, and additionality.

4-3. International funds as policy-makers in green economy financing

4-3-1. The Green Climate Fund (GCF)

The Green Climate Fund (GCF) is a global, multilateral fund established in 2010 by the Parties to the United Nations Framework Convention on Climate Change (UNFCCC). Headquartered in Songdo, South Korea, the Fund's primary objective is to support developing countries in implementing projects and programs aimed at reducing or limiting greenhouse gas emissions and enhancing adaptation to the adverse impacts of climate change.

4-3-2. Adaptation Financing Fund (AF)

The establishment of the Adaptation Fund was approved in 2001 at the 7th Conference of the Parties to the United Nations Climate Change Convention and under the Kyoto Protocol in Morocco, and then at subsequent meetings held in 2005 and 2006 in Canada and Kenya. The approach, principles, and framework of this fund were approved. This fund finances adaptation projects in developing countries. Since 2010, this fund has committed to allocating slightly more than 500 million dollars to 80 projects.

4-3-3. Global Environmental Facility (GEF)

The Global Environment Facility (GEF) is an international fund administered by the World Bank. It finances environmental and climate change projects. The GEF Fund is the largest environmental financing fund with 183 participating countries. About three decades have passed since the GEF's establishment.

4-3-4. Climate Investment Fund (CIF)

The Climate Investment Fund was established with the participation of 5 development banks (AFDB, ADB, EBRD, ADB, and WB) in order to deal with climate change in a multilateral manner. The fund employs various tools to finance projects and mitigate risk, including grants and highly concessional financing. Its goal is to assist developing countries in achieving climate resilience and pursuing low-carbon development.

4-3-5. OPEC Fund for International Development (OFID)

The OPEC Fund for International Development (OFID) is a development financing fund established by OPEC members in 1976 to provide development assistance to developing countries. The main goal of the OPEC Fund for Development is to help economic growth and alleviate poverty in developing countries. The projects that are financially supported by this fund are mainly in the fields of food security, energy, fresh water, health, education, and related infrastructure.

4-3-6. Abu Dhabi Fund for Development and International Renewable Energy Agency

The International Renewable Energy Agency (IRENA) is an international organization that works with around 170 member countries to help them transition to renewable energy on a sustainable basis for development. The assistance of this agency is not limited to grants and financial investments and includes the transfer of knowledge and technology.

4-3-7. Nordic Development Fund (NDF)

The Nordic Development Fund (NDF) is a multinational development financial institution that was established by the 5 Nordic countries (Northern Europe), including Denmark, Finland, Iceland, Norway, and Sweden, in 1989,

and its headquarters are in Helsinki. This fund finances projects in least developed countries and lower-middle-income countries in Latin America, Asia, and Africa, especially projects related to climate change and development. This fund follows the general policies of the Nordic countries in the field of development, about factors such as poverty reduction, gender equality, and human rights.

4-3-8. Middle East and North Africa Transition Fund

The primary objective of this initiative and its associated fund is to assist Arab countries in the Middle East and North Africa in transforming their economies. However, since this fund is specifically designated for the Arab countries in that region, our country is unable to receive the technical and financial support provided by it. This fund was established following the initiative of the Group of Eight industrialized nations in 2011.

4-3-9. Special Climate Change Fund

The Special Climate Change Fund was established under the United Nations Framework Convention on Climate Change in 2001 to finance projects related to the reduction of greenhouse gas emissions, climate change adaptation measures, water resources management, agriculture, energy, transportation, industry, forestry, waste management, and economic diversity. This fund has a complementary role for other financing institutions under the mentioned convention.

Conclusion

As noted in the introduction of this research article, global trends and characteristics of financing the green economy and growth can be categorized as follows:

- In recent years, due to the intensification of international environmental debates and particularly the pressing challenge of climate change, financing the green economy and environmentally friendly economic activities has garnered significant attention from policymakers, economists, financial institutions, and civil society actors. This effort remains heavily dependent on supportive and incentivizing mechanisms, including public-sector involvement, government backing, public financial resources, and multilateral assistance. Consequently, the green economy still cannot rely solely on private financial markets driven by investment returns and conventional economic logic.

- Globally, Green financing has followed a two-dimensional mechanism:

The first aspect involves the expansion and development of literature related to financing growth and the green economy. It includes the conceptual frameworks and policy recommendations primarily created and shared by international institutions, organizations, and various summits and forums at both regional and global levels. The second aspect focuses on funding environmental and green projects and programs through banks using various financial and investment tools, as well as the establishment of multiple funds to support these initiatives.

- Of the total financial mechanisms in the world that provide the possibility of benefiting the environmental and climate projects of our country, we can mention three main mechanisms: funds, banks, and bilateral aid. Given that Iran is classified as a middle-income developing country, it will be less likely to receive many financial resources that are free of charge or with low interest. However, if the projects have investment money, it can be attractive and cost-effective for financing from banks. As far as banks are concerned, returns on investments are very important.

- The most significant barrier currently preventing Iran from accessing financial resources for implementing green economy projects and programs stems from sanctions and political considerations. As long as sanctions remain in place, and particularly as long as anti-Iran policies continue to be enforced by donor powers, especially the United States, through international financial mechanisms, the likelihood of securing multilateral or even bilateral financial support will remain extremely low, approaching zero.

- In relation to the foreign financial mechanisms studied in this article - such as banks, funds, and bilateral aid, which can be utilized for economic and green growth - there are several additional considerations and obstacles to note. These challenges exist alongside sanctions and political issues. Our country is not able to participate in certain mechanisms and institutions, which restrict access to their resources, such as those of the Asian Development Bank. Conversely, we are recognized as a donor country in some mechanisms, like the OPEC Development Investment Fund; however, OPEC member countries are ineligible to receive financial aid from this fund. European funds primarily target regions within Europe, making them inaccessible to Iran.

Furthermore, when considering the financial resources available through other mechanisms, apart from bilateral foreign financial resources that are usually proposed as joint investments for project implementation, significant

issues arise regarding project preparation and delivery capacity. A notable obstacle is the lack of expertise and specialized ability to present projects that meet the criteria of these funds, which is essential for evaluating financial resource requests. Given that most international financial resources are now prioritized for addressing climate change, both the public and private sectors in our country need to shift their focus more towards projects aimed at reducing greenhouse gas emissions, rather than other green and environmental sectors. Emission reduction programs and projects can have direct impacts, typically referred to as emission reduction projects, or indirect effects, known as climate change adaptation projects.

- In the field of climate change, today the Green Climate Fund (GCF) has been identified and introduced as the largest provider of financial resources. This fund allocates financial resources to both types of emission reduction and adaptation projects. There are various prerequisites for financially using the resources of this fund. First, there must be an intermediary institution that is acceptable to the fund. The Iranian intermediary institution has not been introduced or identified yet. However, there is an opportunity to use the fund's intermediary institutions.

- In the field of environment, apart from climate, the Global Environment Facility is still the largest international multilateral financial institution. The projects proposed to GEF must have the conditions and features desired by GEF. The preparation of the project to be presented to GEF requires special expertise. To present the project, the private sector must use the channel of the Environmental Protection Organization, which acts as its national reference in the country.

Section 2

Green Economy Index

Introduction: Why an Index for Climate Change

A seminal early step taken internationally toward prioritizing sustainable development was the 1972 United Nations Conference on the Human Environment, popularly known as the Stockholm Conference. This conference marked the first significant global initiative to explore the connection between the environment and development, leading to the creation of the United Nations Environment Program (UNEP). During this event, notions such as "development without environmental destruction" were introduced, which later became precursors to the contemporary idea of sustainable development.

The notion of "sustainable development" emerged as a key intellectual and practical framework for reconciling economic growth, environmental protection, and social justice, gaining prominence in global discussions during the 1980s. In 2000, the United Nations established the Millennium Development Goals, comprising eight primary objectives aimed at reducing poverty, improving health, and enhancing access to education. While these goals did not explicitly address sustainable development, they facilitated increased focus on the interrelationship among economic, social, and environmental development.

The United Nations Conference on Sustainable Development (also known as Rio+20) took place in 2012. The summit highlighted the necessity of taking practical measures for sustainable development, leading to the formation of the

Sustainable Development Goals (SDGs). In 2015, the United Nations adopted the SDGs as a global framework aimed at achieving sustainable development by 2030. The goals consist of 17 primary objectives and 169 related targets, which collectively address the economic, social, and environmental aspects of sustainable development. Alongside the adoption of the SDGs in 2015, the Paris Climate Conference (COP21), the 21st Conference of the Parties to the United Nations Framework Convention on Climate Change, was convened in December of that year. The conference aimed to establish a comprehensive and legally binding global agreement to address climate change and reduce greenhouse gas emissions.

Many governments prioritize policymaking in alignment with various UN SDGs, including income levels, gender equality, health, employment, energy structures, environmental sustainability, and the reduction of greenhouse gas emissions. Indexing is a tool for measuring and evaluating multidimensional phenomena in economic, social, and scientific fields, among others. Indicators serve as instruments for analyzing changes and trends over time or across various groups by integrating quantitative and qualitative measures. Effective indicators require adherence to specific principles and guidelines. The green economy index has been proposed as a mechanism for sustainable development and addressing climate change. This economic model emphasizes economic growth and development as well as a commitment to environmental protection and social justice.

Green economy indices convert extensive and complex information into an easily understandable and comparable format by simplifying and summarizing the data. This enables decision-makers to quickly and accurately grasp the status quo without needing to explore excessive details.

With their capacity for continuous monitoring and evaluation, green economy indices enable organizations and institutions to assess their performance over time relative to their peers. This enables them to make the necessary changes and benchmark against best practices and methods. To ensure fair and meaningful comparisons, such a process requires agreement on definitions, measurement methodologies, and analysis units. Specifically, green economy indices can help Islamic countries compare their performance to that of other countries and learn from successful global experiences.

In the second section, the fifth and sixth chapters present the following two indices:

- Global Green Economy Index (GGEI)

- Islamic Green Economy Index (IGEI)

The GGEI, developed by the Dual Citizen Foundation, analyzes country-specific inputs, which include policy interventions and certain assumptions such as demographic trends, GDP growth, and energy prices. This analysis produces a series of outputs concerning necessary investments, costs mitigated through policy measures, and supplementary advantages in domains such as employment and performance relative to secondary targets associated with energy consumption and emissions.

The GGEI employs a data imputation methodology that relies on the mean scores of five geographically proximate countries to fill in missing data points. This methodological approach to estimating missing data may prove ineffective, especially for countries with incomplete or substantially delayed data reporting. Evidence of this inadequacy is evident in the GGEI ranking of Organization of Islamic Cooperation (OIC) member states, where a significant negative correlation exists between a country's ranking and its Economic Complexity Index (ECI). Nations with a low ECI value are ranked higher, whereas those with higher ECI values are ranked lower. A novel composite index, the IGEI, was conceptualized and developed to mitigate this systemic bias. The IGEI integrates and quantifies several critical dimensions, including natural resource and environmental management, green economy policies, social equity and human sustainability, as well as the role of religion and culture in environmental sustainability, within a framework of 18 indicators.

Chapter Five:

Global Green Economy Index

Introduction: Why an Index for Climate Change[1]

In 2010, Dual Citizen LLC, a consulting firm, was established to promote sustainable development and address climate issues by linking the public and non-profit sectors. The company considers itself a "dual citizen," capable of operating in both the public and private sectors, serving as an intermediary to facilitate positive change and tackle the global climate challenge. In the same year, Dual Citizen LLC released its inaugural GGEI, which was based on expert review. This index ranked 27 countries solely based on expert perceptions.

In 2015, at the COP21, Dual Citizen LLC and KnowlEdge Srl collaborated to develop a market-based model. This model was created to better understand the dynamics of emissions reduction goals in 11 countries, including Brazil, Canada, China, Germany, India, Indonesia, Japan, Mexico, South Korea, the United Kingdom, and the United States. The model takes a systemic approach, assessing whether current country-level policies and NDCs are sufficient to meet the Paris Agreement's goals. It also considers necessary capital, repayment timelines, costs that have been avoided, the winners and losers in the energy sector, and the impact of these policies on employment.

1 The Climate Moment, Available at: https://dualcitizeninc.com/climate/

Data and measurements have proven to be potent catalysts for climate action. Ten years after the initial GGEI, sustainability data has evolved from a niche field to a powerful tool for promoting green economic progress and stakeholder accountability. Large international organizations used to collect green economy data on a regular basis, relying on reports from various countries. We are increasingly collecting data from sensors, satellites, and citizen scientists via mobile technology, often bypassing government intermediaries. Similarly, the modeling and application of this data have grown significantly. NGOs, global finance, multinational corporations, and universities are utilizing this data to develop innovative modeling and tracking systems.

The 2020s have started, and the climate crisis is escalating. The scientific consensus indicates that, if current emission growth rates persist in the country, warming is projected to rise by 1.5 degrees by approximately 2030 under this scenario, especially in the context of resources currently allocated for carbon reduction. While many still see the climate crisis as a distant possibility with vague risks, its effects are already evident, and the opportunity to address them is swiftly diminishing.

With the climate crisis intensifying in the 2020s, policies aimed at reducing greenhouse gas emissions are being compared to the nationally determined contributions established at the most recent Conferences of the Parties. Systems analysis elucidates the relationship between greenhouse gas emission reductions and development gains. Numerous governments prioritize policy-making in alignment with various UN SDGs, including income levels, gender equality, health, employment, energy structures, and environmental considerations. What is the relationship between policy measures designed to reduce greenhouse gas emissions and their effects on different SDGs? Systems analysis addresses this question, and this model serves as a distinctive tool for enhanced understanding of these relationships.

5-1. Significance of Climate Change in Decision-Making, Policy-Making, and Investment1

The GGEI, the first of its kind, was established in 2010. Over the past decade, the GGEI has tracked countries' performance in the green economy, providing a comprehensive view of their relative performance in terms of climate change, economic sector decarbonization, green markets, and environmental sustainability. The index methodology is based on two pillars: "progress

1Available at: https://dualcitizeninc.com/global-green-economy-index/

tracking" and "target verification." This framework provides stakeholders with a novel way to understand how policy, investment, and activism can best ensure a fair and genuine transition.

Market players are becoming more concerned with the sustainability of their investments. Alongside the expansion of global climate-related regulations, customers and shareholders are placing increasing pressure on businesses to transform their business models to align with environmental, social, and governance (ESG) values. ESG data at the company level is rapidly increasing, enhancing how investors and businesses evaluate companies in terms of identifying opportunities and risks. Country-level GGEI data can be used to analyze which markets have green momentum and which are most at risk of regulatory intervention due to slow progress toward global sustainability goals.

The country-level analysis and framework provided by the GGEI are projected to gain increasing significance throughout the 2020s for three primary reasons: opportunity, risk, and activity.

- Rapid advancements in key sectors or technologies related to sustainability often position opportunity markets as potential targets for forward-looking investment. The GGEI's emphasis on measuring progress across 18 indicators makes it clear to investors where this momentum and investment opportunity lie.

- Countries at risk may encounter abrupt regulations from domestic policymakers that hinder progress toward global sustainability goals. The GGEI emphasizes measuring each country's distance from global targets, highlighting where this risk may be greater and how they should prepare for it.

- Reputational risk activities for market players are expected to increase alongside the climate-related threats associated with their investment and business activities. The GGEI framework provides users with tracking capabilities and insights gained from GGEI analysis, enabling them to remain proactive regarding these emerging trends.

Figure 5-1: GGEI capacities

GGEI users have access to comprehensive data that is continually updated. The various usages benefited by different operators are detailed in the table below.

Table 5-1: Usages derived from the GGEI

Client	GGEI Usage	Case Study
Investor	Append GGEI country data to company ESG data to understand full investment context	Market Assessments, Climate Risk Evaluations, ESG Metrics, The Climate Moment (KnowlEdge srl)
Government	Subscribe to GGEI data to track key performance indicators in the green economy	Denmark Ministry of Foreign Affairs, Italy Ministero Della Transizione Ecologica, UNDP Innovation Labs
NGO/International Organization	Build bespoke sustainability measurement frameworks leveraging the GGEI methodology	World Bank Trade & Competitiveness Unit, Institut de la Francophonie pour le développement durable, Pacific Islands Development Forum
Academia	Integrate GGEI data and insight to individual research, teaching, and university-level sustainability programs	Yale School of the Environment, King's College London, INSECC Grande École, ETH Zurich

5.2. Developing an Integrated Model for Climate Change

Our integrated model simulates the economy-wide impacts of policy interventions, including emission reduction targets (e.g., NDCs in the context of the COP process) and renewable energy or energy efficiency targets. These simulations offer valuable insights into the transformation of domestic energy markets, the characteristics of investment opportunities and payback timelines, and the consequent impacts on employment in the renewable energy and energy efficiency sectors.

Much of the modeling developed to date regarding emission reductions and carbon mitigation is characterized by projecting the costs associated with achieving specific reductions at the economy-wide level or by economic sector. The integrated model adopts a more comprehensive perspective on these interventions to enhance understanding of the potential outcomes resulting from their implementation. A traditional approach to this analysis employs cost curves to illustrate the costs of the technology linked to the target emission reduction. Integrated modeling forecasts outcomes for the entire economy over time, establishing direct connections to the stakeholders most impacted—policymakers, investors, and businesses—enabling them to utilize a multidimensional array of results to guide their decision-making.

In simple terms, the integrated model processes inputs specific to each country—including policy interventions and key assumptions such as population trends, GDP growth, and energy prices—to generate outputs on necessary investments, avoided costs resulting from policies, and co-benefits in areas such as employment and performance against energy consumption and emissions-related secondary targets. This framework addresses several core research questions: What are the projected total energy demand and sources for a country under both a business-as-usual scenario and a low-carbon scenario? How do variations in GDP growth, population, and energy efficiency within a given economy impact projected energy demand and emissions levels? How do emissions reductions after 2020 translate into sectoral impacts over time? For instance, what impact does the NDC of the United States have on its energy mix and the proportion of renewables in electricity generation over time? In what ways do reductions in greenhouse gas emissions after 2020 generate investment opportunities? The model calculates and extracts insights on "green jobs" that arise from national commitments, detailing the skills needed to fill these positions and offering insights into the challenges and opportunities related to talent acquisition and workforce training.

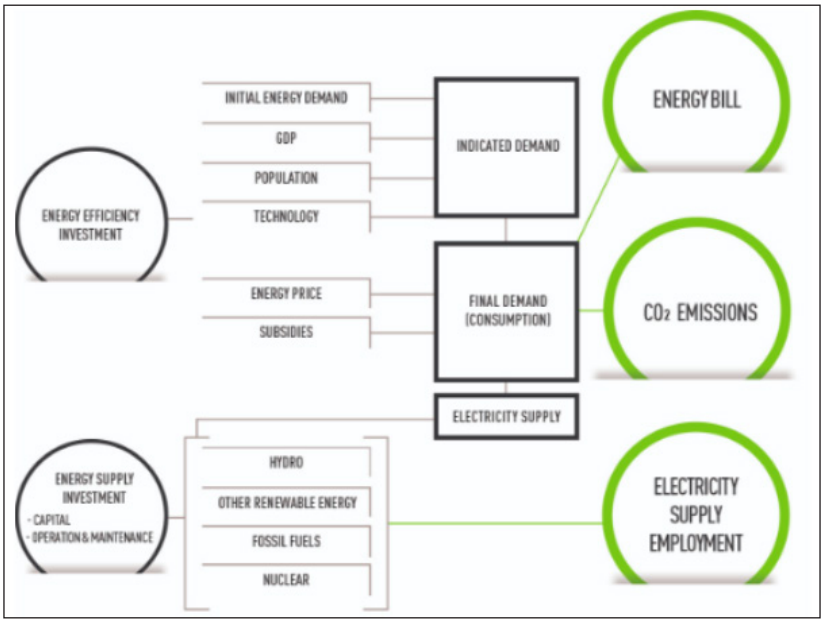


Figure 5-2: Integrated model for climate change

5-2-1. Challenges in the Integrated Climate Change Model

In contemporary society, there exist significant, often imperceptible, challenges and disparities. The coronavirus pandemic highlighted existing gaps; however, systemic instability associated with global climate change, environmental stresses, and social inequalities had already been exerting considerable pressure prior to 2020.

Authored by Dual Citizen LLC, the paper "The Climate Moment: A Systems-Approach to National Emission Reductions"[1] explores several of the most pressing challenges of our time. Specifically, it addresses the question of how to understand the linkages among carbon emissions, energy markets, investment, and employment, analyzing their historical dynamics and future potential for restructuring toward a more sustainable trajectory. The results, obtained from a systemic modeling of 11 countries, emphasize the following key findings:

What progress has each country achieved from 2015 to 2018, and what levels of future ambition are required to meet the 2030 NDCs?

1 Available at: https://dualcitizeninc.com/wp-content/uploads/2022/03/Final_Climate-Moment-2.0.pdf

What progress has each country achieved in decreasing the greenhouse gas emissions intensity of its economy from 2015 to 2018, and how should these initiatives adapt in light of projected GDP growth in the 2020s to fulfill the 2030 NDCs?

What unique challenges and opportunities does each country face in the 2020s, and what policy and market interventions could facilitate further progress?

5-3. GGEI Methodology[1]

The GGEI methodology is derived from the publicly available guidelines published in the OECD handbook on the construction of composite indicators[2]. Extensive consultations were conducted with the developers of other leading indices in this domain to leverage their methodological approaches to similar measurement challenges in the design of the index. The release of an index like the GGEI ultimately reflects a series of decisions that frequently weigh the depth and breadth of the subjects covered with the available data. Moreover, the concept of a "green economy" is still in its early stages and is being gradually expanded through both empirical and theoretical advancements in its various elements. The subsequent sub-sections offer further context regarding the methodological steps and challenges involved in the GGEI 2018 calculation.

5-3-1. Theoretical Framework

In the year preceding the publication of the first edition of the GGEI in late 2010, the Dual Citizen LLC team assembled a group of experts to establish the theoretical framework for what would become known as the GGEI. These experts, who had backgrounds in climate change negotiations, renewable energy, policy advocacy in the green economy, and branding and communications, identified four main dimensions for assessing perceptions: political leadership, policy, investment, and tourism. The initial edition of the GGEI measures perceptions in a generalized manner, soliciting respondents' views on national green reputation across these four areas.

Subsequent editions of the GGEI in 2011 and 2012 expanded this framework in two ways. The first performance metric was derived from the same surveyed variables, using third-party source datasets and, when necessary, in-

1 Available at: https://dualcitizeninc.com/methodology-ggei/
2 Available at: https://www.oecd.org/en/publications/handbook-on-constructing-composite-indicators-methodology-and-user-guide_9789264043466-en.html

ternally generated qualitative criteria. The second development entailed the expansion of the sub-dimensions within each of the four dimensions. This enabled a comprehensive conclusion to be reached from a set of interconnected sub-dimensions instead of depending on a single metric for each dimension (e.g., political leadership was characterized by heads of state, media coverage, international assemblies, etc.).

In 2014, Dual Citizen LLC commissioned a strategic review of the GGEI to revise its methodology and framework, ensuring a more accurate reflection of the various aspects of the green economy. This process resulted in two significant changes. The first was to broaden the sectors addressed beyond tourism to encompass other efficient areas such as construction, transportation, and energy. The second was to integrate environmental performance with GGEI, allowing for an examination of both the economic and environmental pillars of the green economy through perceptions and performance outcomes. This review establishes a clearer connection between leadership and climate change, allowing for an exploration of whether national political rhetoric and policy have genuinely influenced the country's performance regarding climate change.

In early 2020, Dual Citizen LLC undertook a further strategic review of the GGEI, aiming to revise its methodology and framework to include considerations of country progress and distance from global sustainability goals. Additionally, there was an emphasis on further integrating social indicators pertaining to income and gender equality, along with independent environmental indicators associated with the SDGs. This process resulted in three major changes:

The first was to broaden the GGEI measurement approach to assess the change in performance from 2005 to the latest year for which data is available for the index, usually 2020. The data selection process needed to consider this requirement, as all datasets were required to encompass this time period.

Secondly, it benchmarked each indicator relative to globally verified targets. As of the first quarter of 2022, roughly half of the 18 GGEI indicators were benchmarked against these global targets. Other indicators are scaled relative to one another to facilitate measurement, and actions will be taken to incorporate global targets as they receive endorsement from the scientific community. The majority of established metrics, including the GHG emissions/GDP, GHG emissions/per capita, and various decarbonization sector indicators (across the five designated sectors), fail to have globally verified emissions targets. Considering the importance of reducing greenhouse

gas emissions in tackling the climate crisis, it is essential to evaluate these targets in the upcoming years to gain a clearer understanding of each country's emission trajectories within the context of the targets established through the COP process (2030 targets, net zero, etc.).

Thirdly, the index introduced three new indicators associated with the social dimension of the green economy and ESG: income equality and gender equality in the workplace (both found in dimension 1: climate change and social equity) and gender equality in governance (found in dimension 3: markets and ESG investing).

5-3-2. Data Selection

The GGEI employs data that fulfills two primary criteria: quality and coverage. Creating an index such as the GGEI reveals that data sets are frequently less comprehensive than they initially seem and seldom provide uniform coverage across various countries. This is partly attributable to the organizational structures of countries (e.g., the European Union, OECD, G20), which facilitate data collection initiatives and associated parameters. Robust data sets may exist for OECD countries, but not for the entirety of the G20. Moreover, data reported across countries may lack consistency; thus, even with comprehensive data coverage for a group of countries, the time series can be inconsistent, as some countries may possess more recent data than others.

Based on these facts, data selection employs a "top-down" rather than a "bottom-up" approach. This indicates that the primary dimensions and associated sub-categories are established based on the objectives of the GGEI. Subsequently, within this framework, third-party datasets were identified that offered the optimal value measure in accordance with the required GGEI country coverage, or, if needed, a system was developed to compute a quality score.

The top-down approach to data selection is considered defensive for two primary reasons. The first point is that the data at hand may not represent the most significant values to assess regarding a specific topic. Data can be distorted by outdated methodologies or organizational priorities that fail to address current significant issues. Establishing the overall framework guarantees that an indicator is shaped by the most significant issues rather than merely by those that are most readily measurable. Second, this approach is validated by its ability to focus attention on areas where data are deficient. Thus, it incentivizes national statistical offices, government ministries, and international bodies to prioritize the collection of these missing data, thereby

improving overall data availability and quality.

This "top-down" approach has limitations that must be acknowledged within the framework of the green economy. Understanding the green economy involves critical components that currently lack appropriate measurement methods. An example is green jobs, characterized by a vague job definition and inconsistent data across national profiles. Labor rights represent a significant issue globally; however, the complexity involved in establishing a consistent set of variables for definition and measurement has resulted in a lack of a coherent approach and relevant indicators for integration into the third dimension of GGEI. i.e., markets and ESG investing.

5-3-3. Data Collection

Various data sources are utilized to customize and fine-tune the model. The sources take into account both sectors, incorporating variables such as population, GDP, energy demand, and emissions, as well as time series data to enhance the understanding of historical trends and validate the model.

Specifically, the primary data sources used for country-level customization and calibration of the model include the World Bank's World Development Indicators (WDI), United Nations population statistics, the International Monetary Fund's World Economic Outlook (WEO) report, and the World Energy Balances report published by the International Energy Agency. Furthermore, several additional studies are utilized to better tailor the model to national contexts. This includes specific research on labor intensity and technology assessments, as well as national reports on energy policy and outlooks and their resultant emissions, such as the National Communications reports[1] from the United Nations Framework Convention on Climate Change (UNFCCC) and the Intended Nationally Determined Contributions reports published prior to the COP21 conference[2].

This data is verified for consistency across sectors and compared with national databases and forecasts. The estimates and predictions for both the current period (2000-2014) and the future (2015-2040) are thoroughly analyzed and verified.

1 National Communications

2 The Paris Agreement is a legally binding international treaty on climate change. It was adopted by 196 Parties at the UN Climate Change Conference (COP21) in Paris, France, on 12 December 2015. It entered into force on 4 November 2016.

5-3-4. Missing Data Imputation

Although significant efforts are made to identify data sources that offer sufficient country coverage, the lack of certain data is inevitable. Within the framework of the GGEI, this issue was particularly evident in the Markets & ESG Investing dimension. This was primarily because of the diverse profiles of the 160 countries, which include both advanced and emerging economies, making it sometimes impractical to find comprehensive data sources for all four sub-indices.

In this dimension, the method used to integrate missing data involved deriving approximate scores for countries lacking data by utilizing the average scores of five proximate countries in relation to factors that can be inferred. For instance, in a composite index evaluating a nation's attractiveness for renewable energy investment, if a data point for a country is absent, the missing value is estimated by taking into account its proximity to another country's data in the World Economic Forum's (WEF) Global Competitiveness Report. The missing data point is calculated by examining the scores of the five countries most similar to it in the WEF report and then averaging their scores in the composite index to determine the missing data point for the country in question. This method, like any imputation approach, is not without its imperfections and introduces specific assumptions regarding a nation's performance in one area of the economy based on its outcomes in another. However, regarding best practices for index construction and data aggregation, this approach is more responsible than leaving the value blank or assigning an arbitrary average score to countries with missing data.

The issue of missing data has also been addressed, albeit to a lesser extent, in the realm of environmental health for various reasons. In these instances, the absence of data results from a country's natural characteristics. For instance, if a country does not have forests, it is unable to generate value in this area, similar to how a landlocked country cannot create value in fisheries. In these particular instances, the countries involved were given the average score for the corresponding category. This approach is flawed, as it may credit or penalize a country for performance in an environmental category that does not exist, potentially skewing the overall results. Nevertheless, alternative options to our approach are less appealing and would subject the GGEI results to a higher risk of imbalance. Moreover, omitting these categories for the countries in question would assign greater significance to other dimensions and sub-indices in the overall result, leading to a scenario where internal weightings differ from one country to another. On the other hand, omitting these

values would unfairly penalize these countries for natural territorial features that are beyond their control.

5-3-5. Normalization, Weighting, and Aggregation

A consistent normalization protocol was applied to all reported values, using constant-price GDP at Purchasing Power Parity (PPP). The four dimensions and their subsets were given equal weights using a "top-down" data selection approach. The GGEI is clearly derived from a diverse array of underlying data sets, and a consistent methodology must be utilized for their collection. The normalization approach involved calculating the mean and standard deviation for each indicator or data set, which subsequently enabled the calculation of a z-score and provided the corresponding percentile. The percentile values can be summed uniformly to generate a country score expressed on a scale of 0 to 100. This approach is tailored to the specific factors taken into account when assessing each indicator, reflecting its progress over time and its distance from globally verified sustainability goals.

5-3-6. Examination of Causality

This model is utilized to assess the outcomes of policy interventions. Targets may be established, and the necessary investment to achieve them can be estimated, considering the cost of the technology (for instance, depending on the sector and energy source involved) and the timing of the target (for example, a learning factor is incorporated into the analysis). As a result of the investment, energy demand changes—such as those stemming from efficiency improvements—and the energy mix diverges from the baseline scenario, for instance, due to the expansion of renewable energies. The varying levels of energy consumption and the new energy mix will result in changes to the energy bill (e.g., leading to energy cost savings), providing an indication of economic performance (or utility) in relation to the necessary investment. The interventions were analyzed. Furthermore, the combined effect of changes in energy demand and the energy mix results in a reduction of greenhouse gas emissions. These emissions are then compared to the target in relation to a base year (e.g., 2005) and relative to GDP and population.

As implementing the investment necessitates labor (for example, to construct, install, operate, and maintain power generation capacity), the model also estimates employment. It estimates job creation in two ways: first, by considering the construction, storage, and disposal of fixed capital associated

with energy supply (e.g., coal-fired power plants); and second, by evaluating investment and the resulting energy savings in the context of energy demand management. Job creation, along with relative wages, is typically viewed as a cost in a standard cost-benefit analysis (CBA); however, governments often regard it as an additional benefit.

5-4. GGEI Introduced[1]

The GGEI comprises four dimensions and 18 indicators. The four dimensions are "climate change and social equity," "sector decarbonization," "markets and ESG Investing," and "environmental health," each containing specific indicators. Each dimension contributes equally (25 percent) to the total score, and each indicator is uniformly weighted across the four dimensions.

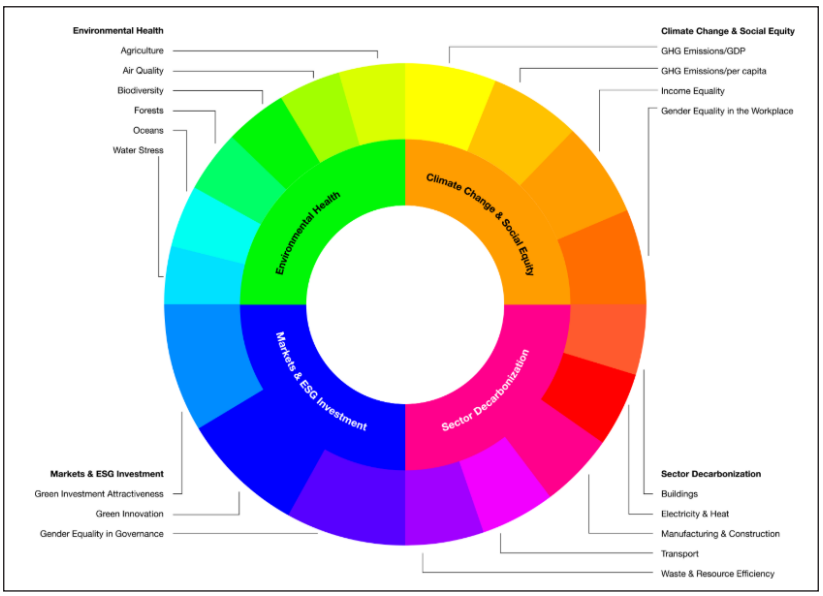


Figure 5-3: Four dimensions of the GGEI

5-4-1. Dimension One: Climate Change and Social Equity

Considering the historical connections between greenhouse gas emissions and economic activity, political leaders need to take social justice into account when addressing the reduction of greenhouse gas emissions.

1 https://dualcitizeninc.com/performance-index/

Table 5-2: Indicators under the climate change and social equity dimension

No.	Indicator	Description
1	GHG Emissions/GDP using exchange rates	This indicator examines countries' decarbonization efforts through the lens of the relationship between welfare production and greenhouse gas emission reductions. That is, to what extent have countries that are decarbonizing succeeded in raising welfare by lowering greenhouse gas emissions?
2	GHG Emissions/per capita	This indicator measures greenhouse gas emissions per capita, which can help explain the extent of a nation's climate change performance.
3	Income equality	The Gini coefficient assesses income equality in a country based on household income. A Gini coefficient of zero indicates perfect equality, while a coefficient of 100 indicates perfect inequality.
4	Gender equality in the workplace	The labor force participation rate refers to the percentage of the population aged 15 and older that is economically active, including all individuals who contribute labor for the production of goods and services within a specified timeframe. To calculate gender equality in the workplace, the female-to-male labor force participation ratio is determined by dividing the female labor force participation rate by the male labor force participation rate and then multiplying by 100.

5-4-2. Dimension Two: Sector Decarbonization

The activities of economic sectors, including construction, electricity and heating, industry, and transport, in the context of decarbonization, outline the green economy vision embraced by many countries. Many countries can enhance productivity and lower their greenhouse gas (GHG) emissions by deploying resources more efficiently in these sectors.

Table 5-3: Indicators under the sector decarbonization dimension

No.	Indicator	Description
1	Buildings	Buildings represent a crucial focus in the decarbonization initiative, as they play a substantial role in greenhouse gas emissions. In New York City, it is estimated that buildings account for over 50 percent of total greenhouse gas emissions.
2	Electricity and heat	Electricity and heat are crucial targets in the decarbonisation effort, with estimates indicating that over half of global energy consumption relies on heating, primarily for residential and industrial purposes. In the developing world, electrification targets involve a trade-off between delivering electricity and heat to the majority of the population while minimizing significant increases in greenhouse gas emissions.
3	Manufacturing & Construction	Factories and manufacturing facilities likewise represent a major target in the decarbonization effort due to their substantial contribution to greenhouse gas emissions. Innovations in the production of zero-carbon steel and concrete could help achieve greenhouse gas emission reduction targets by 2030.
4	Transport	Transport is another sector that significantly contributes to global greenhouse gas emissions. This sector is experiencing growth due to the increasing popularity of electric vehicles. Electric vehicles (EVs) and national policy incentives for consumers to drive them can significantly contribute to reducing greenhouse gas emissions. However, the development of electric vehicles in Asia and Africa is essential for achieving targets in this sector.
5	Waste and resource efficiency	Enhancing resource efficiency is critical in a world characterized by a rising population and finite resources. The waste and resource efficiency sector can advance in several areas, including enhancing recycling efforts. Minimizing waste generated by consumers and businesses while enhancing the emissions intensity linked to waste treatment.

5-4-3. Dimension Three: Markets and ESG Investing

The transition to a green economy necessitates substantial investment from both public and private sectors, along with a commitment from national leaders to foster the appropriate combination of fiscal and policy incentives to expedite green growth.[1]

Table 5-4: Indicators under the markets and ESG investment dimension

1 Environmental and social challenges, such as climate change causing more frequent and severe

No.	Sub-indices title	Description
1	Green investment attractiveness	This index is based on a proxy variable: data from the International Renewable Energy Agency on installed renewable energy capacity. This is a measure for determining the investment attractiveness of national markets.
2	Green innovation	This index is calculated using cumulative patent publication data for environmental technology from 1990 to 2005, along with cumulative patents from 2005 to 2019, as a method for measuring green innovation. The World Intellectual Property Organization patent database is utilized to obtain this information.
3	Gender equality in governance	Women globally remain underrepresented in decision-making roles within government, despite indications of recent progress. Gender equality in parliamentary representation remains unfulfilled. In the absence of representation at this level, women find it challenging to exert influence over policy.

5-4-4. Dimension Four: Environmental Health

Environmental health serves as the foundation for sustainable development. Tensions between natural ecosystems and human activities are on the rise, carrying implications for public health, community cohesion, and overall social well-being.

Table 5-5: Indicators under the environmental health dimension

No.	Indicator	Description
1	Agriculture	Agriculture plays an important part in the global economy, contributing to food security and nutrition, as well as the overall economic landscape, since numerous individuals and communities rely on agriculture for their livelihoods. Similar to numerous environmental health concerns, agriculture embodies a conflict between enhancing productivity and efficiency and preserving the quality of soil and other inputs for agricultural production.

weather crises, as well as gender and racial inequality, data security, and privacy, are major concerns. Discerning investors want assurance that their money is not going to companies that exacerbate or contribute to these problems. They prefer to invest in organizations whose goals are consistent with the ESG principles.

No.	Indicator	Description
2	Air Quality	Air quality is closely linked to health outcomes, particularly in developing countries. It is frequently emphasized as a prime example of how the green economy connects economic, environmental, and social outcomes concurrently. Furthermore, pollution linked to economic activities can adversely affect community air quality, underscoring the conflict between the income generated by these activities and the negative (and expensive) public health consequences they may produce.
3	Biodiversity	The relationship between biodiversity and the usefulness of ecosystems is evident. Maintaining a natural and healthy balance of species, both plant and animal, directly influences crop diversity and land management.
4	Forests	Forests are intricately connected to climate and the economy. Forests absorb and sequester carbon in trees and soil and are often referred to as carbon sinks when they take in more carbon from the atmosphere than they release. Forests are vital in the global economy, contributing both through the production of forest products for international markets and through the connections between local communities and their surrounding forests.
5	Oceans	The oceans are intricately connected to both climate and the economy. The oceans supply 50 percent of the Earth's oxygen and absorb 50 times more carbon dioxide than the atmosphere does. The oceans serve as vital channels for global trade, while various fish species inhabit these waters and are harvested for human consumption.
6	Water stress	Water stress is an increasing concern globally and is being intensified by climate change. Water stress generally refers to the percentage of freshwater withdrawn by all activities in relation to the total freshwater available. As climate-induced freshwater scarcity spreads, often exacerbated by political conflicts over freshwater resources, countries—especially in the developing world—are facing increasing water stress.

5-5. Countries' Ranking in the Index

Table 5-6: Top ten rankings in the GGEI for 2024 (total countries 160)

Rank	Country	Index
1	Sweden	0.799
2	Switzerland	0.781
3	Norway	0.747
4	France	0.744
5	Denmark	0.742

6	Iceland	0.713
7	Austria	0.711
8	England	0.704
9	Ireland	0.703
10	Portugal	0.701

Table 5-7: Ranking of OIC member countries in the GGEI for 2024 (total countries 160)

No.	Rank	Country	Index
1	39	Albania	0.566
2	42	Djibouti	0.560
3	70	Comoros	0.513
4	73	United Arab Emirates	0.507
5	75	Gabon	0.506
6	84	Kazakhstan	0.491
7	85	Maldives	0.487
8	95	Guinea	0.478
9	102	Cameroon	0.473
10	103	Togo	0.472
11	108	Jordan	0.459
12	109	Ivory Coast	0.458
13	110	Nigeria	0.454
14	114	Azerbaijan	0.448
15	116	Kyrgyzstan	0.443
16	121	Bangladesh	0.435
17	122	Niger	0.434
18	123	Qatar	0.433
19	124	Guinea-Bissau	0.432
20	126	Mali	0.428
21	129	Mozambique	0.424
22	134	Benin	0.419
23	135	Malaysia	0.415
24	137	Senegal	0.404
25	138	Tunisia	0.402
26	139	Burkina Faso	0.401
27	140	Türkiye	0.399

No.	Rank	Country	Index
28	141	Bahrain	0.399
29	142	Kuwait	0.397
30	145	Morocco	0.393
31	146	Lebanon	0.389
32	148	Mauritania	0.384
33	149	Chad	0.379
34	151	Tajikistan	0.377
35	153	Uzbekistan	0.364
36	154	Indonesia	0.363
37	155	Egypt	0.357
38	156	Pakistan	0.342
39	158	Turkmenistan	0.318
40	159	Saudi Arabia	0.314
41	160	Oman	0.262
42	-	Algeria	
43	-	Iran	
44	-	Uganda	
45	-	Sudan	
46	-	Somalia	
47	-	Sierra Leone	
48	-	Libia	
49	-	Gambia	
50	-	Afghanistan	
51	-	Guyana	
52	-	Suriname	
53	-	Yemen	
54	-	Syria	
55	-	Palestine	
56	-	Iraq	
57	-	Brunei	

5-6. Periodic Review of the Index[1]

Since the initial publication of the GGEI a decade ago, national green performance data has undergone periodic peer review and evaluation. The methodology for these surveys is outlined in detail below. The panel consists of over

1 Available at: https://dualcitizeninc.com/perception-survey/

5,000 international experts who contribute insights and perspectives on the subjects that characterize GGEI.

An internal survey was conducted in 2020 to collect expert opinions on effective strategies for advancing green initiatives in the 2020s. From January 28 to April 1, 2020, global experts in climate change, sustainable finance, corporate social responsibility (CSR), and environmental issues were posed a single question: How can policies, markets, and individuals be better aligned to achieve a green breakthrough in the 2020s? The online survey comprised 11 questions and garnered approximately 1,980 responses. The questions were categorized into two primary sections: an analysis of lessons from the 2010s and a forward-looking examination of innovative strategies for accelerating change in the 2020s.

The subsequent phase of the survey will focus on the theme "Achieving Green Progress in the 2020s". This aims to re-examine questions posed in the initial phase within the framework of two significant global events: the COVID-19 pandemic and Russia's invasion of Ukraine. Interviews are conducted with sustainability experts in Africa. The outcomes of these efforts are synthesized into a comprehensive report.

5-6-1. Perception Surveys

The Perceptions Survey for GGEI 2018 was conducted from April 23, 2018, to July 2, 2018. It asked respondents to assess national green performance across four key dimensions: Leadership and Climate Change, Efficient Sectors, Markets and Investment, and Environment. Since its initial publication in 2010, Dual Citizen LLC has created targeted lists for each of these four dimensions, featuring qualified experts who work globally on matters pertaining to the green economy and green growth.

Regardless of the actual survey results, this work has uncovered valuable lessons on the subject. One of the lessons learned is the substantial uncertainty surrounding the definition of the "green economy" across geographies, sectors, and particularly among different types of organizations and institutions (e.g., international organizations, civil society, the private sector, etc.). This finding underscores the necessity of a framework like the GGEI to enhance our understanding of information flows and the varying perceptions regarding different aspects of the green economy.

Another important lesson learned is that, although many individuals and institutions are engaged in sectoral or thematic aspects of the green economy,

there are only a limited number that concentrate specifically on knowledge generation and capacity building at the country level within the green economy itself. (Four exceptions include the UNEP Green Economy Initiative, the Green Growth Knowledge Platform, the Green Economy Coalition, and the Global Green Growth Institute). As a result of this reality, the 2018 GGEI Perception Survey was divided into four distinct groups of respondents based on the proximity of their professional work to the GGEI's four major dimensions. This approach guarantees more informed responses, as individuals knowledgeable about the performance of a sector within the green economy—such as buildings, transport, tourism, and energy—are not tasked with ranking environmental performance in areas like agriculture or forestry.

The information below aims to offer background and enhance transparency regarding the GGEI perception survey and its results. Additionally, it seeks to explain the significance of measuring and understanding perceptions alongside green economic performance.

5-6-2. Survey Design

In a broad sense, the GGEI perception survey design mirrors the performance index. The GGEI survey seeks to capture perceptions of a value measured in the performance index for each of the GGEI's core dimensions: leadership and climate change, productivity sectors/organizations, markets and investment, and environment. For instance, the GGEI Performance Index evaluates the climate change performance of each country, whereas the GGEI Perceptions Survey requests that respondents identify up to five countries they perceive as performing best in this area.

When designing a survey that compares perception and performance, such as this one, it is critical to create survey questions that are optimally aligned with the measured value. For example, if a performance metric indicates a national score at a particular moment, while the perception survey requests respondents to evaluate progress over time, the results are likely to differ significantly. In a similar vein, if the performance metric assesses a variable that respondents interpret differently—for instance, the diverse global understandings of what defines "cleantech"—the outcomes are likely to be inconsistent. Concerning the GGEI survey, a focused effort has been undertaken to tackle these issues while complying with the best practice survey design guidelines set forth by the American Association for Public Opinion Research (AAPOR).[1]

1 Available at: American Association for Public Opinion Research

5-6-3. Addressing Survey Bias

Perceptions, by their very nature, will invariably include some degree of bias. One of the primary services provided by GGEI is to compare perception with performance and highlight gaps, enabling our audience to comprehend the strategies and tactics most effective in addressing them. As previously stated, there are certain types of bias that GGEI diligently strives to eliminate. The first step involves excluding members of governments participating in the survey, ensuring they are not included on our distribution list, and eliminating any results that contain identifiable government email domains. The second involves making every effort to qualify survey respondents as thoroughly as possible. Respondents should avoid relying on general impressions when selecting their country and instead base their choices on actual experiences. An effort is made to restrict the number of responses from individuals who have previously submitted responses to the GGEI in earlier versions. The GGEI must ensure that it does not merely re-survey samples from prior years; instead, it should offer a new random selection of perception surveys with each subsequent survey. Certain indicators inherently experience both positive and negative bias. Concerning the GGEI's qualitative assessment of the head of state and the media, the data likely exhibits a positive bias, indicating that most countries tend to receive a neutral or positive score. This can be clarified by noting that the term "green economy" is primarily utilized in discussions surrounding new green initiatives and policies.

Another example of bias involves GGEI countries, which, because of their official designation, may be less recognized by survey respondents. Singapore serves as a prime example; its official status as a city-state may contribute to its lesser recognition in the GGEI survey, where respondents indicate the best-performing countries or states.

5-6-4. Survey Distribution

The GGEI Perception Survey is conducted entirely online and distributed primarily via email and listservs. This approach does indeed have its limitations. Although it facilitates broader distribution and larger sample sizes, it restricts the depth of understanding regarding respondents' perceptions that could be gained through follow-up questions and small focus groups.

The 2018 edition of the GGEI also made extensive use of social media, especially Twitter, to disseminate the GGEI Perception Survey. The survey was also conducted in French and Spanish, and further research was undertaken

to reach individuals residing in countries where French or Spanish is the official language. This multilingual approach, introduced in 2018, enhances the breadth of responses and geographical diversity of the GGEI.

5-6-5. Survey Respondents

The GGEI Perception Survey is global in scope and encompasses thousands of experts across various fields, including climate change, productivity sectors and organizations, support for green growth, clean technology markets, and diverse environmental categories such as agriculture, water, fisheries, and forests on an international scale. In total, 3,363 responses were collected for the 2018 GGEI Perception Survey. The geographical breakdown is as follows: North America 19%, Europe 24%, Asia 19%, Latin America and the Caribbean 19%, Africa 15%, and Oceania 4%.

5-7. GGEI Data Subscription[1]

Partners and audiences that subscribe to GGEI have access to the complete and most recent GGEI information, along with data from previous editions. Interactions can be tailored to meet specific needs: certain partners may seek the entirety of GGEI data, while others might prefer an interpretation of the results relevant to their countries, regions, or key mission topics. The data can be readily incorporated into third-party models associated with sustainability assessments and ESG investing. Our objective is consistently to foster collaboration that is specifically tailored to these unique needs. To initiate the discussion, here is an example of the structure of a typical GGEI subscription:

Providing comprehensive data from the most recent version of GGEI. The four primary dimensions of the GGEI—climate change and social equity, sector decarbonization, markets and ESG investing, and environmental health—are each characterized by distinct thematic sub-categories. We gather performance data on various topics and themes, measuring progress over time (from 2005 to the present) and assessing their alignment with global sustainability goals. Only customers who are subscribed will receive the complete and exclusive report.

The report presents an interpretation and synthesis of the results, translating them into more accessible topics and evaluating opportunities for clients. The report's overall structure should encompass an executive summary, identification of key trends, implications for the client based on its distinctive approach

1 Available at: https://dualcitizeninc.com/data-subscription/

to the green economy, sustainability, and/or ESG investing, as well as targeted recommendations for enhancing the rating in the future. Specific areas of focus may include capacity building, education, strategic communications, and data analytics.

A one-day virtual or in-person workshop that connects GGEI findings to the client's specific strategic requirements. One workshop model involves assigning individuals to manage green data, thereby enhancing their understanding of GGEI data and its usefulness to them. In other instances, the workshop may include representatives from various stakeholders to enhance their overall understanding of the concept of a green economy. Additional customized models and approaches may be investigated with a deeper comprehension of customer priorities in this area.

The objective is consistently to customize reports according to each subscriber's requirements, ensuring that our offerings provide distinct value to their work.

5-7-1. Customization of the Integrated Model

The option for country-level customization enables customers to create and request their own scenarios based on the model. Here is a sample of various assumptions and policies available for customers to select from.

Policies and goals	Unit
Renewable Energies	Percent
Renewable energy capacity	250 mW
Renewable energy production	MWh/year
Improving energy efficiency	Percent per year
Energy intensity	TJ/$
Investment (annual or cumulative) in RE (total or by technology)	$/year
Investment (annual or cumulative) in EE (total or by sector)	$/year
Targeted emission reduction	Percent or tonne

Assumptions

GDP Growth	Percentage
Population Growth	Percent
Coal price	TJ/$
Oil price	TJ/$

GDP Growth	Percentage
Natural gas price	TJ/$
Electricity price	TJ/$
Baseline energy efficiency improvement	Percent per year
Technology cost (RE, technology-specific), capital, and O&M cost	$/MW
Energy efficiency cost	$/ton
Labor intensity of technologies (construction and O&M)	people/MW
Job creation per million dollars of investment	jobs/$/Year
Discount rate	Percent

5-7-2. How Applicants Can Use the Model

A systemic approach offers various entry points for analyzing the outcomes of both current and future implementations. Modeling results are valuable for planning low-carbon development, particularly concerning net-zero ambitions. They aid in formulating just transitions within the energy sector by identifying areas of job losses and gains. Additionally, these results help pinpoint investment opportunities that promote carbon reduction and foster resilient economic growth, especially regarding the potential for creating local value chains.

Generally, situations where model results can be used for decision-making and are subject to modification and planning include:

- Establishing goals that are essential for attaining stated national and international objectives
- The implementation cost for the anticipated objectives encompasses the distribution of investments among economic actors (e.g., public versus private), along with the proportionate size of the investment (e.g., as a share of GDP)
- Realized co-benefits related to job and income creation, reduced air pollution and health costs, along with enhanced habitat quality and biodiversity

Conclusion

The GGEI, the first of its kind, was published in 2010. Ever since, it has tracked countries' performance in green economies over the past decade. This indicator is assessed on two grounds: "progress tracking" and "goal verification."

The initial edition of the GGEI solely assessed perceptions in a broad sense, inquiring respondents about the national green reputation across four domains. The subsequent editions of the GGEI in 2011 and 2012 expanded this building in two ways. The initial performance measure consisted of the same values inquired about in the survey, utilizing datasets from third-party sources and, when applicable, internally generated quality metrics. The second development involved expanding the subsets of each of the four dimensions, allowing for the generation of an overall result from a set of related subsets rather than relying on a single measure for each dimension.

In 2014, the Dual Citizen Foundation carried out a strategic review of the GGEI to revise its methodology and framework, ensuring a more accurate reflection of the various aspects of the green economy. This process resulted in two significant changes. The first was to broaden the sectors addressed beyond tourism to encompass other efficient areas such as construction, transportation, and energy. The second was to integrate environmental performance with GGEI, allowing for an examination of both the economic and environmental pillars of the green economy through perceptions and performance outcomes.

In early 2020, a strategic review of the GGEI was conducted to revise its methodology and framework, incorporating issues related to country progress and distance from global sustainability goals. The changes, revisions, and compilation of part of the index through expert opinions in the design of the GGEI have led to the absence of a time series for the index, which would allow for an appropriate time trend to compare the actions of different countries.

Another issue is the "top-down" approach to data selection in index calculations. In a top-down approach to data selection, the available data may not represent the most significant values to measure for a specific topic; it could also be outdated and fail to reflect current priorities. Alongside the significant limitations of the "top-down" approach to data selection, the methods used for imputing missing data also encounter difficulties. In the GGEI, this issue was most prominent in the ESG markets and investing dimension, where it is impossible to find complete data sources for the four sub-categories due to the diversity of the 160 country profiles between more advanced economies and

developing economies. The method employed involved calculating approximate scores for countries lacking data by using the average scores of the five countries most similar in terms of inferred factors.

The outcome of the two "top-down" approaches to data selection and the replacement of "missing data" indicates that countries with smaller economic size and complexity rank higher among OIC countries. In comparison, those with greater economic size and complexity are positioned lower on the list. This arrangement is not deemed very logical. In the following chapter, the Green Economy Index for the member countries of the Islamic Conference (IGEI) has been modeled and calculated.

Chapter Six:

Designing a Green Economy Index for the Organization of Islamic Cooperation Member States (IGEI)

6-1. Calculating the Green Economy Index for OIC Member States

The green economy, as a model for sustainable development, represents one of the most significant approaches introduced in the 21st century to address environmental, economic, and social challenges. While emphasizing economic growth and development, this economic model is also dedicated to environmental protection and social justice. In Islamic countries, a green economy can be integrated with Islamic principles like justice, responsibility, and waste avoidance to establish a distinctive model for sustainable development. Consequently, it is crucial to introduce an index that ranks the status of the green economy in Islamic countries, enabling the formulation of more effective policies through precise assessment. This section aims to introduce a new composite indicator, known as the Green Economy Index for OIC Member States, hereafter referred to as the IGEI.

The OIC, also known as the Organization of the Islamic Conference, is the world's second-largest international organization, after the United Nations, with 57 member states. These countries are distributed over four continents and feature large Muslim populations. The members are primarily situated in

Africa, the Middle East, South and Southeast Asia, Central Asia, and certain regions of Europe and Latin America, illustrating the extensive geographical distribution and the cultural, economic, and political diversity present among them.

The organization's history began in 1969 when the leaders of Islamic nations resolved to establish an organization for increased solidarity and cooperation following the fire at Al-Aqsa Mosque in Palestine. The primary goal of this organization was to advocate for the interests of the Islamic world on the global stage and foster unity among Islamic nations. In recent decades, the OIC has broadened its scope of activity to encompass economic, social, cultural, environmental, and human rights issues.

The member states of the Islamic Conference exhibit significant diversity owing to their geographical and economic differences. Countries such as Saudi Arabia, Qatar, the United Arab Emirates, and Kuwait are significant producers of oil and gas, boasting strong economies. In contrast, countries such as Gambia, Niger, and Afghanistan, which are less affluent, are among the members and are confronted with greater economic and environmental challenges. This organization aims to bridge these gaps and enhance collaboration among Islamic countries through the implementation of economic and development cooperation programs.

6-1-1. The Notion and Significance of Green Economy

Since the early 1970s, the concepts of "green economy or green growth" and "green products" have emerged in economic literature. The green economy is frequently juxtaposed with the brown economy; the latter refers to an economy that utilizes fossil and non-renewable resources indiscriminately. Compliance with environmental rules at all phases of production assures that the product is green.

Numerous definitions and interpretations of the green economy have been proposed so far. The "green economy" can be analyzed at both microeconomic and macroeconomic levels. At the micro level, it denotes an economy characterized by manufacturers and small enterprises manufacturing green products. From a macroeconomic standpoint, the situation is more complex, as it is insufficient to merely manufacture green products; rather, the production of these items must be evaluated against the quantity of non-renewable resources utilized. The proportion of green products in a nation's GDP must be distinguished from the proportion of products originating from that nation's

oil resources; thus, evaluating the contribution of each category to GDP will elucidate the standing of the green economy in the ultimate macroeconomic analysis.

The European Union defines a green economy as one that "drives growth, creates jobs, and eliminates poverty" through investments in nature for the planet's long-term survival. The European Union has focused more on factors contributing to economic growth and, to transition to a green economy, highlights the importance of reducing carbon production, utilizing resources efficiently and rationally, and promoting sustainable consumption and production practices. In implementing these measures, the European Commission focuses on market mechanisms like tariffs, customs duties, and environmental subsidies, as these are viewed as essential tools for achieving the economic, social, and environmental objectives of sustainable development.

The UNEP defines a green economy as one that "enhances human well-being and social equity while substantially decreasing environmental risks and resource scarcity." The shared element in various interpretations of the green economy is the decrease in carbon production and emissions. UNEP states that the green economy aims to promote greater alignment among the three dimensions of sustainable development. The development of the economic system aims to strengthen and enhance natural capital and land, while also increasing economic productivity and reducing social inequalities.

Based on these definitions, the green economy is recognized as essential for sustainable development. In other words, the transition to a green economy is critical to accomplishing the SDGs.

6-1-2. Green Economy in Islamic Countries

In Islamic countries, concepts of a green economy can be integrated with religious principles, including economic justice, stewardship of natural resources, and support for marginalized populations. Numerous Islamic teachings highlight the importance of minimizing waste and optimizing resource efficiency, aligning closely with the principles of a green economy. Islamic countries, possessing significant natural resources such as oil, gas, and minerals, bear a crucial responsibility for their effective management. Transforming these resources into opportunities for sustainable development, by investing in clean technologies and minimizing reliance on fossil fuels, constitutes a fundamental solution for achieving a green economy in these nations.

Conversely, a significant barrier to the advancement of a green economy in numerous Islamic countries is their economic reliance on the export of fossil resources. Considering the gradual decline in reserves of these resources and the international pressures to reduce greenhouse gas emissions, these countries need to adopt new strategies aimed at diversifying their economies and developing sustainable technologies. Structural reforms, investment in renewable energy, and the enforcement of strict environmental laws can contribute to progress in this area.

Consequently, the development of a tailored index for Islamic countries can significantly influence the direction of economic and environmental policies. This index will play a crucial role in assessing the performance of countries regarding energy efficiency, the adoption of clean technologies, and the management of waste and resource consumption, thereby determining the status and ranking of Islamic countries on their journey toward a green economy. Consequently, this index can serve as a basis for formulating more precise policies aimed at sustainable development and minimizing environmental damage in Islamic countries.

6-2. IGEI's Primary Criteria

Specific and comprehensive criteria must be examined when determining the IGEI. These criteria can evaluate the status of each country regarding economic, environmental, and social sustainability, offering a fair comparison among Islamic countries. The IGEI comprises several essential components, outlined as follows:

Natural Resource and Environmental Management:

This criterion includes efficiency in exploiting water resources, reduction of greenhouse gas emissions, use of renewable energy, and reduction of deforestation.

Economic Policies:

Evaluation of government support policies for the development of clean technologies, the amount of investment in sustainable energies, and financial facilities for environmental projects.

Social Justice and Human Sustainability:

Investigating the extent of poverty reduction, access to health and educational services, and empowerment of local communities regarding environmental protection.

These criteria assist Islamic countries in evaluating their performance regarding sustainable development and offer solutions for enhancement. Through the development of this index, governments and international institutions can create more effective policies aimed at fostering a green economy and safeguarding the environment in Islamic countries.

6-2-1. Natural Resource and Environmental Management

Natural resource and environmental management is regarded as one of the most crucial pillars of a green economy. Given that Islamic countries possess abundant resources such as oil, gas, water, and fertile land, they need to implement comprehensive strategies for the sustainable utilization of these resources. The following are some of the most important factors:

A) Sustainable management of water resources

Islamic countries face challenges, including water shortages and a rising demand. Implementing water recycling policies, managing consumption, and using efficient technologies for water purification can be effective in this context.

B) Reduction of greenhouse gas emissions

Reducing fossil fuel consumption, utilizing renewable energies such as solar and wind energy, and improving energy efficiency are critical steps in this direction.

C) Protection of forests and ecosystems

Preventing deforestation, increasing vegetation cover, and restoring forests are critical actions for addressing climate change and safeguarding biodiversity.

D) Waste management and recycling

Increasing material recycling, promoting resource reuse, and decreasing waste production can all contribute to the reduction of environmental pollution.

By implementing appropriate policies in this area, Islamic countries can sustainably utilize their natural resources and make progress toward developing a green economy. Fostering a culture of responsible consumption and encouraging public participation in environmental protection are crucial steps in this context.

6-2-2. Green Economy Policies

Green economy policies consist of various strategies and actions undertaken by public and private sectors to promote sustainable development, minimize

adverse environmental effects, and enhance the efficiency of natural resource use. These policies prioritize renewable energy, lowering carbon emissions, optimizing energy usage, and advancing clean technologies. In Islamic countries, green economy policies may be implemented through legal reforms, financial incentives, and investments in sustainable sectors.

Some of the most important criteria for green economy policies are as follows:

A) Investment in renewable energy

Allocating budgets and resources for the development of solar, wind, and hydropower as alternatives to fossil fuels.

B) Financial incentives for green industries

Lowering taxes and offering low-interest loans to businesses engaged in sustainable technologies.

C) Reforms in fossil fuel subsidies

Reducing or eliminating subsidies that contribute to excessive fossil fuel consumption and redirecting these resources toward clean energy.

D) Environmental laws and regulations

Implementing and upholding rigorous environmental standards for industries and businesses to minimize pollution and encourage the use of natural resources.

E) Education and culture building

Raising public awareness regarding the advantages of a green economy and motivating businesses and consumers to opt for sustainable products and services.

Implementing green economy policies can enhance resource efficiency, decrease environmental pollution, and generate job opportunities in sustainable sectors. By implementing suitable strategies in this area, Islamic countries can advance in sustainable development and attain a more favorable position in the green economy index.

6-2-3. Social Justice and Human Sustainability

Social justice and human sustainability are regarded as essential elements of a green economy, which emphasizes the fair distribution of resources, the alleviation of poverty, the generation of sustainable job opportunities, and the guarantee of universal access to vital services such as education and health-

care. In Islamic countries, this concept aligns with Islamic principles, such as economic justice and support for low-income individuals.

Some of the key criteria in this section are as follows:

A) Reducing poverty and economic inequality

Implementing support programs for low-income groups, along with financial and educational assistance for disadvantaged communities.

B) Access to education and health services

Investing in sustainable education and public health to enhance the quality of life while promoting awareness of environmental protection.

C) Creating green job opportunities

Developing sustainable industries that both decrease environmental damage and create new job opportunities.

D) Supporting local communities in sustainable development

Strengthening public participation in decision-making related to natural resource and environmental management.

E) Intergenerational justice

Ensuring the sustainable utilization of natural resources to benefit future generations.

Paying attention to these criteria in Islamic countries' green economy policies can help reduce social inequality, increase public welfare, and foster sustainable societies.

6-2-4. Role of Religion and Culture in Environmental Sustainability

In Islamic countries, religion and culture significantly influence the approaches taken towards environmental protection and sustainability. Numerous Islamic teachings highlight the importance of conserving nature and avoiding the wasteful use of resources. Some of the important criteria in this area include:

A) The role of Islamic teachings in preserving the environment

Inquiring into the impact of Islamic principles on the environmental and economic policies of Islamic countries.

B) Public education and awareness

The extent to which environmental notions are integrated into religious and

cultural education, including the role of schools, mosques, and religious institutions in promoting an environmental protection culture.

C) Community engagement

The role of religious scholars and leaders in promoting a green economy and supporting sustainable development policies.

D) Sustainability-related cultural values

How the indigenous culture of each Islamic country affects people's environmental behavior and sustainable lifestyles.

Attending to these criteria can significantly influence society's perspective on environmental protection and the adoption of green economy policies. Islamic countries have the potential to serve as a successful model for sustainable development by leveraging their religious and cultural strengths.

6-3. Introducing the IGEI: A Multidimensional Indexing Approach

Given the growing global importance of the green economy and the SDGs, as well as nations' increased focus on related topics, significant efforts have been made to develop and implement various indices and metrics to track countries' progress toward these goals. One such index is the GGEI, introduced by the Dual Citizen Foundation. This study will introduce an alternative metric, the IGEI, specifically for member countries of the OIC, for three reasons. Firstly, the GGEI has not been calculated for several important Islamic countries, such as Iran, Algeria, and Iraq. Secondly, under the existing ranking methodology, countries with smaller economic volumes and lower complexity are positioned at the top of the OIC ranking, whereas those with larger economic volumes and greater complexity are ranked lower. This anomaly appears to result from the index's approach to missing data. Ultimately, the GGEI is not presented as a time series, which hinders a thorough analysis and comparison of the progress made by different countries in reaching green economy goals over time. To address these three limitations, the IGEI will be computed.

In light of the criteria and factors influencing the green economy, and with the goal of ensuring maximum compatibility of the calculated index with other related items in the conducted studies, the data have been organized into four primary dimensions, which are detailed below.

6-3-1. Dimension One: Climate Change and Social Justice

Political approaches are crucial for advancing the concept of a green economy and reducing greenhouse gas emissions on a national scale. However, considering the historical connection between greenhouse gas emissions and economic activity, these methods for reducing emissions must also take social justice into account. The first dimension of the IGEI comprises two indicators pertaining to climate change performance and two indicators associated with social justice. Progress between 2005 and the present is assessed for all four indicators. Social justice objectives have also been taken into account. Currently, there is no disaggregated data available at the country level for indicators of greenhouse gas emissions in relation to gross domestic product (GDP) and emissions per capita. This lack of data makes it difficult to determine the extent to which emission intensity must improve to remain on the 1.5°C warming path.

6-3-1-1. Greenhouse Gas Emissions

The greenhouse gas emissions index, relative to GDP, serves as a crucial metric for assessing countries' performance regarding climate change, as it evaluates total greenhouse gas emissions in relation to production. This index indicates the extent to which countries are decarbonizing and their success in generating greater economic welfare (GDP) while reducing emissions.

A review of published data indicates that, based on the actions and policies implemented by countries, the CO2 production has had a global downward trend since the early 1990s; however, this trend has not been consistent across all countries.

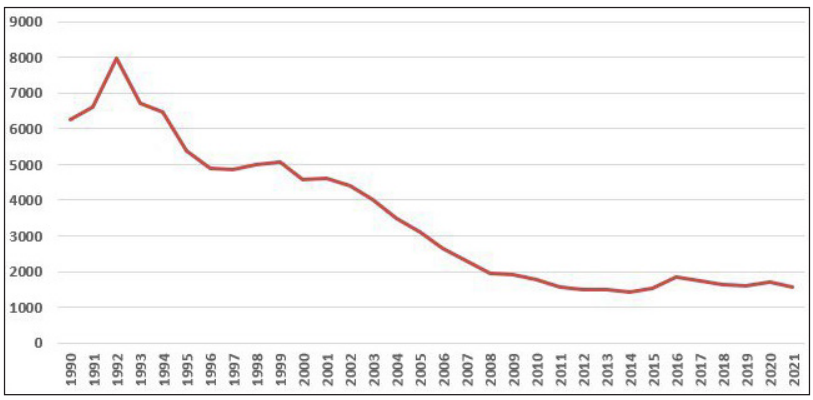


Figure 6-1: CO2 emission trend (tons per million GDP)

Source: www.climatewatchdata.org

6-3-1-2. Per Capita Greenhouse Gas Emissions

The per capita greenhouse gas emissions index is a key measure for evaluating the climate performance of countries. This index analyzes overall greenhouse gas emissions in relation to a country's population, offering a distinct perspective on the decarbonization process of nations. It assesses whether various countries are reducing greenhouse gas emissions in proportion to their populations. A review of published data indicates that the overall trend of this index has been declining since the early 1990s. However, from 2015 to 2018, this trend underwent a slight increase.

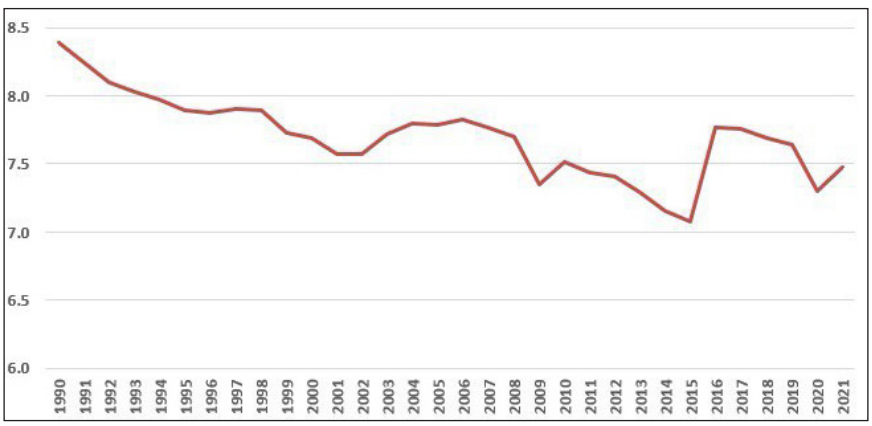


Figure 6-2: Global per capita CO2 emissions trend (tons per person)

Source: www.climatewatchdata.org

6-3-1-3. Income Equality

The Gini coefficient quantifies the degree of income inequality in a country. This coefficient is computed based on household income. A Gini coefficient of zero signifies perfect income equality, whereas a Gini coefficient of 100 represents absolute inequality. The data indicate that, on average, global income inequality, despite fluctuations at the country level, improved until the mid-2000s and has remained relatively stable since that time. It is clear that this trend has not been consistent across countries.

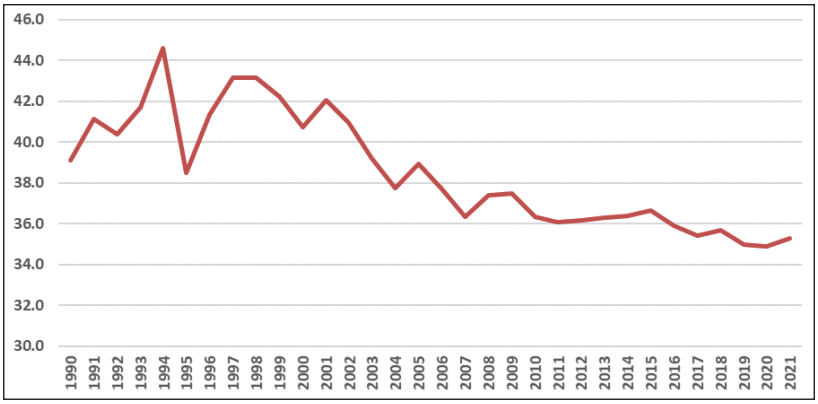


Figure 6-3: Average global trend of the Gini coefficient

Source: The World Development Indicators (WDI)

6-3-1-4. Gender Equality in the Workplace

The labor force participation rate indicates the percentage of individuals aged 15 and older who are engaged in economic activities. This encompasses everyone who contributes their labor to create goods and services within a specified timeframe. To determine gender equality in the workplace, the ratio of female to male labor force participation rates is obtained by dividing the female labor force participation rate by the male labor force participation rate and then multiplying the result by 100. The chart below indicates that, overall, the trend of women's participation in the global economy has been on the rise.

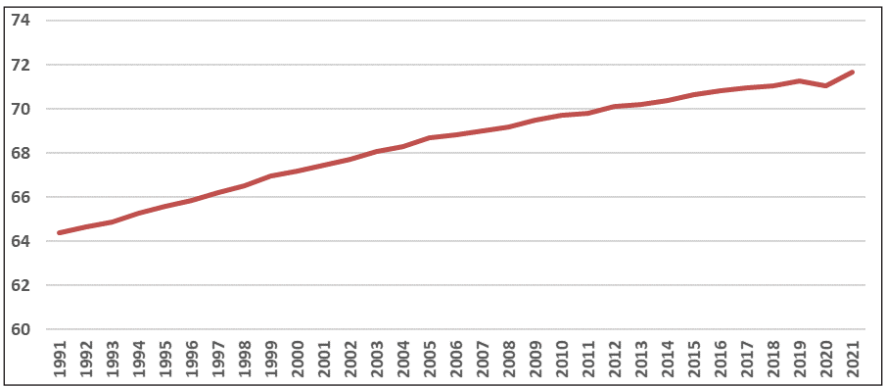


Figure 6-4: Global trend of female-to-male participation ratio

Source: The World Development Indicators (WDI)

6-3-2. Dimension Two: Carbon Reduction in Economic Sectors

The performance of productivity sectors—including buildings, electricity and heat, manufacturing and construction, transport, and resource efficiency and waste management—is central to the green economic visions of most countries. By transitioning to more efficient resource use in these sectors, many countries can enhance their economic productivity while also reducing greenhouse gas emissions.

6-3-2-1. Buildings

The buildings sector is regarded as a key area for carbon reduction, given its substantial contribution to greenhouse gas emissions. This index illustrates the emissions levels by sector expressed as a percentage of GDP. Data indicate that the emission trend in the construction sector has been declining for approximately the last two decades.

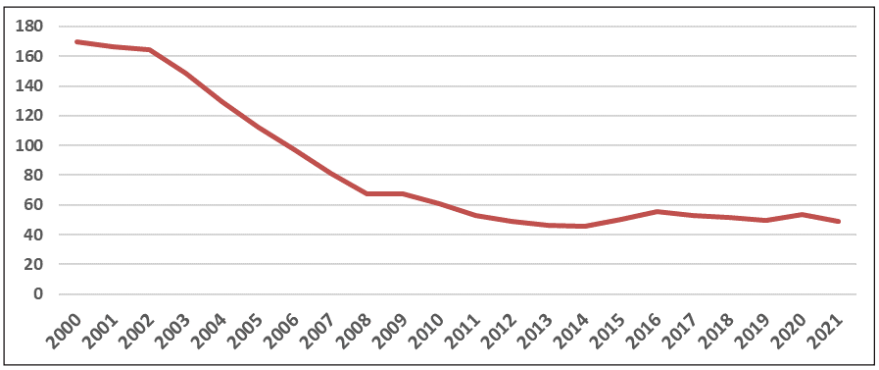


Figure 6-5: Carbon emission trend in the building sector

Source: www.climatewatchdata.org

6-3-2-2. Electricity and Heating Production

Electricity and heating represent another vital component of carbon reduction. Estimates indicate that over 50% of global energy consumption is associated with heating, primarily used for residential and industrial purposes.

In developing countries, electrification presents various challenges, as it is essential to find a balance between enhancing access to electricity and heat for the population while also mitigating the rise in greenhouse gas emissions. Consequently, carbon reduction pathways in this sector are intricate, influenced by variations in energy infrastructure and the level of investment that countries allocate for upgrading this infrastructure. A review of the data indi-

cates that since the beginning of 2000, the average trend in carbon emissions (relative to GDP) worldwide has been decreasing. This suggests that countries are increasingly attentive to the issue of emissions of this type of pollutant.

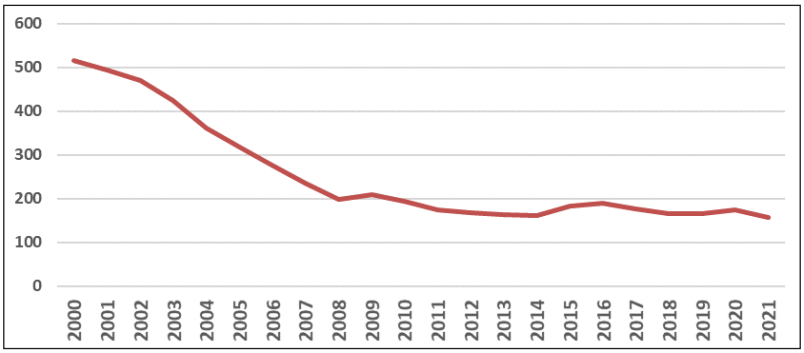


Figure 6-6: Average carbon emission trend in the electricity and heating sector (relative to GDP)

Source: www.climatewatchdata.org

6-3-2-3. Manufacturing and Construction Sector

The manufacturing and construction sector is a major target for carbon reduction, as it significantly contributes to greenhouse gas emissions. Carbon-free steel and concrete present the potential for innovation to achieve the necessary rate of carbon reduction to meet emissions reduction targets by 2030. Numerous prominent companies in the construction materials sector have established science-based targets, reflecting advancements in this area. This has resulted in a declining trend in the average emissions of pollutants within this sector.

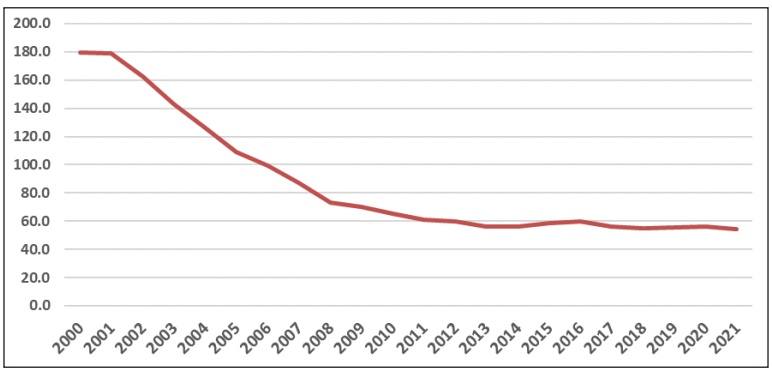


Figure 6-7: Average pollutant emission trend in the manufacturing and construction sector (relative to GDP)

Source: www.climatewatchdata.org

6-3-2-4. Transport

The transport sector is a significant contributor to global greenhouse gas emissions. This sector has garnered significant attention due to the rising use of electric vehicles (EVs) and the incentive policies implemented by various countries to promote their use. Enhancing energy efficiency in this sector is essential, particularly in light of the anticipated rise in vehicle usage due to economic growth in Asia and Africa. The rising trend of pollutant production in this sector suggests that countries should reassess their transportation sector development policies.

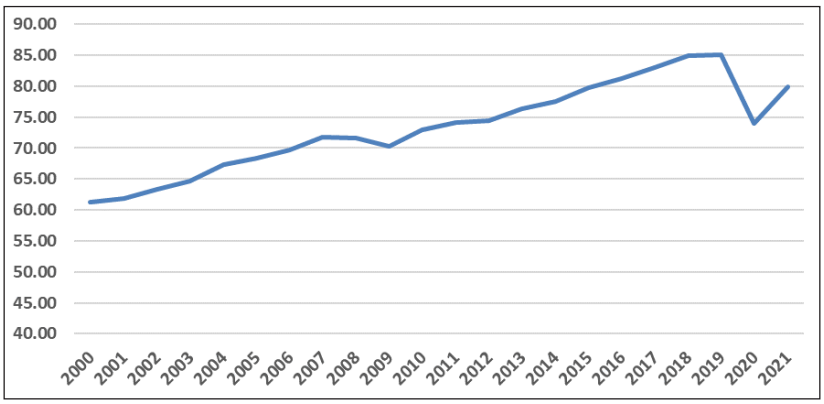


Figure 6-8: Average trend in pollutant emissions in the transport sector

Source: www.climatewatchdata.org

6-3-2-5. Resource Efficiency and Waste Management

Enhancing resource efficiency is crucial in a world characterized by a growing population and limited resources. There are several areas where the waste management and resource efficiency sector can be enhanced, such as:

- Increasing recycling
- Reducing waste by consumers and businesses
- Improving the intensity of greenhouse gas emissions associated with waste processing
- Developing circular economy models where economic processes are designed to restore and regenerate resources

The average efficiency trend in recycling and waste generation indicates that this trend has been decreasing overall since the early 2000s.

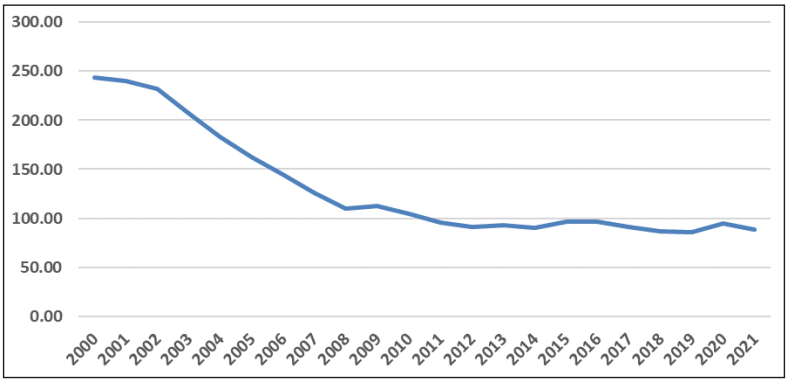


Figure 6-9: Average resource efficiency and waste generation trend

Source: www.climatewatchdata.org

6-3-3. Dimension Three: Markets and ESG Investing

The transition to a green economy requires substantial investment from both public and private sectors, along with a commitment from national leaders to foster the appropriate combination of fiscal and policy incentives to accelerate green growth. Unlike 2010, when the first GGEI was released, sustainability has become a primary focus for investors and leaders in the private sector. Risks and investment opportunities related to climate change are on the rise, and stakeholders and customers are demanding accountability from those who do not prioritize sustainability. The third dimension of IGEI provides insight into the markets that are most engaged in green investment and innovation, as well as the degree to which they are advancing towards gender equality in governance.

6-3-3-1. Green Investment Attractiveness

Data on installed renewable energy capacity from the International Renewable Energy Agency (IRENA) was adopted as a benchmark to assess the attractiveness of national markets for investment in calculating IGEI. To achieve this, the nearly 20-year trend of newly installed renewable capacity has been utilized to pinpoint countries that have drawn considerable investment in renewable energy throughout this timeframe. Meanwhile, a promising aspect is the increasing trend of these capacities, as illustrated in Figure 6-10. This chart illustrates the global average trend since the beginning of 2000, showing that it has nearly doubled over a period of approximately 23 years.

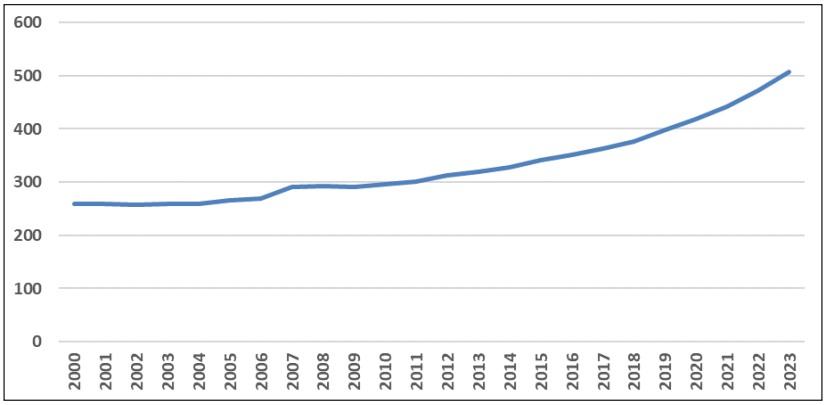


Figure 6-10: The trend of the average global capacity of installed renewable electricity equipment

Source: www.irena.org

6-3-3-2. Green Innovation

In this investigation, patent data pertaining to environmental technology were extracted from the World Intellectual Property Organization database to calculate and measure IGEI. This method, encompassing two 15-year periods, documents the advancement of various markets in fostering green innovation within their jurisdictions. The chart below illustrates the ratio of patents registered in the field of environmental technologies relative to global GDP. This trend has been on the decline since the start of 2000. There can be several reasons for this. For instance, the increasing difficulty in uncovering new fields, despite prior advancements and significant leaps in knowledge, may be one of the contributing factors.

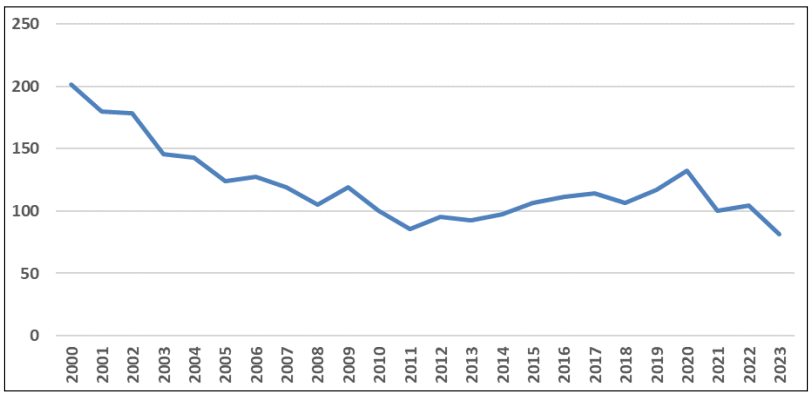


Figure 6-11: Average global patenting trend (relative to GDP)

Source: www.wipo.int

6-3-3-3. Gender Equality in Governance

Over the past few decades, women have been underrepresented in government decision-making positions in most countries, although evidence suggests a relative improvement in this area. Gender equality in parliamentary representation remains a distant goal. In the absence of representation at this level, women face significant challenges in influencing policies. The IGEI assesses the percentage of women's representation in national parliamentary institutions as a metric for evaluating gender equality in governance. The progress aspect of this measurement is evaluated based on changes from 2005 (or the nearest year for which data are available) to the present (or the nearest year for which data are available). The collected data indicate that the average number of women participating in governance has been rising annually.

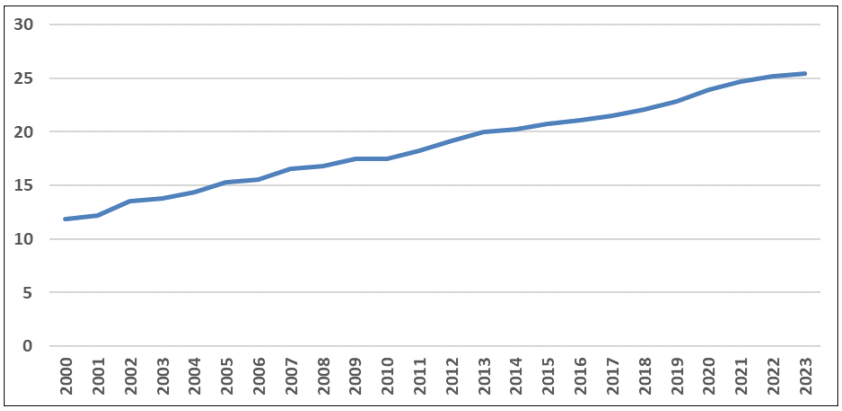


Figure 6-12: Mean trend of female representation in national governance

Source: The World Development Indicators (WDI)

6-3-4. Dimension Four: Environmental Health

Without question, environmental health serves as the foundation for sustainable development. The tension between natural ecosystems and human activities is increasing, which has significant implications for public health, social cohesion, and the overall well-being of societies. When calculating the IGEI, six primary issues within this dimension are taken into account: Agriculture, air quality, biodiversity, oceans, and water stress. Data has been collected from reliable databases based on independent sources. This approach ensures that the measurement of environmental health captures changes over time (typically since 2000) and also illustrates the distance to the established global targets, which are present for five of the six indicators in this dimension.

6-3-4-1. Agriculture

Agriculture is central to the global economy, impacting food security and nutrition, while also serving as a vital economic resource for numerous individuals and communities reliant on this sector. Similar to numerous environmental health issues, agriculture embodies a conflict between the need to enhance production and productivity and the necessity of preserving the quality of soil and other inputs essential for agricultural production. To calculate the IGEI, it utilizes organic farming data gathered by the Research Institute for Organic Agriculture (FiBL) to determine the percentage of arable land cultivated using organic methods. The change variable was collected between 2000 and 2021, as per the data collection process conducted by FiBL. The collected data indicate that, on average, attention to organic farming has increased globally during the years under review. This trend may be attributed to the rising demand for organic products and heightened consumer awareness of these products.

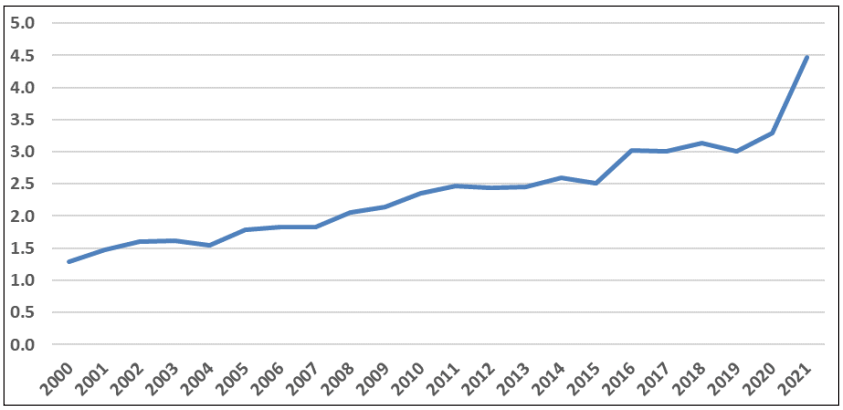


Figure 6-13: The global organic crop cultivation trend

Source: Research Institute for Organic Agriculture (FiBL)

6-3-4-2. Air Quality

Air quality directly affects public health outcomes, particularly in developing countries, which are often used as examples of the complex relationship between the green economy and its economic, environmental, and social consequences. Pollution resulting from economic activities can degrade air quality in communities, underscoring the tension between generating income for individuals and the adverse, costly public health consequences that follow. Consequently, air quality data gathered from the State of Global Air platform

was utilized in the calculation of the IGEI. This platform assesses the average annual population exposure to PM2.5 particulate matter across 160 countries. The World Health Organization states that the annual average level of PM2.5 should not surpass 5 micrograms per cubic meter. An analysis of the gathered data indicates that air quality trends have varied over the past twenty years.

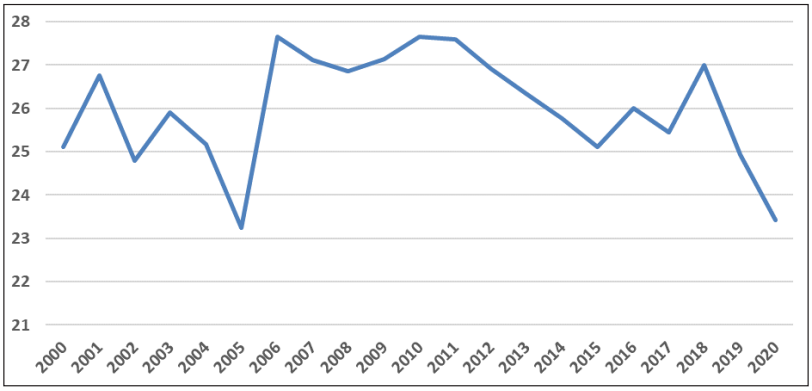


Figure 6-14: Global trend in mean air quality

Source: www.stateofglobalair.org

6-3-4-3. Biodiversity

Biodiversity and ecosystem productivity are clearly interdependent. Maintaining a natural and healthy balance of plant and animal species directly impacts the diversity of agricultural products and land management. To calculate IGEI, data pertaining to Goal 15 of the SDGs (SDG15) was utilized to assess the average proportion of terrestrial Key Biodiversity Areas (KBAs) that are protected. The UN data collection process for SDG15 indicates that this variable was measured from 2000 to 2020. According to the goals set forth by the United Nations Convention on Biological Diversity, 30 percent of key terrestrial biodiversity areas are to be safeguarded by 2030. The data collected from various countries indicates that, on average, the overall impact of these policies has been somewhat successful. Moreover, the trend in biodiversity across countries has shown an upward trajectory over the past two decades.

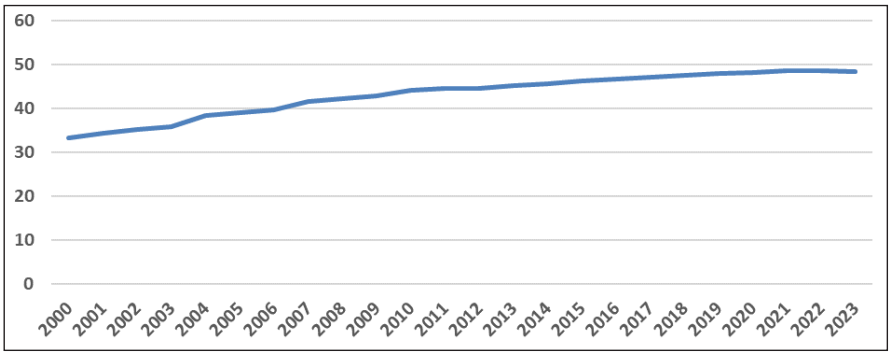


Figure 6-15: Global trend in mean biodiversity

Source: www.unstats.un.org

6-3-4-4. Oceans

The oceans play a crucial role in regulating both the climate and the global economy. They generate 50% of the Earth's oxygen and absorb 50 times more carbon dioxide than the atmosphere does. The oceans serve as a significant pathway for global trade and provide a habitat for fish species that are harvested for human consumption. The IGEI calculation utilizes data from Sustainable Development Goal 14 (SDG 14) to assess the average proportion of Key Marine Biodiversity Areas (KMBAs) that are under protection. As per the goals set forth by the United Nations Convention on Biological Diversity, 30 percent of critical marine biodiversity areas must be safeguarded by the year 2030.

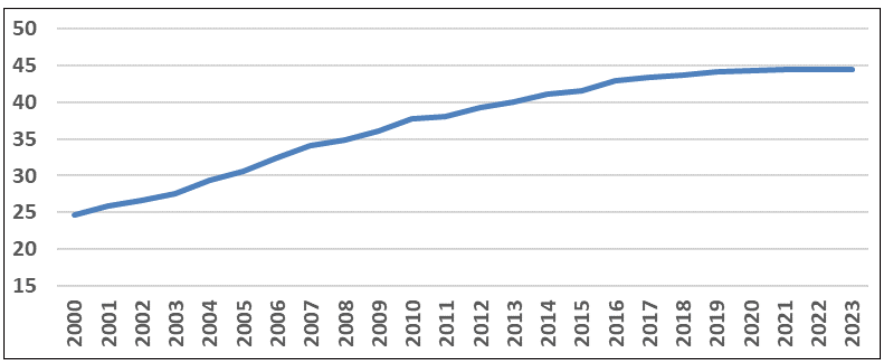


Figure 6-16: Average proportion of key marine biodiversity areas protected under designated conservation zones

Source: www.unstats.un.org

6-3-4-5. Water Stress

Water stress is a growing global concern, exacerbated by climate change. Water stress generally refers to the ratio of freshwater withdrawals for all activities compared to the total available freshwater resources. With the spread of water shortages caused by climate change, which is often accompanied by political conflicts over freshwater resources, countries, especially developing ones, are facing increasing water stress. In calculating IGEI, data pertaining to Sustainable Development Goal 6 (SDG6) was utilized to assess the percentage of freshwater withdrawal in relation to the total water resources available in each country. UN data indicates that the variable was measured from 2005 to 2021. The global target established by UN Water for this indicator is that freshwater withdrawals should not exceed 25 percent of total freshwater resources. Data indicate that, on average, freshwater withdrawals globally have risen, potentially resulting in heightened water stress worldwide.

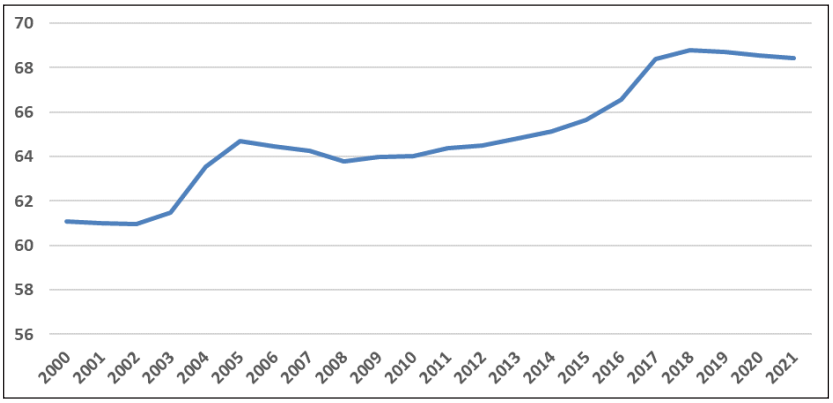


Figure 6-17: Average trend of global freshwater withdrawal to total available resources

Source: www.unstats.un.org

6-4. Method of Calculating the IGEI

In this study, the multidimensional indexation approach proposed by Sarma (2015) was utilized to account for the disparities in data across different countries and to achieve a comparable cross-national metric, thereby calculating the IGEI. With the necessary characteristics, this metric makes it easier to compare indices across nations.

To construct the desired index, which has been utilized in numerous studies employing this method, it is essential to first calculate the achievement rate

of each country in each dimension (d_i) based on Equation 1. This calculation pertains to the four main dimensions of the research: climate change and social equity, sector decarbonization, markets and ESG investing, and environmental health and resource sustainability. Each of these dimensions is divided into various subgroups, as introduced in the previous chapter. Consequently, we have:

$$(1)\ d_i = w_i \frac{A_i - m_i}{M_i - m_i}$$

In Equation 1, A_i denotes the actual value of the i-th dimension, m_i is the lower limit of the i-th dimension, and M_i is the upper bound for that dimension. Furthermore, W_i represents the weight of each dimension, which is a value between zero and one.

According to Equation 1, a greater value for D_i signifies a higher level of achievement for that country in the i-th dimension. Assuming a green economy has n dimensions, a country's progress across these dimensions is denoted by the point (d_1,d_2,...,d_n) within this space. In Euclidean space, the point $O = (0,0,...,0)$ symbolizes the least favorable outcome in achieving the desired dimension, and the point $W = (w_1, w_2, ..., w_n)$ symbolizes the optimal outcome.

In a three-dimensional representation, as shown in the figure below, the point signifies the maximum value in dimension C, with zero values for the other two dimensions. Consequently, within this 3D space, by considering specific weights for each dimension for each country, we will arrive at a point, such as $W(w_1,w_1,w_1)$.

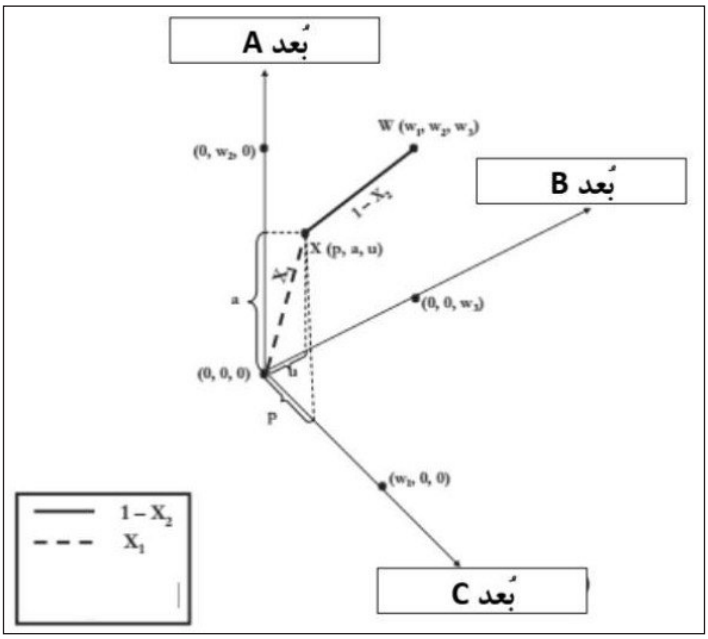


Figure 6-18: Status of the index with three dimensions

The extent to which a country's green economy is realized is mainly assessed by the Euclidean distance of its achievement point X from two reference points: the nadir point O (representing the worst-case scenario) and the ideal point W (representing the best-case scenario). A greater distance between X and O, along with a lesser distance between X and W, suggests enhanced performance in the green economy. It is essential to recognize that in an n-dimensional feature space, two distinct achievement points may be equidistant from W but not from O, and conversely. Consequently, the achievement points of two nations may be equidistant from one reference point while displaying differing distances from another.

If two countries' performance metrics are equidistant from point W but show different distances from point O, the country that is farther from O is deemed to have a better green economy status. On the other hand, if two countries are equidistant from O but have varying distances from W, the country that is closer to W is regarded as having a superior green economy status. Therefore, the development of an index for the green economy should include both distances.

The proposed IGEI index employs the simple average of the Euclidean distance between X and O, along with the inverse of the Euclidean distance between X and W. The distances are normalized according to the distance

between O and W, ensuring that their values remain within the range of 0 to 1. In calculating the simple average of these distances, the inverse distance between X and W is taken into account. This ensures that the IGEI remains a value between 0 and 1 (i.e., the index is bounded) and increases monotonically, indicating that a higher level of the green economy is associated with a higher index value.

With this explanation, we can calculate the distance of each country's current state achievement point (X) from the worst-case scenario (X_1) and the ideal situation (X_2) can be obtained from the following relationships, based on which the Multidimensional Green Economy Index for the Member States of the Islamic Conference (IGEI) can also be calculated.

Based on the foregoing, the distance of a country's current achievement point (X) from the nadir (X_1) and the ideal state (X_2) can be determined using the following equations. These equations further facilitate the calculation of the Multidimensional IGEI.

$$(2)\quad X_1 = \frac{\sqrt{d_1^2 + d_2^2 + \ldots + d_n^2}}{\sqrt{\left(w_1^2 + w_2^2 + \ldots + w_n^2\right)}}$$

$$(3)\quad X_2 = 1 - \frac{\sqrt{\left(w_1 - d_1\right)^2 + \left(w_2 - d_2\right)^2 + \ldots + \left(w_n - d_n\right)^2}}{\sqrt{\left(w_1^2 + w_2^2 + \ldots + w_n^2\right)}}$$

$$(4)\quad IGEI = \tfrac{1}{2}\,[X_1 + X_2]$$

The primary benefit of the multidimensional index derived from Equation 4 is its unit-free nature, along with its characteristics of boundedness, monotonicity, and homogeneity. Moreover, this methodology enables the calculation of each country's achievement level within each specific dimension, a feature not provided by other commonly used indexing methods, such as Principal Component Analysis (PCA). PCA is a statistical technique that calculates a linear combination of different dimensions based on the second-order moment, also known as covariance. Conversely, the aim of calculating the green economy index is to evaluate the level of achievement for each dimension within each country.

6-5. Results of IGEI Calculation

Using the methodology outlined in the previous section and the available data, IGEI was ultimately calculated for the period from 2007 to 2020. The results indicate that the leading countries in the realm of green economy are exclusively European nations (Figure 6-19).

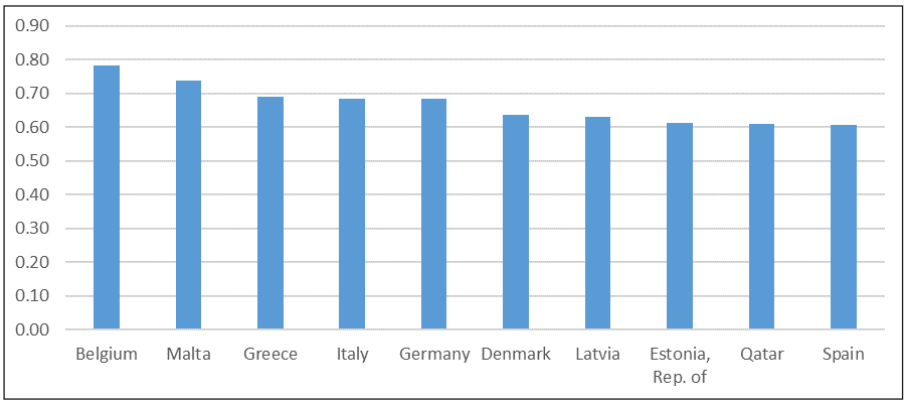


Figure 6-19: IGEI in leading countries across the globe (2020)

6-5-1. IGEI Results Based on Country Income

Figure 6-20 illustrates the progress trend in IGEI across various income groups. These trends display various aspects of the interplay between environmental policies, access to financial resources and technology, and dedication to sustainable development across different countries.

A) High-income Countries

During the review period from 2007 to 2020, the countries in this group exhibited the most stable and highest performance in IGEI. The steady and gradual growth of these countries reflects their ongoing commitment to environmental policies, investment in renewable energy, and the adoption of green technologies. Moreover, the involvement of these countries in international agreements like the Paris Agreement has probably contributed positively to the greening of their economies. This emphasizes the crucial role of sustainable policymaking and robust investment in furthering green economy objectives.

B) Upper-middle Income Countries

This group of countries has performed reasonably well in the green economy; however, their performance exhibits greater volatility when compared to high-income countries. The fluctuations noted in 2010 and 2012 could

have resulted from difficulties in executing environmental policies or shifts in the macroeconomic landscape. Nonetheless, the overall upward trend of this group suggests that these countries are progressively embracing green technologies and advancing in environmental policies. The progress may also be attributed to economic growth and heightened public awareness regarding climate change.

C) Lower-middle Income Countries

This group of countries is experiencing a gentle and gradual increase, likely attributed to infrastructure and financial constraints. While countries in this group may enjoy better access to green technologies compared to low-income countries, economic pressures and political challenges can hinder their progress. The emphasis here is on the necessity for focused international investments and technology transfer initiatives to assist these countries in closing the gap with higher-ranking groups.

D) Low-income Countries

This group of countries exhibits the lowest level of IGEI. While the general trend for this group is upward, the slow growth indicates significant economic, technological, and policy challenges. In these countries, primary economic issues like poverty reduction and enhancing public welfare typically take priority over environmental policies. This underscores the necessity for international collaborations to assist these nations in establishing green infrastructure and enhancing environmental capabilities.

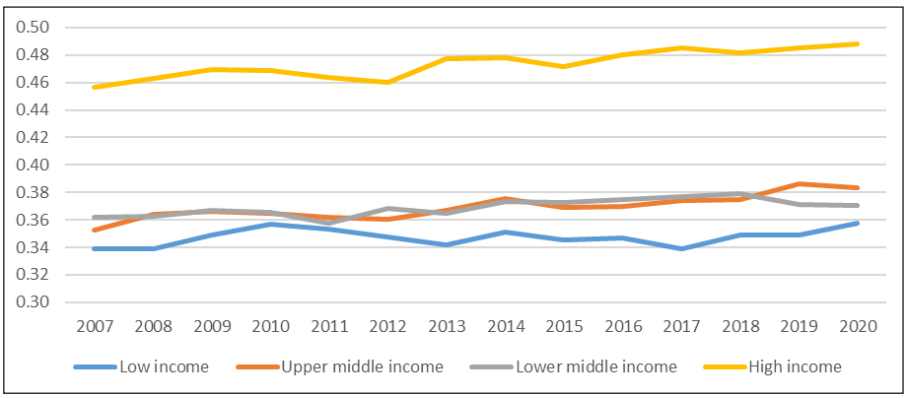


Figure 6-20: IGEI trend across countries by income

6-5-2. IGEI Results Based on Geographical Location

Figure 6-21 illustrates the trend of IGEI changes across various geographical regions from 2007 to 2020. This analysis is carried out across various geographical regions, focusing on the similarities and differences in their performance regarding the advancement of the green economy.

A) North America

During this time period, North America does not exhibit a high IGEI, but its trend remains relatively stable. This does not imply that the green economy is an insignificant issue in these regions. Most countries in this region have implemented numerous important plans over the past decades to stabilize the green economy and enhance the environmental situation; therefore, this index reflects their status during the period from 2007 to 2020.

B) Europe and Central Asia

This region exhibits a relatively good IGEI rate. The trend of the index has remained relatively stable, reflecting ongoing efforts to enhance environmental policies and practices, especially within the European Union. The commitment of European countries to international environmental agreements, such as the Paris Agreement, plays a significant role in this achievement.

C) Latin America and the Caribbean

IGEI in this region is progressing at a rate higher than that of other regions. The trend has been relatively consistent, suggesting a focus on preserving natural resources and forests as well as utilizing renewable energy.

D) Eastern Asia and the Pacific

The East Asia and Pacific region has demonstrated a moderate increase in the IGEI; however, its position remains inferior to that of more developed regions, such as Europe. The growth observed in this index can be attributed to economic development and coordinated regional efforts to adopt green technologies and reduce pollution.

E) Middle East and North Africa (MENA)

IGEI has experienced significant growth in this region over time. However, it performs less effectively than some regions. The slow process may primarily be attributed to challenges associated with water scarcity, a heavy dependence on fossil fuels, and political instability.

F) South Asia

South Asia has the second-lowest IGEI among the regions studied, just above

North America; however, its overall trend is gradually improving. This outcome appears to stem from fundamental structural issues, including inadequate investment in renewable energy and underdeveloped infrastructure.

G) Sub-Saharan Africa

This region has exhibited fairly moderate performance in the IGEI and a mild growth over time. Economic challenges, technological constraints, and social pressures may hinder the swift progress of this region in the IGEI.

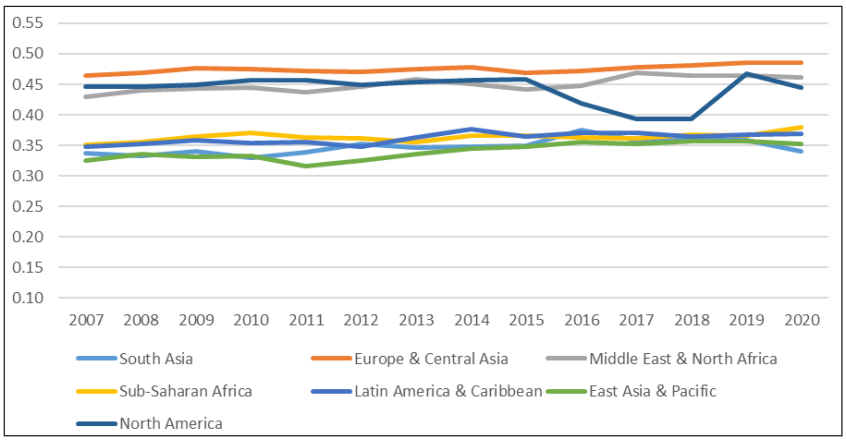


Figure 6-21: IGEI trend by geographical region

6-5-3. IGEI for Islamic and Non-Islamic Countries

Figure 6-22 illustrates the trend of IGEI changes in two groups of countries, namely Islamic and non-Islamic countries, from 2007 to 2020. Below is a review of these trends.

6-5-3-1. IGEI Trend in Non-Islamic Countries

Non-Islamic countries typically exhibit higher IGEI compared to Islamic countries. Nonetheless, the changes in the green index within these countries can be categorized into three distinct time periods.

A) Initial Growth Period (2007-2010)

At the start of the period, the IGEI trend in these countries shows an upward trajectory, reaching its peak in 2010. This increase is most likely due to these countries' adherence to international environmental policies such as the Kyoto Protocol, as well as significant investments in renewable energy and green technologies.

B) Decline and Stabilization Period (2010-2015)

Following 2010, a downward trend is observed, which may be attributed to economic factors, including the global recession that ensued after the 2008 financial crisis, or a temporary decline in green investments. Since 2013, the trend has stabilized, and a gradual improvement has been observed up until 2020.

C) Sustainable Improvement Trend (2015-2020)

During this period, non-Islamic countries again demonstrate significant growth, which may be attributed to more comprehensive clean energy policies and commitments to the Paris Agreement.

6-5-3-2. IGEI Trend in Islamic Countries

Islamic countries overall have a lower IGEI than non-Islamic countries; however, a gradual improvement in this index is observed over time.

A) Initial Growth (2007-2010)

An analogous upward trend is noted in Islamic countries, albeit at a lower level. The initial increase indicates efforts to develop green infrastructure and policies, particularly in more advanced Islamic countries such as the Persian Gulf states.

B) Decline and Recession (2010-2015)

The trend likewise slowed in Islamic countries after 2010. The decline could be attributed to various economic priorities, including an emphasis on the oil and gas sectors, as well as financial and technological limitations present in numerous Islamic countries.

C) Regrowth (2015-2020)

The results obtained indicate that, in recent years, IGEI has exhibited a gradual growth trend in these countries. This may be explained by a heightened awareness of climate change and the gradual acceptance of renewable energy sources in Islamic countries.

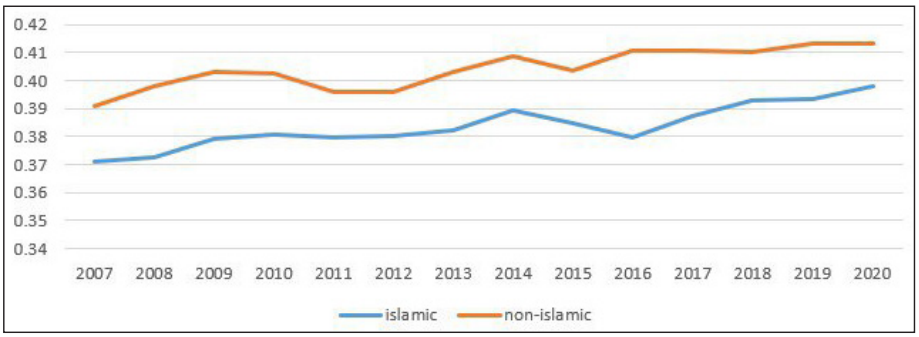


Figure 6-22: Comparison of IGEI trends in Islamic and non-Islamic countries Bottom of Form

6-5-4. Potential Factors Influencing Differences in IGEI Trends across Countries

A) Economic

Non-Islamic countries have achieved greater progress through economic diversification, investments in green technologies, and the implementation of protectionist policies. Conversely, Islamic countries, particularly those with economies reliant on oil and gas, encounter difficulties in this area.

B) Political

International commitments tend to be more robust in non-Islamic countries, where environmental policies are often prioritized more highly.

C) Technological

The access of non-Islamic countries to more advanced technologies is one of the factors contributing to their superiority in IGEI.

D) Sociocultural

Public awareness of environmental issues and social pressure for sustainability have been more pronounced in non-Islamic countries.

6-5-5. Leading Islamic Countries in IGEI

The figure below indicates that Qatar, the United Arab Emirates, and Iran rank as the top three countries in the IGEI among Islamic countries, respectively. Qatar and the United Arab Emirates lead the way, concentrating on investments in renewable energy, advanced technologies, and the development of sustainable infrastructure. Large-scale initiatives like solar parks and

a dedication to minimizing carbon footprints have significantly contributed to the success of these nations. Iran has achieved a high ranking among Islamic countries due to its development programs in renewable energy, including wind and solar energy, as well as natural resource management. However, economic restrictions and sanctions have hindered its ability to progress more rapidly.

Countries like Kuwait, Oman, and Gambia also achieve high rankings by investing in sustainable infrastructure and working to reduce dependence on fossil fuels. Gambia's position among the top 10 countries, despite its limited resources, highlights its considerable efforts in managing natural resources and adopting green technologies. This ranking illustrates the extent to which countries prioritize sustainable development and their approach to utilizing natural resources and technology to enhance environmental performance.

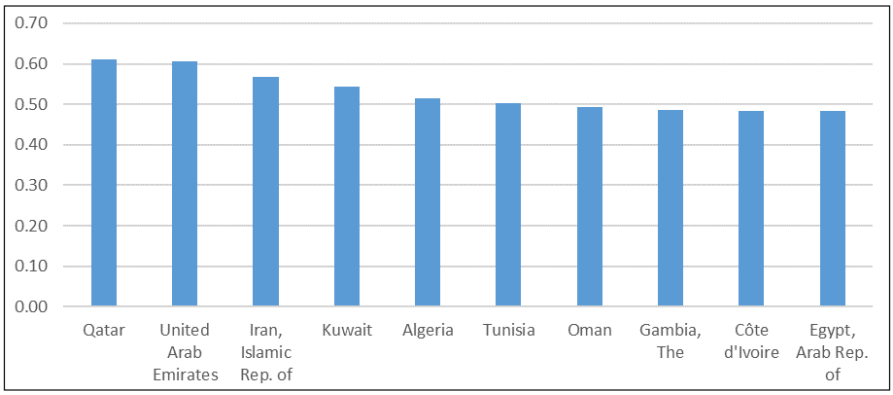


Figure 6-23: Top Islamic Countries in IGEI in 2020

Appendix 1: IGEI for Islamic countries

Country	ISO	2020	Rank
Afghanistan	AFG	0.35	36
Albania	ALB	0.38	33
Algeria	DZA	0.52	5
Azerbaijan, Rep. of	AZE	0.39	29
Bahrain, Kingdom of	BHR	0.43	19
Bangladesh	BGD	0.32	47
Benin	BEN	0.35	41
Brunei Darussalam	BRN	0.26	51

Country	ISO	2020	Rank
Burkina Faso	BFA	0.44	17
Cambodia	KHM	0.36	34
Cameroon	CMR	0.35	35
Chad	TCD	0.35	43
Comoros, Union of the	COM	0.25	52
Côte d'Ivoire	CIV	0.48	9
Djibouti	DJI	0.16	53
Egypt, Arab Rep. of	EGY	0.48	10
Gabon	GAB	0.4	28
Gambia, The	GMB	0.49	8
Guinea	GIN	0.44	16
Guinea-Bissau	GNB	0.41	22
Indonesia	IDN	0.34	45
Iran, Islamic Rep. of	IRN	0.57	3
Iraq	IRQ	0.3	50
Jordan	JOR	0.35	39
Kazakhstan, Rep. of	KAZ	0.38	32
Kenya	KEN	0.43	18
Kuwait	KWT	0.54	4
Kyrgyz Rep.	KGZ	0.4	26
Lebanon	LBN	0.32	48
Libya	LBY	0.41	24
Maldives	MDV	0.15	54
Mali	MLI	0.35	38
Mauritania, Islamic Rep. of	MRT	0.35	42
Morocco	MAR	0.44	15
Mozambique, Rep. of	MOZ	0.31	49
Niger	NER	0.44	14
Nigeria	NGA	0.4	27
Oman	OMN	0.49	7
Pakistan	PAK	0.43	20
Qatar	QAT	0.61	1
Saudi Arabia	SAU	0.47	11
Senegal	SEN	0.41	23

Country	ISO	2020	Rank
Sierra Leone	SLE	0.47	12
Sudan	SDN	0.45	13
Syrian Arab Rep.	SYR	0.33	46
Tajikistan, Rep. of	TJK	0.34	44
Tanzania, United Rep. of	TZA	0.4	25
Togo	TGO	0.42	21
Tunisia	TUN	0.5	6
Turkey	TUR	0.35	37
Uganda	UGA	0.35	40
United Arab Emirates	ARE	0.61	2
Uzbekistan, Rep. of	UZB	0.39	31
Yemen, Rep. of	YEM	0.39	30

Appendix 2: Countries' IGEI ranking in 2020

Country	ISO	2020	Rank
Afghanistan	AFG	0.35	116
Albania	ALB	0.38	98
Algeria	DZA	0.52	34
Angola	AGO	0.33	146
Antigua and Barbuda	ATG	0.22	174
Argentina	ARG	0.45	58
Armenia, Rep. of	ARM	0.42	73
Australia	AUS	0.51	35
Austria	AUT	0.52	32
Azerbaijan, Rep. of	AZE	0.39	90
Bahamas, The	BHS	0.37	103
Bahrain, Kingdom of	BHR	0.43	68
Bangladesh	BGD	0.32	147
Barbados	BRB	0.44	61
Belarus, Rep. of	BLR	0.36	112
Belgium	BEL	0.78	1
Belize	BLZ	0.37	101
Benin	BEN	0.35	129

Country	ISO	2020	Rank
Bhutan	BTN	0.30	158
Bolivia	BOL	0.37	100
Bosnia and Herzegovina	BIH	0.30	156
Botswana	BWA	0.31	150
Brazil	BRA	0.42	79
Brunei Darussalam	BRN	0.26	165
Bulgaria	BGR	0.60	12
Burkina Faso	BFA	0.44	63
Burundi	BDI	0.35	127
Cabo Verde	CPV	0.35	123
Cambodia	KHM	0.36	110
Cameroon	CMR	0.35	114
Canada	CAN	0.41	82
Central African Rep.	CAF	0.35	133
Chad	TCD	0.35	131
Chile	CHL	0.34	140
China, P.R.: Hong Kong	HKG	0.25	168
China, P.R.: Macao	MAC	0.12	182
China, P.R.: Mainland	CHN	0.39	96
Colombia	COL	0.47	51
Comoros, Union of the	COM	0.25	169
Congo, Dem. Rep. of the	COD	0.36	108
Congo, Rep. of	COG	0.42	71
Costa Rica	CRI	0.36	113
Côte d'Ivoire	CIV	0.48	47
Croatia, Rep. of	HRV	0.56	25
Cyprus	CYP	0.50	41
Czech Rep.	CZE	0.51	38
Denmark	DNK	0.64	6
Djibouti	DJI	0.16	180
Dominica	DMA	0.16	179
Dominican Rep.	DOM	0.58	19
Ecuador	ECU	0.39	92
Egypt, Arab Rep. of	EGY	0.48	49

Country	ISO	2020	Rank
El Salvador	SLV	0.29	159
Equatorial Guinea, Rep. of	GNQ	0.56	22
Estonia, Rep. of	EST	0.61	8
Eswatini, Kingdom of	SWZ	0.38	99
Ethiopia, The Federal Dem. Rep. of	ETH	0.25	170
Fiji, Rep. of	FJI	0.21	176
Finland	FIN	0.59	17
France	FRA	0.60	13
Gabon	GAB	0.40	89
Gambia, The	GMB	0.49	46
Georgia	GEO	0.34	136
Germany	DEU	0.68	5
Ghana	GHA	0.42	76
Greece	GRC	0.69	3
Grenada	GRD	0.34	134
Guatemala	GTM	0.36	111
Guinea	GIN	0.44	62
Guinea-Bissau	GNB	0.41	81
Guyana	GUY	0.35	115
Haiti	HTI	0.25	167
Honduras	HND	0.37	105
Hungary	HUN	0.43	66
Iceland	ISL	0.21	177
India	IND	0.37	102
Indonesia	IDN	0.34	142
Iran, Islamic Rep. of	IRN	0.57	20
Iraq	IRQ	0.30	155
Ireland	IRL	0.53	31
Israel	ISR	0.56	24
Italy	ITA	0.68	4
Jamaica	JAM	0.27	164
Japan	JPN	0.42	77
Jordan	JOR	0.35	126
Kazakhstan, Rep. of	KAZ	0.38	97

Country	ISO	2020	Rank
Kenya	KEN	0.43	67
Kiribati	KIR	0.31	152
Korea, Rep. of	KOR	0.59	14
Kuwait	KWT	0.54	28
Kyrgyz Rep.	KGZ	0.40	87
Lao People's Dem. Rep.	LAO	0.33	144
Latvia	LVA	0.63	7
Lebanon	LBN	0.32	148
Lesotho, Kingdom of	LSO	0.24	173
Liberia	LBR	0.42	75
Libya	LBY	0.41	85
Lithuania	LTU	0.59	15
Luxembourg	LUX	0.43	65
Madagascar, Rep. of	MDG	0.22	175
Malawi	MWI	0.30	153
Malaysia	MYS	0.34	138
Maldives	MDV	0.15	181
Mali	MLI	0.35	125
Malta	MLT	0.74	2
Marshall Islands, Rep. of the	MHL	0.27	163
Mauritania, Islamic Rep. of	MRT	0.35	130
Mauritius	MUS	0.19	178
Mexico	MEX	0.50	43
Moldova, Rep. of	MDA	0.39	93
Mongolia	MNG	0.35	122
Montenegro	MNE	0.45	56
Morocco	MAR	0.44	60
Mozambique, Rep. of	MOZ	0.31	151
Myanmar	MMR	0.28	161
Namibia	NAM	0.51	36
Nepal	NPL	0.30	154
Netherlands, The	NLD	0.55	26
New Zealand	NZL	0.34	141
Nicaragua	NIC	0.35	121

Country	ISO	2020	Rank
Niger	NER	0.44	59
Nigeria	NGA	0.40	88
North Macedonia, Republic of	MKD	0.26	166
Norway	NOR	0.37	104
Oman	OMN	0.49	44
Pakistan	PAK	0.43	69
Palau, Rep. of	PLW	0.42	72
Panama	PAN	0.28	160
Papua New Guinea	PNG	0.28	162
Paraguay	PRY	0.35	132
Peru	PER	0.43	70
Philippines	PHL	0.35	124
Poland, Rep. of	POL	0.58	18
Portugal	PRT	0.55	27
Qatar	QAT	0.61	9
Romania	ROU	0.52	33
Russian Federation	RUS	0.35	119
Rwanda	RWA	0.30	157
Samoa	WSM	0.54	30
São Tomé and Príncipe, Dem. Rep. of	STP	0.54	29
Saudi Arabia	SAU	0.47	50
Senegal	SEN	0.41	83
Serbia, Rep. of	SRB	0.39	91
Seychelles	SYC	0.41	84
Sierra Leone	SLE	0.47	52
Singapore	SGP	0.45	55
Slovak Rep.	SVK	0.46	53
Slovenia, Rep. of	SVN	0.56	23
Solomon Islands	SLB	0.35	117
South Africa	ZAF	0.56	21
South Sudan, Rep. of	SSD	0.34	139
Spain	ESP	0.61	10
Sri Lanka	LKA	0.50	42
St. Kitts and Nevis	KNA	0.44	64

Country	ISO	2020	Rank
St. Lucia	LCA	0.34	137
St. Vincent and the Grenadines	VCT	0.35	118
Sudan	SDN	0.45	54
Suriname	SUR	0.45	57
Sweden	SWE	0.51	39
Switzerland	CHE	0.42	80
Syrian Arab Rep.	SYR	0.33	143
Tajikistan, Rep. of	TJK	0.34	135
Tanzania, United Rep. of	TZA	0.40	86
Thailand	THA	0.51	37
Togo	TGO	0.42	74
Tonga	TON	0.33	145
Trinidad and Tobago	TTO	0.32	149
Tunisia	TUN	0.50	40
Turkey	TUR	0.35	120
Uganda	UGA	0.35	128
Ukraine	UKR	0.42	78
United Arab Emirates	ARE	0.61	11
United Kingdom	GBR	0.59	16
United States	USA	0.48	48
Uruguay	URY	0.49	45
Uzbekistan, Rep. of	UZB	0.39	95
Vanuatu	VUT	0.24	172
Venezuela, Rep. Bolivariana de	VEN	0.37	107
Vietnam	VNM	0.36	109
Yemen, Rep. of	YEM	0.39	94
Zambia	ZMB	0.25	171
Zimbabwe	ZWE	0.37	106

A Handbook of Green Finance for Islamic Countries

Table of Contents

Chapter One:

Introduction and Basic Concepts

1-1. Definition of Green Financing

- **Green financing refers to the process of securing and allocating financial resources for projects and activities that help promote environmental enhancement, reduce pollution, preserve natural resources, and address climate change.**
- This form of financing includes investments in renewable energy sources (such as solar and wind), waste management, water treatment, sustainable transportation, and other environmentally friendly activities.
- **Types of green projects:**
  - Renewable energy sources (solar, wind, geothermal)
  - Waste management and recycling
  - Water resources management and sustainable agriculture
  - Sustainable transportation (electric public transportation, bike-sharing programs)
- **Rationale for importance:**
  - Climate change, as one of the most pressing challenges of the 21st century

- The need for investment in sustainable sectors to mitigate the risk of environmental crises
- Economic and social opportunities arising from sustainable development (including the creation of green jobs)

1-2. Green Financing: New Economic and Social Opportunities

Green financing offers more than environmental benefits; it has considerable potential for developing **new economic and social opportunities**. This is particularly significant for Islamic countries, which encounter issues such as water scarcity, climate change, and reliance on fossil fuels.

1) Economic Opportunities

A) Creating new jobs

- Green financing helps develop new industries such as **renewable energies, water management,** and **sustainable transportation**, thereby contributing to job creation.
- Example:
  - Implementing solar and wind energy projects necessitates the employment of specialists in engineering, equipment installation and maintenance, and project management.
  - Renewable energy projects have created thousands of jobs in Saudi Arabia and the United Arab Emirates.

B) Attracting international investments

- Green finance increases a nation's capacity to attract international capital.
- Example:
  - Using Islamic financial instruments such as **green *sukuk*** can help attract international investors to green projects.
  - The **Noor Ouarzazate Solar Complex** project in Morocco drew international investments, which in turn supported the economic development of the region.

C) Increasing economic competitiveness

- Investing in renewable energy and sustainable technologies can lower energy costs and raise productivity across various economic sectors.
- Example: Deploying solar and wind energy can reduce energy costs and increase business competitiveness.

D) Creating new industries

- Green financing helps develop new industries such as **green technologies, waste management and recycling**, and **smart cities**.
- Example: The development of the electric vehicle industry in countries such as Malaysia and Turkey

2) Social Opportunities

A) Improving the quality of life

- Green projects can help enhance the quality of life within local communities.
- Example:
  - Implementing water management and seawater treatment projects can help rural communities access safe drinking water.
  - Water management projects in Saudi Arabia have contributed to reduced water waste and improved the quality of life.

B) Mitigating inequalities

- Green finance can help reduce social inequalities.
- Example: Solar energy projects in rural areas can provide disadvantaged communities with clean energy.

C) Increasing public awareness

- Green projects can help raise public awareness about the significance of environmental protection and sustainable development.
- Example: Conducting public training and workshops on the advantages of sustainable natural resource management and renewable energy

D) Increasing energy security

- Investing in renewable energy can decrease reliance on fossil fuels and increase energy security.
- Example: Using solar and wind energy in Iran and Algeria, for example, can help reduce fuel imports.

3) Long-term Benefits

A) Sustainable development

- Green finance helps countries realize SDGs.
- Example: Achievement of targets related to clean energy (SDG 7), water resources (SDG 6), and sustainable cities and communities (SDG 11)

B) Reducing costs associated with natural disasters

- Investing in climate change mitigation initiatives can help lower the expenses associated with natural disasters (e.g., droughts and floods).
- Example: Initiatives pertaining to water resource management and the preservation of natural resources in countries such as Bangladesh and Pakistan

C) Increasing international credibility

- Countries engaged in green finance enhance their international credibility and can assume a more effective role in the global arena.
- Example: Morocco is recognized as an exemplary case in solar energy development.

Green financing enhances environmental conditions while simultaneously generating new economic and social opportunities. Opportunities include job creation, the attraction of international investments, the enhancement of quality of life, and the mitigation of inequalities. Utilizing Islamic financial instruments, such as green sukuk, in conjunction with international collaboration, enables countries to capitalize on opportunities and achieve sustainable development.

4) Islamic Finance Principles

Islamic finance is based on Sharia principles, which include the prohibition of riba (interest), maisir (gambling), and gharar (excessive uncertainty), alongside a significant focus on social justice. There is considerable alignment between the principles of Islamic finance and the objectives of green finance, largely because both emphasize social equity, environmental preservation, and sustainable development. We will examine the alignment of Islamic finance principles with the objectives of green finance.

- Emphasis on social justice and sustainable growth

A) Fair distribution of resources

- Islamic Finance:
  - Islamic finance principles emphasize the importance of equitable distribution of wealth and resources. The principles involve avoiding exploitation, such as usury (riba), and promoting income redistribution through mechanisms like almsgiving (zakat) and charitable endowments (waqf).
- Green Finance:

- Green projects also facilitate equitable resource distribution and enhance the quality of life for local communities.
- Example: Using solar energy can help reduce social inequalities in rural areas.

B) Sustainable development

- Islamic Finance:
  - Islamic finance prioritizes sustainable development and refrains from engaging in activities detrimental to the environment (such as polluting industries).
- **Green Finance:**
  - Green financing also promotes sustainable development and preserves natural resources for future generations.
  - Example: Investing in water management and renewable energy projects
    - **Preventing usury and encouraging direct investment**

A) Avoiding usury

- Islamic Finance:
  - In Islamic finance, riba (compound interest) is prohibited. Instead, instruments such as **partnership, mudaraba,** and **rent** are employed.
- Green Finance:
  - These principles align with green finance, as they promote direct investment in green projects.
  - **Example:** Using **rental sukuk** to invest in solar energy projects

B) Encouraging investment in real projects

- Islamic Finance:
  - Islamic finance encourages investing in real, tangible projects and avoids virtual or speculative transactions.
- Green Finance:
  - Green projects demand investment in real areas such as renewable energy and water management.
  - **Example:** Using **participatory sukuk** to build solar power plants
    - Emphasis on preservation of the environment

A) Preventing harm and losses

- Islamic Finance:
  - Islamic financial principles emphasize the **prevention of harm and losses** (ḍarar wa lā ḍirār) and prohibit involvement in activities that result in environmental damage.
- Green Finance:
  - Green financing also aids in mitigating the adverse effects of human activities on the environment and addressing climate change.
  - Example: Investing in carbon emission reduction and waste management enterprises

B) Promoting sustainable use of natural resources

- Islamic Finance:
  - Islamic finance emphasizes the sustainable use and inhibits the excessive extraction of natural resources.
- Green Finance:
  - Green projects similarly contribute to the sustainable management of water, energy, and land resources.
  - Example: Using advanced technologies for seawater treatment and water recycling
    - **Using Islamic financial instruments for green financing**

A) Green Sukuk

- Islamic Finance:
  - **Sukuk** is an Islamic financial instrument that serves as an alternative to traditional bonds.
- Green Finance:
  - **Green sukuk** enables investment in environmentally friendly projects, including renewable energy, water management, and sustainable transportation.
  - **Example:** Using green sukuk to build wind farms in Morocco

B) Mudarabah and partnership

- Islamic Finance:
  - **Mudaraba** and **partnership** are instruments for co-investment in projects.

- Green Finance:
  - These instruments can be employed to invest in green projects such as waste management and smart cities.
  - Example: Using partnerships to develop electric public transport networks

C) Waqf and Zakat

- Islamic Finance:
  - **Waqf** and **zakat** are tools that help finance social and environmental projects.
- Green Finance:
  - These instruments can be utilized to support green projects, including reforestation and natural resource conservation.
  - Example: Using waqf to develop forest parks and protect biodiversity

• Benefits of harmonizing Islamic finance principles with green finance

A) Earning the confidence of investors

- Employing Islamic finance principles in green financing can foster trust among Muslim and non-Muslim investors.
- **Example:** Issuing green sukuk in compliance with Sharia principles may appeal more to Islamic investors.

B) Increasing transparency

- Islamic financial principles stress transparency and ethics in transactions, which can contribute to reduced **greenwashing** and increased credibility of green projects.

C) Creating jobs aligned with Islamic values

- Green projects can contribute to job creation that aligns with Islamic values, such as social justice and environmental protection.
- The principles of Islamic finance align with the objectives of green finance in numerous ways. This harmony arises from a common focus on social justice, environmental protection, and sustainable growth. Utilizing Islamic financial instruments such as green sukuk, partnerships, and endowments can effectively achieve green finance objectives and contribute to sustainable development.

5) Challenges and Opportunities in Islamic Countries

- Challenges:
  - **Insufficient technical knowledge:** Many Islamic countries fail to have the required expertise to design and execute green projects.
  - **Weak legal frameworks:** Absence of supportive laws and regulations for green financing
  - **Reliance on oil revenues:** Many Islamic countries continue to rely on oil revenues and show a reluctance to invest in sustainable sectors.
- Opportunities:
  - **High potential of renewable energies:** Countries such as Iran, Saudi Arabia, and Morocco hold significant potential for harnessing solar and wind energy.
  - **Young and talented population:** Many Islamic countries have a young population that can be trained to serve as the workforce for green projects.
  - **Support from international institutions:** Organizations such as the IDB and the OIC can provide technical and financial support.

Chapter Two:

Green Financing Instruments in Islamic Finance

2-1. Green Sukuk

Green sukuk is a major Islamic financial instrument specifically designed to finance environmentally friendly projects and promote sustainable development. This instrument attracts Islamic and international investors for green projects by combining Islamic financial principles with green financing objectives. Below, we will analyze the specifics of this financial instrument and its applications.

1) Definition of Green Sukuk

- **Sukuk:**
  - Sukuk is an Islamic financial instrument that serves as an alternative to conventional bonds. Sukuk is structured according to Sharia principles and represents ownership in real assets or designated projects.
- **Green sukuk:**
  - Green sukuk is a type of sukuk specifically designed to finance green projects, including renewable energy, water management, sustainable transport, and environmental protection.

2) Characteristics of Green Sukuk

A) Compliance with Sharia principles

- Green sukuk comply with the principles of Islamic finance, thus steering clear of riba (compound interest).
- These instruments are based on various Islamic contractual frameworks, including **musharakah** (partnership), **ijarah** (rent), and **mudarabah** (profit-sharing).

B) Focus on green projects

- **Green sukuk specifically finances projects that contribute to environmental conservation and sustainable development.**
- **Example:**
  - Construction of solar and wind power plants
  - Water resources management and seawater treatment
  - Development of electric public transport networks

C) Transparency and reporting

- Issuing green sukuk necessitates transparent reporting regarding the use of funds and the environmental impacts associated with the projects.
- These reports are typically prepared in accordance with standards such as **GRI** (Global Reporting Initiative) and **SASB** (Sustainability Accounting Standards Board).

3) Applications of Green Sukuk

A) Renewable energies

- Green sukuk can be employed to finance solar, wind, and geothermal energy projects.
- **Example:** Noor Ouarzazate Solar Complex in Morocco, a project financed using green sukuk

B) Water management

- Green sukuk can be utilized to finance water management projects, including seawater desalination and treatment, water recycling, and broader water resource management projects.
- **Example:** Water management projects in Saudi Arabia that utilized green sukuk for financing

C) Sustainable transport

- Green sukuk can be used to develop sustainable public transport systems, including metros, electric buses, and shared networks.
- **Example:** Developing metro networks in countries such as Malaysia and Türkiye

D) Environmental protection

- Green sukuk can be used to finance initiatives such as reforestation, biodiversity preservation, and waste management.
- **Example:** Afforestation projects in Pakistan and Bangladesh, among others

4) Benefits of Green Sukuk

A) Attracting Islamic investors

- Green sukuk is more attractive to Muslim investors as it is more compliant with Sharia principles.

B) Increasing international credibility

- The use of green sukuk can enhance the international credibility of countries and position them as leaders in Islamic finance and sustainable development.

C) Reducing greenwashing

- Transparency and reporting principles in green sukuk help reduce **greenwashing.**

D) Creating new jobs

- Green projects have the potential to generate new employment opportunities in sectors such as renewable energy and water management.

5) Challenges and Solutions

A) Challenges

- **High initial costs:**
  - Implementing green projects requires substantial initial capital.
- **Non-familiarity**
  - Some investors and governments have an insufficient understanding of the concept of green sukuk.

B) Solutions

- **International cooperation**
- Cooperation with international organizations such as **IDB** and **AAOIFI** to raise awareness and facilitate funding
- **Use of advanced technologies**
  - Deploying low-cost technologies to implement green projects

6) Practical Examples

A) Malaysia

- In 2017, Malaysia became the first country to issue green sukuk, which was allocated for solar energy and water management projects.

B) Saudi Arabia

- Saudi Arabia has utilized green sukuk to fund renewable energy and water management initiatives.

C) Morocco

- Morocco uses green sukuk to finance projects, including the Noor Ouarzazate Solar Complex.

Conclusion

Green sukuk, an innovative instrument in Islamic finance, plays an important part in financing green projects and promoting sustainable development. This tool effectively combines Sharia principles with green financing objectives, thereby attracting investors and fostering new opportunities for sustainable development.

2.2. Islamic Financial Partnerships

Islamic financial partnerships are one of the key tools in the Islamic financial system that are specifically designed to support development and sustainable projects. These tools help finance environmentally friendly projects and sustainable development by emphasizing joint participation, risk-taking, and fair profitability. Below, we will examine the details of Islamic financial partnerships and how they are used in green financing.

1) Definition of Islamic Financial Partnerships

- Partnership:
  - A partnership is a form of Islamic financial contract wherein two or more parties pool their financial resources for a joint project or activity. The profits and losses generated from this project are distributed among the parties in accordance with a mutually agreed-upon arrangement.
- **Application in green financing:**
  - Islamic financial partnerships can finance green projects, including renewable energy, water management, and sustainable transportation.

2) Types of Islamic Financial Partnerships

A) Mudaraba

- Definition:
  - In this type of partnership, one party, the investor, provides financial resources, while the other party, the manager, is responsible for implementing the project. The profits from the project are distributed among the parties as per the agreement.
- Application in green financing:
  - Example:
    - Using Mudarabah to finance solar energy projects that require high initial capital

B) Musharakah (Participation)

- Definition:
  - In this type of partnership, all parties are involved in both the investment and management of the project, with profits and losses distributed among them as agreed.
- Application in green financing:
  - Example:
    - Using partnerships to develop electric public transport networks that require collaboration between the government and the private sector

C) Ijarah (Rent)

- Definition:
  - In this type of partnership, one party leases assets (such as equipment or land) to the other party.

- Application in green financing:
  - Example: Using a lease to finance solar or wind power plant equipment

3) Characteristics of Islamic Financial Partnerships

A) Co-participation

- In Islamic financial partnerships, the parties collaborate on the project and equitably share the associated risks and benefits.

B) Compliance with Sharia principles

- Islamic financial partnerships are designed in compliance with Sharia principles and prohibit riba (compound interest).

C) Flexibility

- These tools are highly flexible and can be utilized for various types of projects, including green projects.

4) Applications of Islamic Financial Partnerships in Green Financing

A) Renewable energies

- Islamic financial partnerships can finance solar, wind, and geothermal energy projects.
- Example: Partnerships to build solar power plants in countries such as Morocco and Saudi Arabia

B) Water management

- These tools may be utilized for water management projects, including seawater desalination, water recycling, and the management of water resources.
- Example: Deployment of Mudaraba in Pakistan and Bangladesh to finance water management projects

C) Sustainable Transport

- Islamic financial partnerships can facilitate the development of sustainable public transport systems, including metros, electric buses, and shared networks.
- Example:
  - Partnerships to develop metro networks in Malaysia and Türkiye, among others

D) Environmental protection

- These tools can be used for projects such as afforestation, biodiversity conservation, and waste management.
- Example: Using partnerships for afforestation projects in Iran, Algeria, etc.

5) Benefits of Islamic Financial Partnerships

A) Attracting Islamic investors

- Islamic financial partnerships are more attractive to Muslim investors as they comply with Sharia principles.

B) Fair distribution of risks and profits

- Risk and profit are equitably shared between the parties in these instruments, thereby enhancing investor confidence.

C) High flexibility

- Islamic financial partnerships can be used for various types of projects, including green projects.

D) Increasing international credibility

- These tools can enhance the international credibility of countries and position them as leaders in the realms of Islamic finance and sustainable development.

6) Challenges and Solutions

A) Challenges

- Non-familiarity
  - Some investors and states are not perfectly familiar with the concept of Islamic financial partnerships.
- Contract complexity:
  - These tools may be challenging for certain parties due to the complexity of the contracts.

B) Solutions

- Education and promotion:
  - Holding training courses and workshops to further familiarize investors with these tools
- International collaboration

- Collaboration with international organizations such as the IDB and AAOIFI to facilitate the use of these tools

7) Practical Examples

A) Malaysia

- Malaysia has employed Islamic financial partnerships to finance solar energy and water management projects.

B) Saudi Arabia

- Saudi Arabia has used Islamic financial partnerships to finance renewable energy and water management projects.

C) Morocco

- Morocco utilized Islamic financial partnerships to finance the Noor Ouarzazate Solar Complex.

Islamic financial partnerships serve as a significant instrument within Islamic finance, contributing substantially to the financing of green projects and sustainable development. These tools emphasize joint participation, risk-taking, and fair profitability, which helps attract investors and create new opportunities for sustainable development.

3-2. Qard al-Hasana and Interest-Free Loans

Qard al-Hasana and interest-free loans serve as two significant instruments in the Islamic financial system, specifically aimed at fostering development, social initiatives, and sustainable projects. These tools are crucial for financing environmentally friendly projects and sustainable development, as they highlight the absence of usury (compound interest) and promote unprofitable or low-interest financing. In the following, we will analyze the specifics of these tools and their application in green financing.

1) Definition of Qard al-Hasana and Interest-Free Loans

A) Qard al-Hasana

- Definition:
  - Qard al-Hasana refers to a form of interest-free loan provided as a charitable or benevolent act. The lender offers financial resources to the borrower and receives solely the principal amount of the loan, without any interest or additional return.

- Application in green financing:
  - Qard al-Hasana can be employed to finance green projects such as renewable energy, water management, and sustainable transportation.

B) Interest-free loans

- Definition:
  - Interest-free loans are a type of financial facility provided based on Islamic financial principles. These loans are characterized by the absence of compound interest and the frequent inclusion of consultative or technical support services.
- Application in green financing:
  - These loans can be used for green projects such as waste management, afforestation, and natural resource conservation.

2) Characteristics of Qard al-Hasana and Interest-Free Loans

A) Absence of usury (*riba*)

- These tools completely avoid usury (compound interest) and are designed in accordance with Sharia principles.

B) Focus on social justice

- Qard al-Hasana and interest-free loans contribute to the equitable distribution of wealth and financial resources and are planned particularly for vulnerable and disadvantaged groups.

C) Transparency and ethics

- These tools promote transparency and ethics in transactions, helping to reduce greenwashing.

3) Applications of Qard al-Hasana and Interest-Free Loans in Green Finance

A) Renewable energies

- Qard al-Hasana and interest-free loans can be employed to finance solar, wind, and geothermal energy initiatives.
- Example:
  - Using Qard al-Hasana loans to build solar power plants in rural areas

B) Water management

- These tools can be utilized for various water management projects, including seawater desalination, water recycling, and water resource management.
- Example:
  - Employment of interest-free loans to finance water management projects in Saudi Arabia and Pakistan

C) Sustainable transport

- Qard al-Hasana and interest-free loans can be used to develop sustainable public transport systems such as metros, electric buses, and shared networks.
- Example:
  - Qarz-ul-Hasana used to develop metro networks in countries such as Malaysia and Turkey

D) Environmental protection

- These tools can be applied to projects such as afforestation, biodiversity conservation, and waste management.
- Example:
  - Qarz al-Hasanah can be employed for afforestation projects in countries such as Iran and Algeria.

4) Benefits of Qard al-Hasana and Interest-Free Loans

A) Winning the trust of Islamic investors

- Qard al-Hasana and interest-free loans are more attractive to Muslim investors as they comply with Sharia principles.

B) Fair distribution of resources

- These tools help distribute financial resources fairly and are specifically planned for vulnerable and disadvantaged groups.

c) Increasing access to taxes for small projects

- Qard al-Hasana and interest-free loans can help small, local projects that typically have limited access to financial resources.

D) Increasing international credibility

- These tools can help raise the international credibility of countries and introduce them as leaders in the realms of Islamic finance and sustainable

development.

5) Challenges and Solutions

A) Challenges

- Non-familiarity:
  - Some investors and states are not quite familiar with the concepts of Qard al-Hasana and interest-free loans.
- Insufficient resources:
  - Financial resources to provide Qard al-Hasana and interest-free loans may be limited.

B) Solutions

- Education and promotion:
  - Holding training courses and workshops to make investors more familiar with these tools
- International collaboration
  - Collaboration with international organizations such as the IDB and AAOIFI to facilitate the use of these tools

6) Practical Examples

A. Malaysia

- Malaysia has employed Qard al-Hasana and interest-free loans to finance solar energy and water management projects,

B) Saudi Arabia

- Saudi Arabia has applied Qard al-Hasana loans to finance water management and renewable energy projects

C) Bangladesh

- Bangladesh has utilized Qard al-Hasana loans to finance waste management and environmental protection initiatives.

Qard al-Hasana and interest-free loans serve as critical instruments in Islamic finance, significantly contributing to the financing of green projects and sustainable development. These tools assist in attracting investors and generating new opportunities for sustainable development by highlighting the lack of usury, promoting equitable resource distribution, and fostering non-profitable financial support.

2-4. Islamic Insurance (*Takaful*)

Islamic insurance, *takaful*, is an Islamic financial instrument specifically designed for financing and managing risk in various projects. This insurance system functions in accordance with Sharia principles, steering clear of usury, gambling, and any lack of transparency. With a focus on ethics and social solidarity, Islamic insurance can significantly contribute to the support of green projects and sustainable development. In what follows, we will analyze the specifics of this tool and its application in green financing.

1) Definition of Islamic insurance

- Takaful:
  - This is an insurance system that operates in accordance with Islamic principles. In this system, individuals or organizations combine their financial resources to safeguard one another in the event of accidents or risks.
  - This system is designed based on concepts such as cooperation, fairness, and transparency.
- Difference from conventional insurance:
  - In contrast to conventional insurance, Islamic insurance excludes usury (compound interest) and gambling (gharar), focusing instead on joint participation and risk sharing.

2) Characteristics of Islamic Insurance

A) Joint contribution

- In Islamic insurance, group members (participants) pool their financial resources in a shared fund to protect one another in the event of risks.

B) Compliance with Sharia principles

- This system is designed in full accordance with Sharia principles and avoids usury, gambling, and a lack of transparency.

C) Focus on social justice

- Islamic insurance emphasizes the equitable allocation of financial resources and the protection of at-risk individuals.

D) Risk management

- This system helps manage risks in projects and is particularly helpful in green projects that may encounter environmental challenges.

3) Applications of Islamic Insurance in Green Financing

A) Renewable energies

- Islamic insurance can be employed to support solar, wind, and geothermal energy projects.
- Example:
  - Providing insurance for solar power plants against natural hazards, including hurricanes and earthquakes

B) Water management

- These systems can be used for water management projects such as seawater treatment, water recycling, and water resources management.
- Example:
  - Providing insurance for water treatment facilities against technical risks or natural disasters

C) Sustainable transport

- Islamic insurance can be utilized to develop sustainable public transport systems, including metros, electric buses, and shared networks.
- Example:
  - Providing insurance for electric public transport networks against accidents or technical failures

D) Environmental protection

- These systems can be employed for projects such as afforestation, biodiversity conservation, and waste management.
- Example:
  - Providing insurance for forestry initiatives against natural hazards such as fire or drought

4) Benefits of Islamic Insurance in Green Financing

A) Winning the trust of Islamic investors

- Islamic insurance is more attractive to Muslim investors because it complies with Sharia principles.

B) Risk management

- These systems mitigate risks in green projects and provide investors with financial protection in case of risks.

C) Increasing access to insurance services

- Islamic insurance can benefit vulnerable and disadvantaged groups who tend to have limited access to insurance services.

D) Increasing international credibility

- These systems can help raise the international credibility of states and introduce them as leaders in the realms of Islamic finance and sustainable development.

5) Challenges and Solutions

A) Challenges

- Non-familiarity:
  - Some investors and states are not perfectly familiar with the concept of Islamic insurance.
- Insufficient resources:
  - Financial resources for Islamic insurance may be limited.

B) Solutions

- Education and promotion:
  - Holding training courses and workshops to make investors more familiar with these systems.
- International collaboration
  - Collaboration with international organizations such as the IDB and AAOIFI to facilitate the use of these tools

6) Practical Examples

A) Malaysia

- Malaysia is one of the leaders in using Islamic insurance to fund solar energy and water management projects.

B) Saudi Arabia

- Saudi Arabia has employed Islamic insurance to support water management and renewable energy projects.

C) Bangladesh

- Bangladesh has applied Islamic insurance to support waste management and environmental protection projects.

Islamic insurance serves as a significant instrument within Islamic finance, playing a crucial role in funding green projects and promoting sustainable development. These systems emphasize joint participation, risk management, and fair distribution of resources, which helps attract investors and create new opportunities for sustainable development.

Chapter Three:

Policy and Institutional Frameworks

3-1. State Policies and Financial Support

- The role of the government
  - Developing the required infrastructure, such as solar energy networks
  - Offering financial incentives, such as tax breaks and credit facilities
- **Example:** National solar energy programs in Iran and Morocco

3.2. Regulatory Frameworks

- Islamic Green Standards
  - Developing standards to prevent greenwashing

Greenwashing is a key notion in the realm of green finance and sustainable development. This term describes behaviors or actions that seem to be environmentally friendly. Yet, in reality, they have minimal effect on enhancing the environment or may even be intentionally crafted to mislead stakeholders. This phenomenon has the potential to diminish public and investor confidence in “green” projects and financial instruments.

Below is a more detailed explanation of greenwashing and how to address it:

1) Definition of greenwashing

- **Greenwashing** is the practice by which enterprises, organizations, or governments portray their actions as environmentally friendly or sustainable, while failing to implement meaningful changes to safeguard the environment.
- These actions may involve employing green slogans, engaging in misleading advertising, or disseminating false information regarding the sustainability of products or services.

2) Types of greenwashing

Greenwashing can appear in many forms, with some common types including:

A) False green labels

- Businesses may advertise their products using labels such as "eco-friendly," "green," or "sustainable," despite the absence of a legitimate standard or certification to support these claims.
- **Example:** A company that produces plastic bottles could advertise its products as "recyclable," yet in reality, only a small portion of them undergo recycling.

B) Oversimplifying information

- Businesses may only showcase specific aspects of their operations as environmentally friendly, while other activities could be detrimental to the environment.
- **Example:** An energy company may advertise its investment in solar energy, even though its primary source of revenue remains fossil fuels.

C) Lack of transparency in reporting

- Some enterprises may present data or information that is incomplete or that clouds the true picture of their environmental performance.
- **Example:** A bank might assert that its investments in renewable energy have grown, yet this increase may only account for a minor fraction of its overall investment portfolio.

D) Use of jargon or complex terms

- Some enterprises may employ technical or complex terminology to assert that their activities are environmentally friendly, yet such terms may obscure their true meaning.

- **Example:** Employing phrases such as "carbon neutral" without offering a clear explanation of how this objective will be accomplished.

3) Reasons for Greenwashing

Greenwashing may be undertaken for several reasons:

A) Attracting customers and investors

Many consumers and investors tend to prefer products and services that are environmentally friendly, prompting companies to engage in greenwashing practices to appeal to these markets.

B) Increasing credibility and public image

- Some enterprises engage in greenwashing practices to improve their public image and avoid environmental criticism.

C) Legal and institutional pressure

- Occasionally, companies engage in superficial actions in response to legal or institutional pressures aimed at complying with environmental standards.

4) Negative Effects of Greenwashing

Greenwashing can negatively affect communities and the environment in various ways:

A) Declined public trust

- When businesses or organizations make false claims about their activities being environmentally friendly, it leads to a decline in public trust regarding green projects and financial instruments.

B) Reduced investment in green projects

- Greenwashing may result in attracting inappropriate capital or diminishing investment in genuinely green projects.

C) Delay in environmental progress

- When attention is directed towards superficial and misleading actions, genuine advancement in environmental conservation is hindered.

5) How to Address Greenwashing

To address greenwashing, systematic and transparent measures need to be implemented. Some solutions are as follows:

A) Developing valid standards and certificates

- Establishing both international and local standards to verify the sustainability of projects and products.
- **Example:** GRI (Global Reporting Initiative) and SASB (Sustainability Accounting Standards Board) standards

B) Transparency in reporting

- Businesses and organizations are required to offer precise and clear information regarding their environmental performance.
- **Example:** Presentation of annual reports on the reduction of greenhouse gases or energy consumption

C) Independent monitoring and evaluation

- Independent organizations may monitor and evaluate green claims.
- **Example:** Establishing supervisory bodies in Islamic countries to verify the veracity of claims related to green financing

D) Education and increased awareness

- Consumers and investors can be trained on how to identify false claims and truly green projects.

E) Enforcing strict laws

Strict laws and regulations could be implemented to prevent greenwashing and penalize companies that participate in such practices.

6) Greenwashing in Islamic Countries

In Islamic countries, greenwashing may occur more often owing to inadequate legal and institutional frameworks. To mitigate this phenomenon, the Sharia and ethical principles of Islamic finance may be employed:

- **Transparency:** The uncertainty principle in Islamic finance serves as a mechanism to mitigate greenwashing.
- **Social justice:** Highlighting social justice and accountability in financial practices can help minimize greenwashing.

Greenwashing poses a significant challenge in the realm of green finance, potentially undermining trust and efficiency within this sector. To address this phenomenon, cooperation among governments, financial institutions, companies, and society is essential. Establishing clear standards, independent

oversight, and enhancing public awareness can contribute to the reduction of greenwashing.

3-3. Related International Institutions

This section introduces two pivotal international organizations: the Accounting and Auditing Organization for Islamic Financial Institutions (**AAOIFI**) and the International Islamic Financial Market (**IIFM**). Both organizations play a key role in the fields of **Islamic finance** and **green financing**. By establishing standards and regulatory frameworks, these organizations contribute substantially to the development and transparency of Islamic finance, while also being significant in promoting the goals of green financing.

1) AAOIFI

A) Introduction

- **AAOIFI** is an international non-profit organization established in 1991, dedicated to the development of accounting, auditing, ethics, and governance standards within the Islamic finance sector.
- This organization is recognized as a leading authority in the Islamic world for the regulation and standardization of Islamic financial activities.

B) Role in green finance

- In recent years, AAOIFI has also focused on green and sustainable finance. The organization has set standards that ensure alignment between Islamic principles and environmental objectives.
- Example:
  - Developing standards for issuing **green sukuk,** which are specifically designed for environmentally friendly projects
  - Providing tips to prevent **greenwashing** within Islamic finance

C) Significance for Islamic countries

- AAOIFI assists Islamic countries in aligning with global standards in Islamic finance while remaining compliant with Sharia principles.
- This organization enhances investor and stakeholder confidence in Islamic finance projects, including green initiatives, by offering transparent frameworks.

D) Website and resources

- Official website www.aaoifi.com

- This website includes published standards, reports, and documents related to Islamic finance.

2) IIFM

A) Introduction

- **IIFM** is an international organization established in 2002, dedicated to promoting and facilitating Islamic financial markets.
- This organization particularly emphasizes **sukuk** and other Islamic financial instruments.

B) Role in green finance

- In recent years, the **IIFM** has focused on topics related to **green sukuk**, playing a role in the development of Islamic financial instruments that support green projects.
- This organization has supplied operational frameworks and standard contracts for the issuance of green sukuk.
- Example:
  - The development of model green sukuk contracts intended for use by governments, banks, and corporations
  - Providing guidelines for assessing the environmental impacts of financial projects

C) Importance for Islamic countries

- IIFM assists Islamic countries in exploiting their significant potential in renewable energy and natural resource management.
- This organization helps minimize risk and increase capital attraction in green projects by providing standard frameworks.
- Example:
  - Facilitating the issuance of green sukuk for solar energy projects in Morocco and the United Arab Emirates, among others

D) Website and resources

- Official website www.iifm.net
- This website includes reports, contract templates, and documentation related to Islamic financial markets.

3) How to Use the Services of These Organizations in Green Financing

- **AAOIFI:**
  - Utilizing standards published by AAOIFI to guarantee transparency and adherence to Sharia principles in green projects
  - Implementing this organization's guidelines to prevent greenwashing
- **IIFM:**
  - Using green sukuk contract templates to attract capital in renewable energy and natural resource management projects
  - Utilizing its operational frameworks to facilitate the issuance of green sukuk

The AAOIFI and IIFM organizations play a vital role in the development and standardization of Islamic finance, serving as primary references for Islamic countries in the area of green financing. Utilizing the standards and frameworks offered by these organizations, Islamic countries can implement more effective strategies for sustainable development and addressing climate change.

A more detailed discussion on the use of **AAOIFI** and **IIFM** services for green finance in Islamic countries is presented below. Details on the mechanisms through which these organizations support green projects will also be presented.

3-1) How to Use AAOIFI Services in Green Financing

A) Use of Sharia and financial standards

- AAOIFI has established standards that serve as a reference for designing and implementing green Islamic finance projects.
- Example:
  - **Sharia standards:** These standards outline the alignment of Islamic financial instruments, including sukuk, mudarabah, and muzara'ah, with Sharia principles and environmental objectives.
  - **Accounting and reporting standards:** These standards enhance transparency in financial reporting and facilitate the evaluation of the environmental impacts of projects.

B) Preventing greenwashing

- **AAOIFI** provides guidelines to help identify and prevent **greenwashing.**
- Methods:

- Developing precise criteria for assessing the sustainability of projects
- Providing transparent reporting templates that include detailed information about the environmental impacts of projects

C) Education and promotion

- **AAOIFI** offers training courses and workshops designed to familiarize financial professionals, accountants, and green project managers with Islamic financial standards and principles of green financing.
- **Example:**
  - Training on how to use green sukuk for renewable energy projects
  - Training on how to assess the environmental impacts of projects

D) Collaboration with international institutions

- AAOIFI collaborates with international organizations, including GRI (Global Reporting Initiative) and SASB (Sustainability Accounting Standards Board), to align Islamic finance standards with global green finance standards.
- **Result:** This collaboration can help Islamic countries utilize global capacities for sustainable development.

3-2) How to Use IIFM Services in Green Financing

A) Developing green sukuk contract templates

- IIFM provided standard templates for green sukuk contracts suitable for use by governments, banks, and companies.
- **Pros:**
  - Reduced costs and time required for contract design
  - Increased investor confidence in green projects
- **Example:**
  - Using green sukuk contract templates for solar energy projects in countries such as Iran, Morocco, and Saudi Arabia

B) Facilitating access to global financial markets

- By providing operational frameworks and clear standards, IIFM helps Islamic countries gain access to global financial markets.
- **Example:**
  - Facilitating the issuance of green sukuk in international markets to attract international investors

C) Supporting innovation in Islamic financial instruments

- IIFM develops new Islamic financial instruments to support green projects.
- **Example:**
  - Developing Islamic financial instruments for water resources management and sustainable agriculture initiatives
  - Designing new tools for sustainable transportation projects

D) Promoting Islamic financial markets

- IIFM promotes Islamic financial markets and attracts capital for green projects through conferences, seminars, and the publication of research reports.
- **Example:**
  - Holding conferences focused on the role of green sukuk in sustainable development
  - Publishing reports on the achievements of green initiatives in Islamic countries

3-3) Practical Examples of Using AAOIFI and IIFM Services

A) Example of AAOIFI

- **Malaysia**
  - The Malaysian government utilized AAOIFI standards to issue its inaugural green sukuk in 2017, which was allocated for solar energy and water management projects.
  - This initiative was recognized as a successful model for other Islamic countries.

B) Example of IIFM

- **United Arab Emirates**
  - UAE banks have adopted green sukuk contract templates developed by IIFM for projects related to solar energy and waste management.
  - These projects have contributed to the reduction of air pollution and the sustainable management of water resources.

3-4) How Countries Cooperate with AAOIFI and IIFM

A) Deployment of educational resources

Countries may benefit from training courses and documents published by

these organizations to enhance their technical knowledge in the area of green finance.

B) Implementation of standards and frameworks

- States and financial institutions can establish standards such as AAOIFI and utilize contract templates from IIFM to design and implement their green projects.

C) International Collaboration

- Countries can collaborate with these organizations to leverage international resources for sustainable development.
- **Example:**
  - Collaboration with **AAOIFI** to develop national green finance standards
  - Collaboration with **IIFM** to attract international investors for green projects

The AAOIFI and IIFM organizations, as two primary authorities in the realm of Islamic finance, play a significant role in the development and standardization of green financing. Utilizing the standards, contract templates, and educational services provided by these organizations, Islamic countries can implement effective strategies for sustainable development and address climate change.

4) Role of Relevant International Organizations

- IDB: Supporting green projects in Islamic countries
- OIC: Establishing collaborative networks to exchange experiences

International organizations play a significant role in supporting sustainable development and promoting green finance in Islamic countries. We will examine the roles of two prominent organizations, IDB and OIC, below.

4-1) IDB

A. Introduction

- IDB is an international financial institution established in 1975, aiming to promote economic, social, and cultural development in the member countries of the OIC.
- This bank facilitates financing for development projects in accordance with Islamic financial principles.

B) Role in green finance

- In recent years, the IDB has focused on matters concerning sustainable development and green finance. The bank supports projects that promote environmental preservation and mitigate climate change.
- **Key activities:**
  - Financing for renewable energy projects, such as solar, wind, and geothermal
  - Water resources management and sustainable agriculture
  - Investment in waste management and sustainable transportation projects

C) Practical examples

- **Solar energy project in Morocco:**
  - IDB has contributed to the Noor Ouarzazate Solar Complex project, one of the world's largest solar farms, which helps reduce carbon emissions and increase access to clean energy.
- **Water resources management in Bangladesh:**
  - IDB has invested in water resource management and sustainable agriculture projects in Bangladesh, contributing to improved water quality and enhanced agricultural production.

D) Initiatives and programs

- **Cooperation with international institutions:**
  - IDB collaborates with organizations such as the World Bank and the International Fund for Agricultural Development (IFAD) to attract more funding for green projects.
- **Green Transformation Facility (GTF) Fund:**
- The IDB has established this fund to support green projects in Islamic countries. This fund helps countries increase their capacities in the field of renewable energy and natural resource management.

The GTF Fund is a new financial instrument aimed at facilitating the financing of environmental projects and promoting sustainable development. Through international cooperation, this fund enables banks, financial institutions, and governments to collect and allocate the essential financial resources required for the implementation of green projects. This chapter will examine the details of the GTF, its role in green financing within Islamic countries, and its operational mechanisms.

1) Definition of the GTF

The GTF is a financial mechanism intended to support projects focused on environmental sustainability and renewable energy. This fund is typically established by international entities such as the IDB, the World Bank, or regional organizations. It functions as a platform designed to attract and consolidate both private and public investments, directing resources toward SDGs.

A) GTF objectives

- Facilitating economic transformation: transitioning from a fossil fuel-based economy to an economy that is based on renewable energy
- Supporting green projects: Financing projects that contribute to reduced pollution, manage natural resources, and address climate change
- Sustainable development: creating sustainable infrastructure and strengthening local capacities to address environmental challenges

B) Features of the GTF

- Transparency: The GTF typically operates with high transparency, with its financial and decision-making processes traceable.
- International collaboration: This fund is typically governed by an international or regional body and leverages inter-state cooperation to achieve shared objectives.
- Compatibility with Islamic principles: In Islamic countries, this fund typically adheres to the principles of Islamic economics and employs interest-free financial instruments.

2) GTF's contribution in Islamic countries

A) Support for renewable energy projects

The GTF in Islamic countries specifically focuses on renewable energy projects, including:

- Solar energy: Financing the installation of solar panels in rural and urban areas
- Wind energy: Construction of wind farms in areas with high potential
- Hydropower: Development of projects pertaining to hydro turbines and the management of water resources

B) Management of water resources

Water scarcity poses a significant challenge in many Islamic countries. The GTF supports projects aimed at improving the management of water resources. Among these projects are:

- Efficient irrigation: Development of drip and smart irrigation systems
- Water treatment: Constructing water treatment facilities to enable the reuse of contaminated water

C) Urban waste management

The GTF also assists with municipal waste management projects, including:

- Recycling: Developing recycling infrastructure and reducing waste
- Waste to energy: Using waste to produce energy

3) How the GTF works

A) Attracting financial resources

The GTF provides its financial resources through:

- Government participation: Governments act as one of the primary sources of funding for this fund.
- Private sector investment: Attracting private investors through Islamic financial instruments such as green sukuk
- International aid: The fund receives financial aid from international organizations and other countries.

B) Resource allocation

The financial resources attracted by the GTF are allocated to a variety of projects based on:

- Environmental priorities: projects with maximal impact on the environment
- Local capacities: Projects that are feasible under local conditions
- Financial return: Projects that are financially sustainable

C) Monitoring and evaluation

The GTF consistently monitors and evaluates the performance of its supported projects. This process includes:

- Periodic reports: It receives periodic reports on project progress.
- Environmental impact assessment: It examines the positive impacts of projects on the environment.

- Financial evaluation: It examines the financial returns of projects to ensure the return on investment.

4) IDB's role in the GTF

IDB is one of the primary institutions involved in the creation and management of GTF funds. This role encompasses:

A) Creation of new funds

The IDB collaborates with governments and international organizations to create GTF funds, typically tailored for specific projects.

B) Financing

The IDB serves as a key investor in GDF funds, utilizing Islamic financial instruments such as green sukuk and civil partnerships for financing.

C) Supervision and management

The IDB consistently monitors and manages the performance of the GTF funds, ensuring that financial resources are allocated appropriately and that projects are implemented effectively.

5) Case Studies

- **Solar energy project in Morocco**

The GTF in Morocco has contributed to the development of one of the world's largest solar power plants. This project was financed using green sukuk and has played a significant role in reducing greenhouse gas emissions in the region.

- **Water management in Bangladesh**

The GTF in Bangladesh has contributed to the development of efficient irrigation and water resources management projects, which have reduced water waste and increased agricultural production.

6) Challenges and Solutions

A) Challenges

- Insufficient financial resources: A primary challenge is attracting enough financial resources for green projects.
- Lack of awareness: Inadequate knowledge of investors and stakeholders about the importance of green projects

B) Solutions

- Raising awareness: Holding workshops and seminars to raise awareness about the importance of green projects
- Developing legal frameworks: Establishing laws and regulations to facilitate financing green projects

The GTF serves as a crucial instrument for financing environmental projects and promoting sustainable development in Islamic countries. Considering the significant role of this fund in attracting financial resources and supporting green projects, it is essential for governments, the private sector, and investors to collaborate effectively to enhance this type of financing in Islamic countries.

4-2) OIC

A) Introduction

- OIC is an international organization established in 1969, comprising 57 Islamic countries. This organization aims to enhance economic, social, and cultural collaboration among Islamic countries.

B) Contribution to green finance

- As an international network, the OIC facilitates the development of regional and international cooperation aimed at achieving sustainable development and promoting green finance.
- **Key activities:**
  - Creating collaborative networks to exchange experiences and best practices with respect to green finance
  - Supporting joint projects between Islamic countries to combat climate change
  - Promoting the use of Islamic financial instruments, such as green sukuk, to support green projects

C) Practical examples

- **Solar energy networks in North Africa and the Middle East:**
  - The OIC has supported the establishment of solar energy networks in Egypt, Algeria, and Morocco, facilitating collaborative resource management.
- **Natural disasters**
  - The OIC assists Islamic countries in strengthening their capacity to

manage natural disasters (such as floods and droughts). This is accomplished by exchanging experiences and providing technical assistance.

D) Initiatives and programs

- **Regional collaboration:**
  - The OIC helps build regional cooperation for sustainable development
  - **Example:** Cooperation between member countries regarding water resources management and sustainable agriculture
- **Education and promotion:**
  - The OIC offers training courses and workshops to help professionals and policymakers appreciate green finance and Islamic financial instruments.

4-3) How to use IDB and OIC service in green financing

A) Using IBM services

- **Applying for financial aid**
  - States can request IDB to finance their green projects.
- **Using the GTF:**
  - Countries can use this fund to increase their capacities in renewable energy and natural resource management.
- **Attending workshops and training courses**
  - Professionals and policymakers can benefit from IDB training courses to learn about the concepts of green financing.

B) Using OIC services

- **Joining collaborative networks**
  - Countries can join OIC collaborative networks to share their experiences and resources.
- **Using training and workshops**
  - Specialists can benefit from OIC training courses to learn about Islamic financial instruments and green financing principles.
- **Creating joint projects**
  - The OIC allows countries to collaborate on projects related to renewable energy and natural resource management.

The IDB and OIC play critical roles in promoting sustainable development

and green finance in Islamic countries. The IDB provides direct financial assistance, while the OIC fosters collaborative networks and facilitates the exchange of expertise. Together, they help countries build their capacity in the field of green finance.

We will now go into greater detail and provide practical information on how to use the services of the IDB and the OIC for green finance. The goal is for you to be able to apply this knowledge to develop practical programs and projects in Islamic countries.

4-4) How to use IDB services

A) Applying for funding for green projects

- **Procedural steps**

  1. Need identification

  - Governments or local institutions ought to identify their needs in areas such as renewable energy, water resource management, and sustainable agriculture.

  2. Preparation of the detailed plan

  - Proposals should include comprehensive information regarding the project's purpose, required budget, and its environmental and social impacts.

  3. Submitting the application to the IDB

  - Applications must be submitted through the appropriate ministries, such as the Ministry of Energy or the Ministry of Environment, to the IDB.

  4. IDB review and approval

  - IDB reviews requests and allocates financial resources upon approval.

- **Practical example**

  - Solar energy project in Bangladesh:
    - The government of Bangladesh requested assistance from IDB to finance a solar energy project in rural areas, facilitating local communities' access to clean energy.

B) Using the GTF

GTF's purpose:

- This fund supports countries to enhance their capacity in renewable energy and natural resource management.

- **How to use GTF's services**

  1. Identification of challenges

  - Countries must identify their challenges in the areas of renewable energy and natural resource management.

2. Application for technical and financial assistance

- Countries may submit a request via IDB for assistance with training, technical advice, and funding.

3. Implementation of projects

- Countries can implement projects after receiving aid.

- **Practical example**
  - GTF in Jordan:
    - Jordan utilized the fund to develop solar and wind energy projects, thereby reducing its dependence on fossil fuels.

C) Attending workshops and training courses

- **Training goals:**
  - To educate professionals and policymakers about the principles of green financing and Islamic financial instruments

- **How to use:**

1. Registration for courses:

- Experts and policymakers can access the IDB website to enroll in training courses.

2. Familiarization with best practices:

- These courses help participants learn about successful experiences in other countries.

3. Implementation in your country:

- After training, participants can apply their knowledge to implement projects in their homeland.

- **Practical example**
  - Water Management Workshop in Egypt:
    - IDB hosted a workshop to train Egyptian experts on advanced water resource management technologies.

4-5) How to use OIC services

A) Participation in collaborative networks

- **The purpose of networks:**
  - To establish regional and international cooperation to exchange experiences and resources

- **How to use:**

1. Joining collaborative networks:

- Countries can join OIC collaborative networks.

2. Sharing experiences:

- Countries can share their experiences with others regarding green finance.

3. Using shared resources:

- Countries can use shared resources, such as technologies and equipment.

- **Practical example**
  - **Solar energy network in North Africa:**
    - Member States of the OIC in North Africa established a network for the joint exploitation of solar energy.

B) Using training and workshops

- **Training goals**
  - To educate professionals and policymakers about Islamic financial instruments and green financing principles
- **How to use**

1. Participation in workshops:

- Experts can attend workshops organized by OIC.

2. Knowledge of standards

- These workshops introduce Islamic finance standards and green financing to participants.

3. Implementation in your country:

- Once they are trained, participants can apply their knowledge to local projects in their homeland.

- **Practical example**
  - **Disaster Management Workshop in Pakistan:**
    - OIC hosted a workshop to assist Pakistani experts in using advanced methods for disaster management.

C) Creating joint projects

- **Project objectives:**
  - To create joint projects among Islamic countries to address climate change and contribute to sustainable development
- **How to use**

1. Identification of opportunities

- Countries should identify shared opportunities for renewable energy and natural resource management.

2. Cooperation with other countries

- Countries can collaborate to create joint projects.

3. Implementation of projects

- Upon agreement, countries can implement their projects.

- **Practical example**
  - **Water Resources Management Project in the Middle East**
    - Member States of OIC in the Middle East developed a project to improve water resource management.

The IDB and OIC organizations play critical roles in promoting sustainable development and green finance in Islamic countries. Using the services of these organizations, countries can take effective steps to combat climate change and promote sustainable development.

Chapter Four:

Case Studies and Practical Measures

4-1. Successful Case Studies

Noor Ouarzazate Solar Complex in Morocco

The Noor Ouarzazate Solar Complex is among the largest and most advanced solar energy projects globally, located in the Ouarzazate region of Morocco. This project exemplifies the success of green financing and international co-operation in promoting sustainable development. In the following sections, we will provide a detailed explanation of this project and its significance in the clean energy sector.

1) Project Introduced

A) Position and capacity

- **Location:**
  - This project is implemented in Ouarzazate in southern Morocco. This region serves as an ideal location for the implementation of solar energy projects, owing to its high solar radiation levels.
- **Capacity:**
  - Project Noor Ouarzazate consists of multiple stages, with a total capac-

ity of nearly **580 MW**. This amount of energy is sufficient to supply electricity to approximately **1.1 million people**.

B) Type of technology

- This project employs Concentrated Solar Power (CSP) technology.
  - CSP draws on mirrors or lenses to concentrate sunlight, producing heat that is then used to generate steam and turn turbines.
  - One unique feature of CSP is its ability to store energy and generate electricity even on cloudy days or at night.

2) Project Objectives

A) Reducing reliance on fossil fuels

- Morocco has traditionally relied heavily on fossil fuel imports; however, this project has helped the country reduce its reliance on fossil fuels and transition to renewable energy.

B) Mitigating carbon emissions

- The Noor Ouarzazate Project reduces greenhouse gas emissions; estimates indicate that this project decreases approximately **760 thousand tons of carbon** annually.

C) Increasing access to clean energy

- This project has enabled both rural and urban populations to access clean and affordable energy.

3) Project Financing

A) IDB's contribution

- The IDB was one of the primary institutions that provided financing for this project.
- The IDB helped implement various stages of this project through loans and financial facilities.

B) Collaboration of other institutions

- **World Bank:**
  - The bank also assisted in financing the project and provided the necessary financial resources.
- **International Fund for Agricultural Development (IFAD):**

- This fund likewise contributed to financing the project.

- **International organizations**
  - Organizations such as the German **KfW Bank** and the French Agency for Development (AFD) also invested in this project.

C) Islamic financial instruments

- This project employed Islamic financial instruments such as **green sukuk** to attract capital.
- **Pros:**
  - Attracting capital from Islamic financial markets
  - Compliance with Sharia principles

4) Challenges and Solutions

A) Challenges

- **High initial costs:**
  - Implementing solar energy projects demands a substantial upfront investment.
- **Sophisticated technology:**
  - Deploying CSP technology requires high technical knowledge and expertise.

B) Solutions

- **International cooperation**
- Cooperation with international institutions and technology transfer to Morocco

- **Joint financing:**
  - Using financial resources from multiple institutions to reduce financial pressure

5) Results and Impacts

A) Environmental impacts

- Reduced greenhouse gas emissions
- Reduced dependence on fossil fuels

B) Social and economic impacts

- Creating new jobs in renewable energy

- Improved access to clean energy for local populations

C) A model for Islamic countries

- This project is recognized as a successful model for other Islamic countries.
- **Example:**
  - Countries such as Iran, Algeria, and Pakistan could gain valuable insights from Morocco's experiences in executing solar energy projects.

The Noor Ouarzazate Solar Complex exemplifies successful green financing and international collaboration for sustainable development. This project has not only contributed to reducing carbon emissions and enhancing access to clean energy but has also served as a model for other Islamic countries in the renewable energy sector.

Water Management Project in Saudi Arabia

Water resources management presents significant challenges in Middle Eastern countries, particularly in Saudi Arabia. It faces a significant shortage of fresh water and relies heavily on groundwater resources and seawater treatment. Water management projects in Saudi Arabia serve as notable examples of global initiatives aimed at promoting sustainable development and conserving natural resources. In the following, we will analyze one of the most significant water management projects in Saudi Arabia.

1) Project Introduced

A) National Water Resources Management Project

- **Objective:**
  - This project aims to manage water resources sustainably, increase efficiency, and minimize waste.
  - The primary goal of the project includes:
    - Reduced dependence on groundwater resources,
    - Increased deployment of advanced technologies for water purification and recycling, and
    - Improved management of water distribution networks,

B) Location and capacity

- **Location:**
  - This project has been implemented across Saudi Arabia, including major cities such as Riyadh, Jeddah, and Medina.

- **Capacity:**
  - The project is dedicated to developing new infrastructure for seawater treatment, rainwater management, and wastewater recycling.

2) Project's Purpose

A) Reduced water consumption

- This project aims to decrease water consumption across multiple sectors, such as agriculture, industry, and urban applications.
- **Strategies**
  - Implementing efficient irrigation systems, such as drip irrigation
  - Installing smart meters to control household water consumption

B) Increased use of recycled water

- One of the primary objectives of this project is to enhance the use of recycled water for agricultural and industrial purposes.
- **Example:** Using treated wastewater to irrigate gardens and farms

C) Development of seawater treatment technologies

- Saudi Arabia relies on seawater desalination because of its geographical location. This project has contributed to the development of advanced technologies for seawater desalination.
- **Pros:**
  - Reduced water treatment costs
  - Lower energy consumption in treatment processes

3) Project Financing

A) The role of the Saudi Arabian government

- The Saudi Arabian government has allocated substantial funding for this project via the Ministry of Water Resources and Environment.
- **Example:**
  - Investment in water treatment infrastructure and water distribution networks

B) Contribution of international banks

- **World Bank:**
- The World Bank has provided financing for certain aspects of the project.

- **IFAD**
  - The fund has contributed to enhancing water management within the agricultural sector.

C) Islamic financial instruments

- This project has used Islamic financial instruments such as *sukuk* to attract capital.
- **Pros:**
  - Capital infused from Islamic financial markets
  - Compliance with Sharia principles

4) Challenges and Solutions

A) Challenges

- **Shortage of freshwater:**
  - Saudi Arabia is among the driest countries globally and possesses limited freshwater resources.
- **High costs of seawater treatment:**
  - Seawater treatment processes require substantial energy and investment.

B) Solutions

- **Deployment of advanced technologies:**
  - Implementing seawater treatment systems using low-energy technologies
- **International collaboration**
  - Collaboration with advanced countries regarding water management and technology transfer

5) Results and Impacts

A) Environmental impacts

- Reduced excessive extraction of groundwater resources
- Reduced pollution of surface and groundwater

B) Social and economic impacts

- Facilitated access to fresh water for local populations
- Introduction of new jobs in the field of water management and related technologies

C) A model for Islamic countries

- This project exemplifies a successful model for other Islamic countries in terms of water management.
- **Example:** Countries such as Iran, Pakistan, and Egypt could gain from Saudi Arabia's experience in water resource management.

The water management project in Saudi Arabia exemplifies global initiatives aimed at sustainably managing water resources and tackling environmental challenges. This project has not only improved water management but has also served as a model for other Islamic countries in the area of water resources management.

4-2. Practical Strategies for Countries

- **Step-by-step framework:**
  - Assessing needs and current capacities
  - Designing and implementing green projects
  - Attracting capital from the private and international sectors

4-3. Evaluation and Reporting

- **Reporting standards:**
  - GRI (Global Reporting Initiative)
  - SASB (Sustainability Accounting Standards Board)
- **Reporting standards in the field of green finance**

In the realm of green financing and sustainability, reporting standards are essential for delivering transparent, accurate, and comparable information. These standards assist organizations, companies, and governments in reporting their environmental, social, and economic performance in a consistent manner. In the following section, we will explore two significant standards: GRI and SASB.

1) GRI

A) Introduction

- GRI is an international organization established in 1997, focused on developing sustainability reporting standards.

- These standards enable organizations to report transparently and comparably on their ESG performance.

B) GRI's objective

- The primary objective of GRI is to establish a standardized framework for sustainability reporting that assists stakeholders, including investors, customers, and local communities, in making more informed decisions.

C) Characteristics of GRI

- **Conclusiveness**
  - **GRI** covers various aspects of sustainability, including:
    - **Environment:** Energy consumption, water management, and carbon emission reduction
    - **Social:** Workers' rights, human rights, and community welfare
    - **Governance:** Risk management, transparency, and accountability
- **Transparency**
  - This standard enables organizations to deliver precise and reliable information about their environmental and social impacts.
- **Comparability**
  - Performance reports prepared in accordance with GRI are comparable to those of other organizations and industries.

D) Application of GRI in green financing

- GRI helps organizations to report the impact of green projects in a transparent manner.
- **Example:**
  - A solar energy company can utilize GRI to report the quantity of carbon emission reductions achieved through its activities.
  - An Islamic bank could employ GRI to report its investments in green projects.

E) Website and resources

- Official website www.globalreporting.org
- This website includes new standards, guidelines, and reporting examples.

2) SASB

A) Introduction

- SASB is a non-profit organization established in 2011, focused on developing sustainability reporting standards for diverse industries.
- These standards concentrate on information pertinent to investors that can impact financial decisions.

B) SASB's objective

- The primary objective of SASB is to establish standards that assist investors in assessing companies' sustainability performance and making informed investment decisions.

C) Characteristics of SASB

- **Focus on investors:**
  - SASB provides crucial information for investors that can impact the financial performance of companies.
- **Specialty-orientedness:**
  - SASB has developed standards for various industries, such as energy, transportation, and agriculture.
- **Transparency and comparability:**
  - These standards help organizations provide accurate and comparable information regarding their sustainability performance.

D) Application of SASB in green financing

- SASB helps financial institutions and companies to provide investors with accurate and pertinent information regarding the effects of their green initiatives.
- **Example:**
  - An Islamic bank can employ SASB to report its investments in renewable energy projects,
  - A water management company can utilize SASB to report on its water efficiency enhancements.

E) Website and resources

- Official website www.sasb.org
- This website includes industry standards, guidelines, and reporting examples.

3) How to use GRI and SASB in green financing

A) Using GRI

- **Environmental Impact Reporting:**
  - Organizations can build on GRI to report the environmental impacts associated with their green projects.
  - **Example:** Report on the reduction of carbon emissions from solar energy projects
- **Transparency in reporting:**
  - This standard helps organizations provide accurate and transparent information about their performance.

B) Using SASB

- **Reporting to investors:**
  - Companies and financial institutions can use SASB to deliver information that is significant to investors.
  - **Example:** Reporting on your investments in green projects and their impact on financial performance
- **Assessing risks and opportunities:**
  - This standard helps organizations assess sustainability-related risks and opportunities.

The GRI and SASB standards play a crucial role in promoting transparency and comparability of information within the realm of green finance. GRI offers a comprehensive framework for reporting to all stakeholders, whereas SASB presents a focused standard tailored specifically for investors. Together, they allow organizations to showcase their sustainability performance in a standardized manner.

Chapter Five:

The Future of Green Finance in Islamic Countries

5-1. Emerging Opportunities

- **New technologies:**
  - Blockchain for transparency in green finance
  - Artificial intelligence for green project management

5-2. Long-term Perspective

1) SDGs

- Achieving goals related to clean energy, water, and sustainable cities

In 2015, the United Nations established the SDGs, a set of 17 comprehensive targets for 2030 that aim to improve human lives, protect the environment, and foster sustainable economic growth. Three of these goals are especially important for green finance and sustainable development in Islamic countries: clean energy, water, and sustainable cities. Below, we will look at how to achieve these specific goals.

Goal 6: Clean water and sanitation for all.

A) Goal definition

- **Goal 6** seeks to ensure the **availability and sustainable management of water and sanitation for all**.
- This goal aims to improve water quality, reduce pollution, and increase water efficiency.

B) Secondary objectives

- **6.1:** Achieving universal and equitable access to safe and affordable drinking water, sanitation, and hygiene for all
- **6.2:** Improving water management and reducing water pollution
- **6.3:** Increasing water-use efficiency in agriculture and industry

C) Applications in Islamic countries

- **Sustainable water resources management**
  - Countries such as Saudi Arabia and Iran can utilize advanced technologies to treat seawater and recycle water.
  - **Example:** A water management project in Saudi Arabia has contributed to reducing water consumption and enhancing the use of recycled water.
- **Water waste reduction**
  - Implementing efficient irrigation systems, such as drip irrigation, in the agricultural sector
- **International Cooperation**
  - Countries can benefit from each other's experiences in water management.

SDG 7: Clean and affordable energy for all

A) Goal definition

- **Goal 7** seeks to ensure access to affordable, reliable, sustainable, and modern energy for all.
- This goal involves increasing the share of renewable energy, improving energy efficiency, and developing clean energy infrastructure.

B) Secondary objectives

- **7.1:** Ensuring universal access to affordable, reliable, and modern energy services

- **7.2:** Increasing the share of renewable energies in total global energy consumption
- **7.3:** Doubling global energy efficiency rates by 2030

C) Applications in Islamic countries

- **Development of solar and wind energy:**
  - Islamic countries such as Saudi Arabia, the United Arab Emirates, and Iran can leverage their significant potential in the renewable energy sector.
  - **Example: Noor Ouarzazate Solar Complex** in Morocco serves as a good model for other countries.
- **Reducing dependence on fossil fuels:**
  - Countries that rely on oil and gas can lessen their dependence on fossil fuels by investing in renewable energy.
- **Using green sukuk:**
  - Islamic financial instruments, such as *green sukuk*, can be utilized to attract capital for clean energy projects.

SDG 11: Sustainable cities for communities

A) Goal definition

- **Goal 11** seeks to make cities and human settlements inclusive, safe, resilient, and sustainable.
- This goal involves reducing air pollution, implementing effective waste management, and developing sustainable transportation solutions.

B) Secondary objectives

- **11.1:** Ensuring access to safe and affordable housing for all
- **11.2:** Increasing access to safe, affordable, and sustainable public transportation
- **11.6:** Reducing the harmful impacts of cities on the environment, especially with respect to waste management and air quality

C) Applications in Islamic countries

- **Sustainable transport systems:**
  - Implementing electric and shared public transportation systems in large cities

- **Example:** The implementation of metro networks and electric buses in countries such as the United Arab Emirates and Turkey

- **Waste management**
  - Implementing recycling and waste reduction programs in cities
- **Smart cities**
  - Using smart technologies to manage urban resources such as water, energy, and transportation

Connection between SDGs and green financing

A) Attracting capital for green projects

- Green finance can contribute to achieving the SDGs.
- **Example:**
  - Using green sukuk to invest in renewable energy projects (SDG 7)
  - Financing for water management and recycling projects (SDG 6)

B) Transparency in reporting

- Using reporting standards such as GRI and SASB enables organizations to convey the impacts of their green projects transparently.

C) International cooperation

- Islamic countries can collaborate with international organizations, such as the IDB and OIC, to secure additional financial and technical resources for achieving the SDGs.

The SDGs, particularly those concerning clean energy, water, and sustainable cities, play a crucial role in advancing green finance and sustainable development in Islamic countries. By utilizing Islamic financial tools, such as green sukuk, engaging in international partnerships, and implementing effective reporting standards, these countries can effectively meet their sustainability targets.

5-3. Coordination between Countries

- Creating regional networks to exchange experiences and resources

Coordination between countries plays a crucial role in the realm of green financing and sustainable development. Regional networks facilitate the sharing of knowledge, experiences, and resources among countries, enabling them to

achieve common goals in environmental sustainability and development. In the following, we will explore this issue more thoroughly.

1) The Need for Coordination between Countries

A) Common challenges

- Countries, particularly those in the Islamic world, face common challenges, including a **scarcity of water resources**, **climate change**, and **reliance on fossil fuels**.
- Coordination between countries can help solve these challenges,

B) Efficient use of resources

- The natural resources and technologies accessible in countries are restricted. Establishing regional networks enables countries to utilize their resources collaboratively and effectively.

C) Transfer of experiences

- Countries with successful experiences in renewable energy or water management can share their knowledge with others.

2) Creating Regional Networks

A) Definition of regional networks

- **Regional networks** refer to a group of countries or organizations formed to exchange experiences, resources, and cooperate in common areas.
- These networks can function at a regional level, such as in the Middle East or North Africa, or even on a global scale.

B) Objectives of regional networks

- **Exchange of best practices**
  - Sharing successful experiences and challenges in the realms of green financing and sustainable development
- **Collaboration on resources**
  - Shared use of financial, technological, and human resources
- **Strengthening of capacities**
  - Raising countries' technical and specialized knowledge in areas such as renewable energy and water management

3) Practical Examples of Regional Networks

A) Solar energy network in North Africa and the Middle East

- **Objective:**
  - To create a network for the collaborative utilization of solar energy in regions with high solar radiation
- **Participating countries**
  - Countries such as Morocco, Algeria, Egypt, and Saudi Arabia
- **Impacts**
  - Reduced reliance on fossil fuels
  - Increased access to clean energy

B) Water Management Network in the Middle East

- **Objective:**
  - To improve water resources management and reduce water waste in Middle Eastern countries
- **List of participating countries.**
  - Countries like Iran, Iraq, Türkiye, and Jordan
- **Impacts**
  - Reducing water consumption in various sectors
  - Increased use of recycled water

C) Sustainable transportation network in Islamic countries

- **Objective:**
  - To develop sustainable and environmentally friendly public transport systems
- **Participating countries**
  - Countries such as Türkiye, Malaysia, and the United Arab Emirates,
- **Impacts**
  - Reduced air pollution
  - Higher access to safe and affordable public transportation

4) How to Create and Manage Regional Networks

A) Identifying needs and opportunities

- **Countries should identify their needs and opportunities in areas of mutual interest.**
- **Example:**
  - The high potential of solar energy in the North African and Middle Eastern regions

B) Cooperation with international organizations

- Countries may utilize the services of organizations such as IDB and OIC to establish regional networks.
- **Example:**
  - IDB can help create solar energy networks.

C) Implementation of joint projects

- Countries can develop collaborative projects in fields such as renewable energy, water management, and sustainable transportation.
- **Example:** Joint projects for water resources management in shared river basins

D) Technology transfer and training

- More advanced countries can share technology and knowledge with others.
- **Example:** Training specialists in seawater treatment or the application of solar technologies

5) Benefits of Regional Networks

A) Reduced costs

- Shared use of resources and technologies can reduce costs.

B) Increased efficiency

- Collaboration between countries can help increase efficiency in project implementation.

C) Strengthened international relations

- Establishing regional networks can enhance relationships among countries and boost international collaboration.

Establishing regional networks for the exchange of experiences and resources represents an effective approach to attaining SDGs and facilitating green financing. These networks help countries utilize their resources effectively and gain insights from one another's experiences.

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