

Investment in renewable energies as a strategic option to achieve sustainable finance -Malaysian Experience Model -**الاستثمار في الطاقات المتجددة كخيار استراتيجي لتحقيق التمويل المستدام – التجربة الماليزية أنموذجاً –****Fatima Zohra Kaddour**

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Received: 21/07/2023**Accepted:** 05/01/2024**Published:** 06/01/2024**Abstract:**

This study aims to highlight sustainable finance, which is one of the modern topics that has come to attract the attention of the world's nations, and highlighting the realities of investing in renewable energies and its role in achieving sustainable finance, while presenting Malaysia's experience and drawing its most important lessons as a successful experience in this area. In our study, we relied on the extractive approach with its descriptive and analytical tools, where we provided background coverage and analysis of the various statistical data produced in the reports of the various international Organizations. We concluded that investing in renewable energies attracts a large proportion of the revenues from sustainable financial issuances; Malaysia has achieved great success and effectiveness in developing sustainable finance practices and investing in renewable energy sources through the establishment of a strong legislative and institutional structure and concerted efforts to bring together the financial system's actors.

Keywords: Sustainable Finance; Renewable Energy; Malaysian Experience; Financial System; Investment.

JELClassificationCodes: Q4, P28, Q5, Q01

ملخص:

تهدف هذه الدراسة إلى تسليط الضوء على أحد الموضوعات الحديثة التي أصبحت تجذب انتباه دول العالم وهي التمويل المستدام، وكذا إبراز واقع الاستثمار في الطاقات المتجددة ودوره في تحقيق التمويل المستدام مع عرض التجربة الماليزية واستخلاص أهم الدروس المستفادة منها باعتبارها تجربة ناجحة في هذا المجال. واعتمدنا في دراستنا على المنهج الاستنباطي بأدواته الوصف والتحليل حيث قمنا بالتغطية الخلفية والتحليلات اللازمة لمختلف البيانات الإحصائية الصادرة في تقارير المنظمة الدولية للطاقة ومختلف الهيئات الدولية وتفسيرها. وخلصت هذه الدراسة لأن الاستثمار في الطاقات المتجددة يجتذب نسبة كبيرة من عائدات الإصدارات المالية المستدامة، وقد حققت ماليزيا نجاحا وفعالية كبيرين في تطوير ممارسات التمويل المستدام والاستثمار في مصادر الطاقة المتجددة، من خلال إنشاء هيكل تشريعي ومؤسسي قوي، وبذل جهود متضافرة للجمع بين الجهات الفاعلة في النظام المالي. كلمات مفتاحية: التمويل المستدام، الطاقة المتجددة، التجربة الماليزية، النظام المالي، الاستثمار.

تصنيفات JEL: Q01، Q5، P28، Q4

INTRODUCTION:

Today's energy issues consider the highest priority around the world, especially as the hypothesis of the depletion of non-renewable energies, and the exacerbation of environmental disasters resulting from their use grows. Threatening the financial and energy stability of the economies of the world's nations in general, and oil States in particular, as they depend mainly on the income of their oil resources to finance their domestic economy, in order to provide immunity to global economic volatility and ensure financial and environmental sustainability. The shift towards renewable energies has become the primary goal for both developed and developing countries. Their Governments have sought to improve the investment climate in renewable energies, by shaping incentive strategies and working to create all the necessary legislative and institutional frameworks for their success and increased interest in adopting and attracting sustainable finance practices and innovative mechanisms aimed at financing sustainable investments, including renewable energy investments Malaysia has achieved great success in this direction.

Malaysia achieved the so-called Asian miracle, and attracted the attention of the international system by providing one of the world's most successful economic experiences, and enabling it to advance its economy as developed countries in just two decades despite its limited human and material potential. In recent years, it had sought to adopt the concept of a green economy by experimenting in investing in renewable energies as an alternative to non-renewable energy that polluted the environment and threatened to deplete. Moreover it had taken the initiative of adopting the concept of sustainable finance which has become a global endeavour that most developed countries have been quick to embrace. It focused in particular on the mechanism of green sukuk that have the capacity to further expand the Islamic finance market and to help bridge the gap between the traditional and Islamic world of finance, primarily to finance renewable energy projects, the problem of our research is highlighted:

The problem of the study: Through our research paper, we will try to highlight the importance of investing in renewable energies in achieving sustainable financing, thus presenting Malaysia's experience as one of the leading experiences in this area and drawing the most important lessons learned from it to operationalize this type of financing in Algeria. The problem of our study is reflected in the following key question:

What is the reality of investing in renewable energies, and how it can contribute to sustainable financing in the world in general and in Malaysia in particular?

The main question divided into a series of sub-questions:

- What is renewable energy? What are their sources?
- What is the concept of sustainable financing? What are its products?
- What are the strategies and policies of sustainable finance and investment in renewable energies in Malaysia?

Hypotheses of the study: To answer the problem of the study, the following hypotheses have been developed :

- Non-renewable sources of energy reflect the world's dominant energy markets, and renewable energies continue to account for a small share of global electricity production;
- Renewable energy investments are the main polarizer of the proceeds of Malaysia's sustainable financial issuances;

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- The Malaysian Government has developed programmes and strategies to promote investment in renewable energies and develop sustainable financing that enable it to achieve positive results in this area.

Importance of the study: The importance of this study is to highlight one of the recent topics that has come to attract the attention of the countries of the world. Namely, sustainable finance, and highlighting the most important strategies and mechanisms in this area, as well as demonstrating the role of investing in renewable energies in achieving its objectives while presenting the Malaysian experience that has been proactive in adopting sustainable finance policy, and supporting investment in renewable energies and drawing the most important lessons learned from it.

Objectives of the study: Through this study, we seek to achieve the following objectives:

- Identifying areas and methods of sustainable finance;
- Examine the reality of investing in renewable energies and highlight its role in promoting sustainable finance;
- Learn about Malaysia's experience in sustainable finance and support renewable energy projects.

The methodology used in the study: So that we can build a vision that helps solve the problem at hand and achieve purely the goals, we relied on the analytical descriptive curriculum and background coverage on the various statistical data and analyses needed for them and their interpretation in order to reach the results and recommendations.

Previous studies:

- **Monowar, H., & Others 2018 study:** is an article entitled: « **A state-of-the-art review of hydropower in Malaysia as renewable energy: Current status and future prospects** » ; published in Energy Strategy Reviews. In this article, the hydropower potential in Malaysia, current and future prospects of large and small-scale hydropower development, and issues and challenges related to hydropower development are described. Small hydropower promotion techniques, government initiatives, and the advantages and barriers to small hydropower development are also included.

- **Wan Syakirah, W. A., & Others 2019 study:** is an article entitled: « **The Potential And Status Of Renewable Energy Development In Malaysia** », published in Energies Review. This study highlights the current state of energy in Malaysia; it covers the traditional sources of generation including natural gas, coal and big hydro stations. It discusses also the availability of renewable energy resources and their development status, and presents and analysis renewable energy policies and programmes aimed at increasing renewable energy generation in the country and the status of their implementation.

Based on the foregoing, most previous studies are similar to our study on the importance of investing in renewable energies and the need to encourage and stimulate it by taking advantage of leading international experiences in this field. However, our study differs from previous studies, highlighting the importance of integrating sustainability into the financial sector by developing supportive mechanisms and policies and identifying how investing in renewable energies contributes to sustainable financing goals.

1- Renewable Energies

1-1 Definition of Renewable Energies

Renewable Energies are known to be those that are generated naturally and sustainably. These energies defined by the multiplicity of international bodies and organizations interested in this area. Through this axis, we will try to address the most important of these definitions.

Among the most important definitions of renewable energies are:

- Defined by the United Nations Environment Protection Programme (UNEP) as « Energy derived from natural sources that are replenished at a higher rate than they are consumed sunlight and wind, for example, are such sources that are constantly being replenished. Renewable energy sources are plentiful and all around us. » (united nations, 2023)

- Defined by U.S. Energy Information Administration (EIA) as « energy from sources that are naturally replenishing but flow-limited ; renewable resources are virtually inexhaustible in duration but limited in the amount of energy that is available per unit of time. » (U.S. Energy Information Administration, 2023)

1-2 The Sources Of Renewable Energy

Here are a few common sources of renewable energy : (Ottmar & others, 2012, p. 1)

1-2-1 Bioenergy can be produced from a variety of biomass feedstocks, including forest, agricultural and livestock residues ; short-rotation forest plantations ; energy crops ; the organic component of municipal solid waste ; and other organic waste streams ;

1-2-2 Direct solar energy technologies harness the energy of solar irradiance to produce electricity using photovoltaics (PV) and concentrating solar power (CSP), to produce thermal energy, to meet direct lighting needs and, potentially, to produce fuels that might be used for transport and other purposes ;

1-2-3 Geothermal energy utilizes the accessible thermal energy from the Earth's interior. Heat is extracted from geothermal reservoirs using wells or other means ;

1-2-4 Hydropower harnesses the energy of water moving from higher to lower elevations, primarily to generate electricity. Hydropower projects encompass dam projects with reservoirs, run-of-river and in-stream projects and cover a continuum in project scale ;

1-2-5 Ocean energy derives from the potential, kinetic, thermal and chemical energy of seawater, which can be transformed to provide electricity, thermal energy, or potable water ;

1-2-6 Wind energy harnesses the kinetic energy of moving air. The primary application of relevance to climate change mitigation is to produce electricity from large wind turbines located on land (onshore) or in sea- or freshwater (offshore).

1-3 The Role Of Renewables In Clean Energy Transitions

The deployment of renewables in the power, heat and transport sectors is one of the main enablers of keeping the rise in average global temperatures below 1.5°C. In the Net Zero Emissions by 2050 scenario, renewables allow electricity generation to be almost completely decarbonised. Meanwhile, renewable transport fuels and renewable heat contribute to significant emissions reductions in transport, buildings and industry. (The International Energy Agency, 2023)

1-4 The Benefits of Renewable Energy

Here are some of the benefits of using renewable energy : (Office of Energy Efficiency & Renewable Energy, 2023)

- Enhanced reliability, security, and resilience of the nation's power grid ;

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- Job creation throughout renewable energy industries ;
- Reduced carbon emissions and air pollution from energy production ;
- Increased energy independence ;
- Increased affordability, as many types of renewable energy are cost-competitive with traditional energy sources ;
- Expanded clean energy access for non-grid-connected or remote, coastal, or islanded communities.

2- Sustainable finance:

2-1 Definition Of Sustainable Finance:

Sustainable finance generally refers to the process of taking due account of environmental, social, and governance (ESG) considerations when making investment decisions in the financial sector, leading to increased longer-term investments into sustainable economic activities and projects. (Nicholls, 2021, p. 3)

-According to the United Nations Framework Convention on Climate Change UNFCCC **Sustainable finance** refers to local, national or transnational financing—drawn from public, private and alternative sources of financing—that seeks to support mitigation and adaptation actions that will address climate change.

Sustainable finance requires a transformation from the conventional finance systems. The transition is barricaded by factors such as, short-termism. Such a cause can be considerably achieved by the application of principles for responsible investment as guided by UN, long term capitals, equator principles for banks etc. (VERNON, 2022, p. 4)

2-2 The Sustainable finance market :

The positive Sustainable finance market is dominated by debt products, notably green bonds (Nicholls, 2021, p. 7)

Green Bonds are any type of bond instrument where the proceeds or an equivalent amount will be exclusively applied to finance or re-finance, in part or in full, new and/or existing eligible Green Projects and which are aligned with the four core components of the Green Bond Principles (GBP). (VERNON, 2022, p. 10)

Similar to Green Bonds, **Green Sukuk** are Shari'ah compliant investments in renewable energy and other environmental assets. They address Shari'ah concern for protecting the environment. Proceeds are used to finance construction, to refinance construction debt, or to finance the payment of a government-granted green subsidy (The Climate Bonds Initiative, 2023). Green sukuk has two labels: "Islamic" and "Green".

3- The reality of renewable energies and Sustainable finance

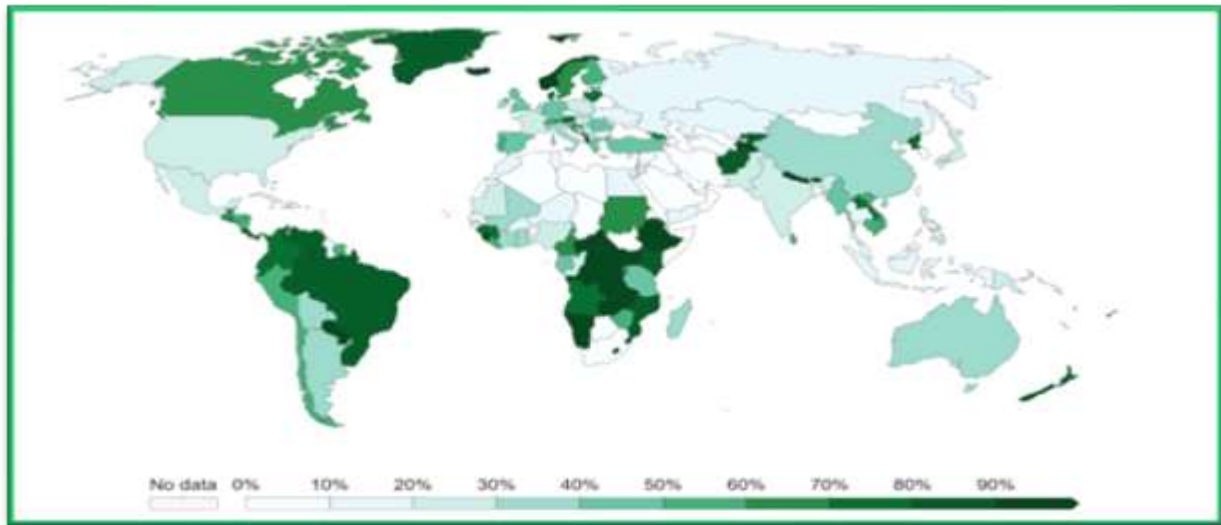
3-1 The reality of renewable energies in the global energy mix:

To reduce CO₂ emissions and environmental pollution, the world needs to shift rapidly towards renewable energy sources that will play a key role in decarbonizing global energy systems in the coming decades, and through this requirement we will try to highlight the reality of renewable energy production and distribute their share of the global energy mix.

3-1-1 The Distribution of the world's renewable energy production by region in 2021:

Figure 1 shows us the distribution of the share of electricity production from renewable sources in the energy mix across the world for 2021, noting that the share of production does not exceed the threshold of 30% in most regions of the world. While more than 80% of the energy mix is made up of a number of North and South American countries, most notably Canada and Brazil. Some South African countries have achieved a high rate of renewable energy production of nearly 95%, such as the Republic of Knogo and the Central African Republic. In Europe, production averaged about 40%, and both Denmark were occupied. Norway and Sweden led the region with a production share of more than 70%, while most Asian countries recorded a production share of more than 25%, excluding North Korea, Afghanistan, Tajikistan, and Kyrgyzstan, which have achieved more than 83%.

Figure 1: Distribution of the share of electricity production from the world's renewable sources in 2021



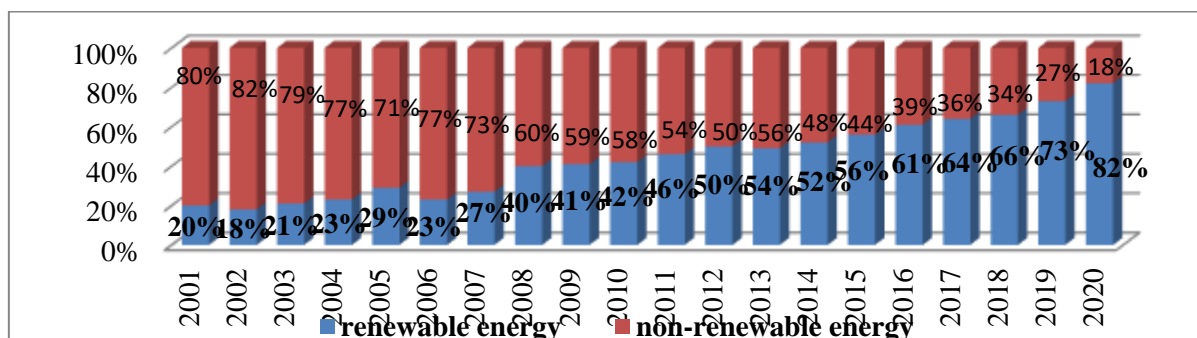
Source: <https://ourworldindata.org/>, accessed on: 13-06-2023.

3-1-2 The Evolution of global renewable energy capacity additions during 2001-2020:

We note through figure 2 that the share of new composite renewable energy capacity additions in total energy additives has experienced fluctuating growth during the 2001-2007 period and has not exceeded 30%. In 2008, the share of renewable additions has risen considerably to 40% per cent of the total and has subsequently maintained a steady and rapid pace of growth. In 2012, it surpassed non-renewable energy sources in terms of the share of new composite additions and this is due to increased international interest in renewable energy projects and their endeavour to reduce the environmental implications of non-renewable energies, In 2020, the highest levels were recorded with renewables contributing up to 82% of new energy additions worldwide.

Figure 2: Evolution of renewable energy capacity additions in the global energy mix during 2001-2020.

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Source: (Sustainable Energy Development Authority (Seda), 2021, p. 12)

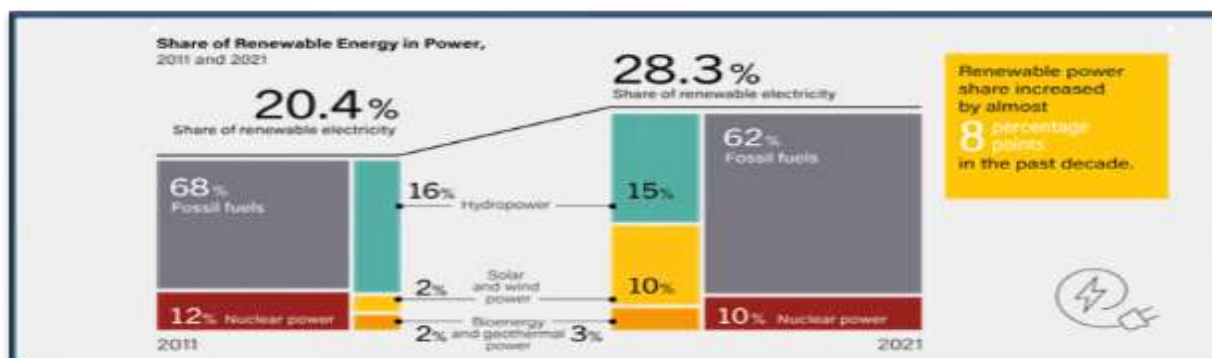
3-1-3 The Distribution of the share of renewable energy in the global energy mix:

The renewable energy sector accounted for the lion's share of the total new energy additions installed over the last decade in exchange for a perceived decline in non-renewable energy additions, reflecting the trend of international strategies aimed at increasing the share of renewable energy contribution to the global energy mix, which is distributed as follows:

3-1-3-1 The Distribution of the share of renewable energy in global electricity generation by source at the end of 2011 and 2021:

Despite significant developments in global renewable energy composite capacity additions, renewable electricity continued to face challenges in achieving a greater share of global electricity generation, as illustrated in the figure 3, where proven renewable energy capacity was sufficient to provide only an estimated 28.3% of global electricity generation at the end of 2021. This recorded an increase of about 8% from 2011, while hydropower, although declining, maintained the lead in 2021 with more than 58% of the estimated renewable generation share, accounting for about 78% of total 2011. Followed by solar and wind energy, which increased significantly, accounting for about 35% of total 2021 compared to 9% of total 2011 Bioenergy then comes up with only 10% of the renewable generation share for 2021 and 2011.

Figure 3: Distribution of the share of renewable energy in global electricity generation by source at the end of 2011 and 2021.



Source : (The REN21 , 2022, p. 44)

3-2 The Evolution of the volume of green bond issues globally during the period 2009-2021:

Green bonds have been receiving increasing attention in recent years and have seen significant growth in the volume of issuances as they are an innovative solution to address

climate change, mitigation and adaptation, and a mechanism to mobilize financial resources towards sustainable investments. In this section, we will try to examine the most important developments in the green bond market.

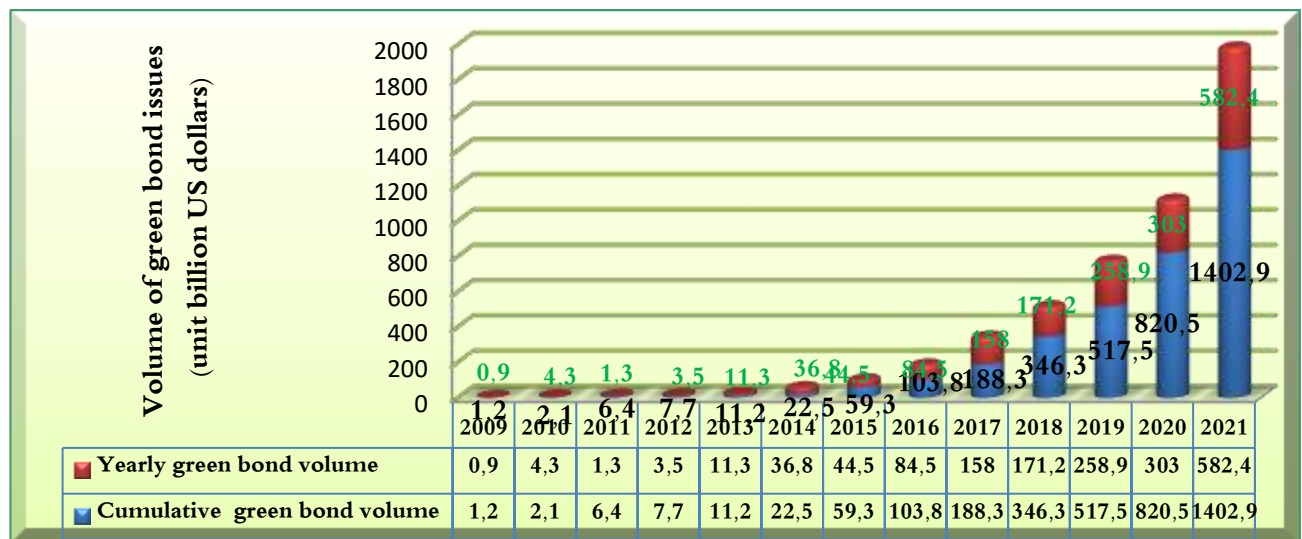
3-2-1 The volume of annual and cumulative issuance of green bonds evolved globally during 2009-2021:

Figure 4 shows us the evolution of the volume of green bond issues in the world during 2009-2019, through which we note that the pace of green bond issuance has undergone two basic stages during this period:

- Phase I (first five years from 2009 to 2013) : In 2011, green bond issuance fell to USD 1.3 billion after exceeding USD 4 billion in 2010, and 2012 and 2013 saw issuance rise again due to increased international interest in the environment and climate change. The green bond market shifted from niche to public markets bringing the annual green bond issuance to more than USD 11 billion in 2013, approaching the cumulative volume of the last four years.

- Phase II (second five years from 2014 to 2021): This period saw a rapid increase in the pace of issuance due to the conclusion of several international conventions that obliged States and Governments to adapt to climate impacts and resort to green bonds. After the annual issuance in 2014 amounted to approximately USD 37 billion, It more than quadrupled to more than USD 171 billion in 2018, while 2019 recorded a rapid jump in the volume of releases of USD 258.9 billion. Setting a new record for an increase in the pace of issuance estimated at more than 51% over 2018, while 2020 saw a decline in this pace due to the repercussions of the Krona virus. To rebound rapidly in 2021, issuances amounted to about USD 582.4 billion, exceeding the cumulative green bond issuance threshold of USD 1400 billion.

Figure 4 : Evolution of the world's annual and cumulative issuance of green bonds during 2009-2021



Source : Prepared by the researcher on the basis of : (Almeida, 2020, p. 15) , and www.climatebonds.net
accessed : 25-06-2023.

3-2-2 The Evolution of the distribution green bond proceeds by sector during 2014-2021:

Figure 5 shows us the evolution of the distribution of green bond yields across different sectors during 2014-2021. We note that there is an increase in volumes across all sectors during this period where both the water sector witnessed, wastes, moderate land use with an average

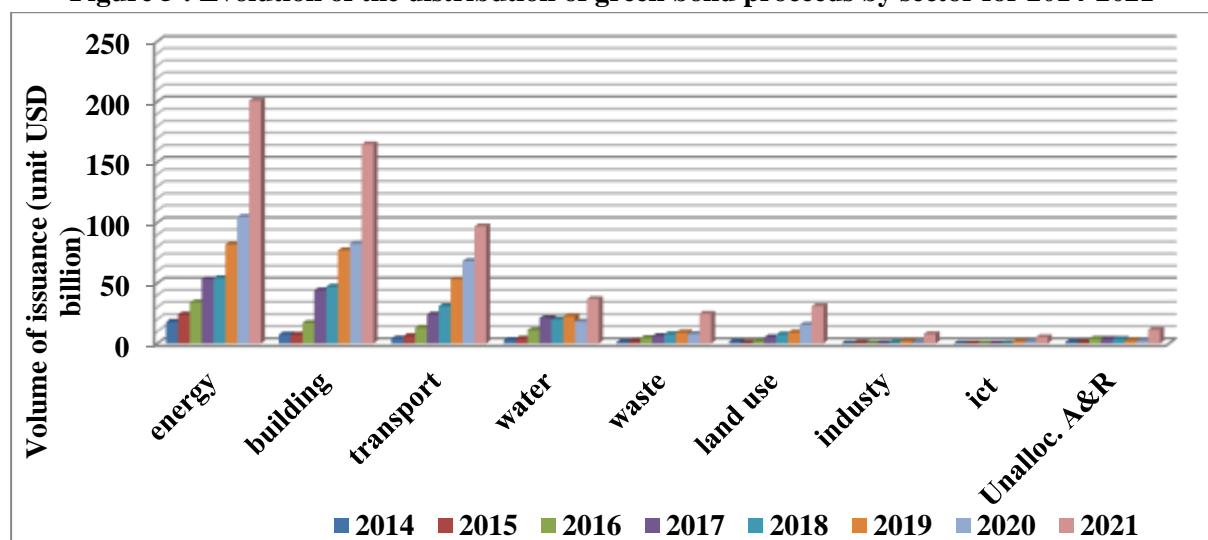
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growth rate of about 17% until 2021, which has a growth rate of over 50%. The water sector has maintained its fourth place among the largest sectors with more than USD 36 billion, while the waste and land use sector for the first time exceeded the USD 20 billion threshold in annual volume.

The renewable energy, buildings, and transport has maintained the top three sectors consecutive positions in terms of growth and volume since 2014; the renewable energy sector exceeded the USD 200 billion threshold during 2021. The buildings sector also saw the largest absolute increase in the year by more than USD 82 billion, while the transport held third place with about USD 96 billion.

While industry, ICT and the non-protection and recovery sector (Unallocated A&R) have achieved very small growth rates and may be absent in most years, valued at only USD 12 billion.

Figure 5 : Evolution of the distribution of green bond proceeds by sector for 2014-2021



Source : Prepared by the researcher on: www.climatebonds.net, accessed : 25-06-2023.

3-2-3 The Evolution of Global Green sukuk Issues in 2017-July 2020

Islamic sukuk are the most important product of the Islamic financial industry, for their critical importance in providing sources of finance and multiple outlets to invest surplus Muslim funds. Especially because they are diverse opening up more space for sukuk and increasing investors' confidence in them even in non-Islamic countries, considering that their owners, exporters and even intermediary institutions share risks and returns, thereby enhancing investment control and increasing investor confidence. Demand has increased locally and internationally and has developed considerably in many respects and thus contributed to an unprecedented presence of Islamic financial products in international financial markets.

With investors increasingly oriented towards green bonds, green sukuk have emerged as a new face of sustainable financing instruments in line with the purposes of Islamic Shari' a. They have received increasing attention in the past few years, and their global market issuances have increased rapidly in their ability to provide financing to achieve both the sustainable development goals and the principles of Islamic Shari' a.

We note from figure 6 that the volume of green sukuk issued has been evolving since the beginning of their issuance in July 2017 to 2019, exceeding 50% growth in all years. However, the sharp recession in the global economy caused by the COVID-19 pandemic has led to a significant decline in the volume of the release during the first six years of 2020 compared to 2019. The proportion of issuance of green sukuk from the total Islamic sukuk issued continues to increase annually, with less than three years having reached more than 2%. This is due to the growing interest of investors who prefer to invest in accordance with Islamic sharia principles in green finance; According to the World Bank's report, green sukuk have the potential to channel USD 2 trillion from the Islamic finance market towards financing green and sustainable projects.

Figure 6 : Evolution of the World's Green Sukuk Issues in 2017-July 2020
(Unit: USD Million)



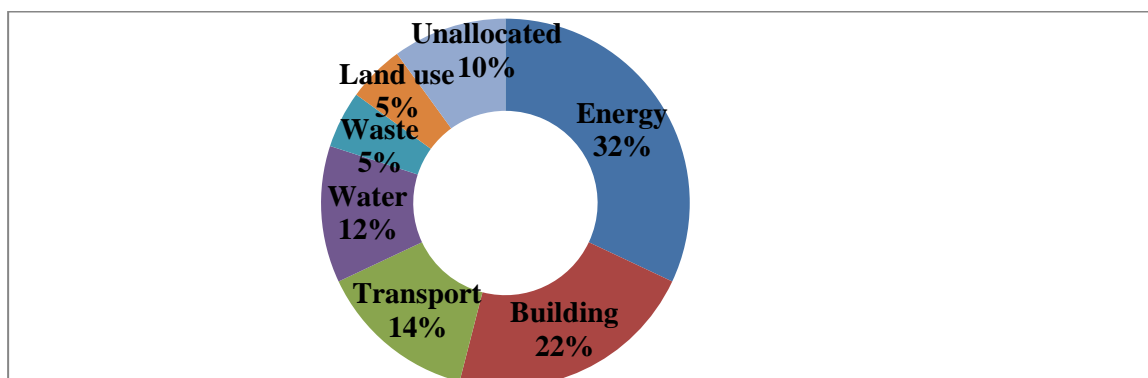
Source : (World Bank Group, 2020, p. 31)

3-2-5 The Distribution of the use of green sukuk proceeds to various sectors during 2019

Figure 7 shows us that the market for green sukuk so far, has a primary focus on financing renewable energy projects by more than 30%, in addition to the low-carbon building sector and sustainable transport, which accounted for 22% and 14% respectively of the total proceeds of green sukuk. The water sector allocates about 12%, which is broadly in line with global green bond proceeds despite some small differences. For example, transport accounts for 20% of the global green bond market proceeds while only 14% in the green bond market. The waste management and sustainable land use sectors account for 05% of the total proceeds of green sukuk.

Figure 7 : Distribution of proceeds from green sukuk by sector during 2019

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Source: Prepared by the researcher on : (Davidson, 2021, p. 18)

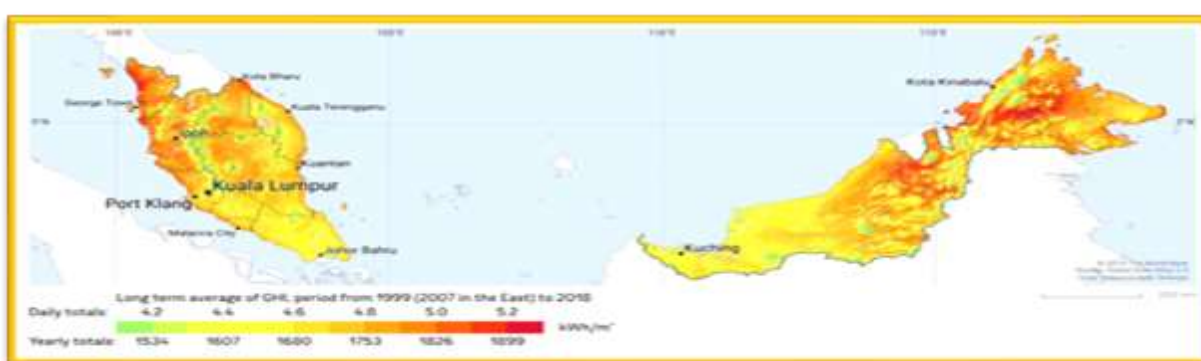
4- Malaysia's renewable energy potential

Malaysia's climate is characterised by relatively high temperature and humidity, with humidity ranging from 80% to 90% excluding highs and temperature. It varies throughout the year between 22 ° C and 33 ° C and the average daily temperature is 26.5 ° C. monsoon « , as well as twice-yearly monsoon gusts, north-east and south-west (Mekhilef & others, 2012, pp. 387-388), Malaysia thus possesses a variety of renewable energy resources, including :

4-1 Solar Energy:

Malaysia has high solar potential due to its strategic position near the equator, as well as its hot and sunny weather throughout the year. Monthly solar radiation is estimated at 400-600 MJ/m², and irradiation is higher during the northeastern monsoon when winds from Central Asia to the South China Sea through Malaysia and finally to Australia between November and March, radiation is reduced during the southwestern monsoon when the direction of the wind changes and emits from Australia and moves towards the island of Sumatra before reaching the Strait of Malacca between May and September (Wan Syakirah & Others, 2019, p. 4)

Figure 8: Malaysia's horizontal solar radiation map



Source : [https : //globalsolaratlas.info/](https://globalsolaratlas.info/), accessed 26-06-2023.

Through figure 8 we note that Malaysia's strategic geographical location makes it characterized by enormous amounts of annual solar radiation ranging from 1400 to 1900 kWh/m² with an average of about 1643 kWh/m² per year of more than 10 hours per day. Even in Malaysia's smallest state Perlis that is located in the northern region of Malaysia on the border with Thailand, an average of 5.02 kW/m² of solar radiation produced daily. We note also that the northern region of Malaysia shows more intense radiation than the southern region, thus

Malaysia is very suitable for the use of photovoltaic power especially as the weather situation in Malaysia is appropriate and predictable.

4-2 Wind power :

Malaysia is located on the northern side of the equator. The average wind speed ranges from 8 m/s during the monsoon season to a comfortable breeze of about 3 m/s between the monsoon and apart from strong winds. Less strong winds blow for a period of time ranging from minutes to hours called medium-sized winds with a speed of 1-100 km that affects smaller areas and shows intense vertical flow, examples of which are those that contribute to the formation of thunderstorms or produced by hurricanes and local winds such as land and marine breezes, mountain and valley breezes. (Khalid & Others, 2013, p. 147).

Figure 9 : Map of wind speed rates over 100 metres from the ground of the State of Malaysia



Source : <https://globalwindatlas.info/>, accessed 26-06-2023.

Figure 9 shows that Malaysia can be considered a low wind speed area compared to other countries. Wind energy potential is minimal, with an average wind speed of between 1.5 and 4.5 m/s in high-altitude areas, while high winds of 9 to 11 m/s. Most notably, Mersing, Johor and Kuala Terengganu as areas of the Malaysian peninsula. Codes and mornings are the highest possible wind areas in eastern Malaysia. In addition, Malaysia has potential for offshore wind power that can be exploited in the "Sea", caused by strong winds from the Indian Ocean and South China Sea during the monsoon season.

4-3 Hydropower:

High year-round temperature and humidity in Malaysia, as well as high rainfall are among the most important factors that make Malaysia one of the largest areas rich in water energy potential hydropower, where it has a total theoretical potential of 123,000 gigawatts per hour per year. With the start-up of new hydropower plants currently under construction projected to exploit approximately 30% of the country's economically usable potential hydropower. Moreover, Malaysia has about 500 MW of potential small hydropower in many rivers and dams, which can illuminate rural and remote areas, where large-scale power generation is not economically feasible hydropower can play an important role in Malaysia's electricity generation mix (Monowar & others, 2018, p. 426).

4-4 Convert waste into energy:

Malaysia is the second largest palm oil producer after Indonesia. Moreover, that is why you have a huge source of waste palm oil that can be used for biomass, which has an advantage over other types of renewable energy in terms of availability and huge resources. In addition, this type of resource can be easily stored, and Malaysia produces approximately 168 million tons of biomass, including resources from waste palm oil, rice crusts, coconut waste, sugarcane residues, municipal wastes and forest residues biomass has shown a significant state of proliferation in Malaysia compared to other technologies, This represents about 17% of

Malaysia's total renewable energy potential, and can generate up to 2,400 MW of power. (Wan Syakirah & Others, 2019, p. 8)

5- Malaysia's Renewable Energy Investment Strategy

Malaysia's energy sector is a very important sector for economic development. The Malaysian Government has focused in previous years on increasing the production of non-renewable energies as the primary driver of Malaysia's economic growth, resulting in a decline in its reserves ; and prompted the Government to reconsider its energy strategy by stimulating and encouraging the use of renewable energies, Seeking to increase its share in the energy mix. We will try to address the Malaysian Government's most important strategies and Roadmaps supporting investment in renewable energies and its most important achievements in this area.

5-1 Malaysia's renewable energy strategy by 2025:

The Malaysian Government is seeking to intensify the development of renewable energy, especially biomass, as the fifth fuel supplier under the country's fuel diversification policy. The policy developed in 2001 aimed at providing 5% renewable energy from electricity generation by 2005, equivalent to between 500 and 600 MW of composite capacity, and policy has strengthened through fiscal incentives. In 2018, Malaysia set a target of 20% renewable energy in the country's energy mix by 2025. In order to reach the target an increase of 18% from 2% in 2018. The country needs to attract a total of USD 8 billion in renewable energy investment during this period to attract investment. The Government can improve renewable energy governance and investment climate for foreign investors. (stringfixer, 2023)

5-2 Malaysia's Renewable Energy Roadmap 2035:

The Formulation of Strategic Framework by Sustainable Energy Development Authority Malaysia (SEDA), as mandated by the Ministry of Energy and Natural Resources aims to support Malaysia's vision to achieve a 31% share of renewable energy in the energy mix by 2025 and 40% by 2035. In addition calls for coordinated action among various stakeholders in enabling Malaysia to benefit from the enormous potential of energy learning projects in promoting economic, environmental and social outcomes. The road map also supports the Energy Authority's Energy Development Plan for Energy Sector Development to meet future electricity demand. The road map includes three lines of action: Assess proven core capacity and potential renewable energy resources, develop private energy technology goals and scenarios, and develop a strategic roadmap. (Seda Malaysia, 2023)

6- The Reality of Investing in Renewable Energies in Malaysia

Through Table1 we note that the capabilities used for renewable energies in Malaysia have grown significantly during the period (2009-2021), jumping from 2,836 MW in 2009 to about 8,898 MW in 2021, with a growth rate of more than 180% resulting mostly from a rise in hydropower capacity of 6,211 MW in 2021. The problem is more than 77% of total capacity and recorded its highest increase in 2015 of approximately 1,000 MW resulting from the operation of two hydropower plants in Hulu Terengano in December 2015. Bioenergy is second in total installed capacity at 11%. The growth rapidly escalated in the following year, reaching a 2015 high of about 1580 MW, while 2017 recorded a measurable decline in bioenergy capacity due to a decline in palm oil production, reflecting total capacity. The total solar capacity came third with 20% of the total capacity for 2021. It had experienced little growth in

2009-2011, and had begun to grow gradually since 2012 following the entry into service of the feeding tariff mechanism. This is due to the launch of the Net Energy Measurement Program (NEM) in 2016, by the Malaysian Government; while Malaysia has not recorded any operation of wind capacity due to its weak resources compared to other countries.

Table 1: Malaysia's Renewable Energy Capacity Development during 2009-2021

(Unit: MW)

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Total Renewable Energy	2836	2797	3895	4241	5677	6357	7551	7958	7333	7540	7961	8570	8898
Hydropower	2118	2135	3121	3449	4535	4761	5742	6121	6145	6165	6185	6197	6211
Solar Energy	1	1	1	25	97	166	229	279	370	536	894	1483	1787
Bioenergy	717	662	774	768	1045	1431	1580	1558	818	839	882	890	900

Source: Prepared by the researcher on the statistics of 2021 and 2022 of the International Renewable Energy

Agency IRENA, available at: <https://www.irena.org/>, accessed: 25-03-2022.

7-Malaysia's Sustainable Financing Strategy

Malaysia established as a global leader in Islamic Finance, and this success has largely developed over time with the efforts of the various players in enabling a facilitative ecosystem. Both the banking system and the Capital Market Regulator have developed a robust regulatory and policy framework to support intermediaries to leverage their depth of expertise, and expertise in Islamic finance to develop sustainable finance in Malaysia. These efforts have further enhanced by the significant involvement of institutional investors who included sustainable financing as a priority in Malaysia's Institutional Investment Act as early as 2014. (MSFI, 2020)

In addition, the Malaysian government has put in place several different incentives to ensure Malaysia is on track to meet its commitments under the 2016 Paris Agreement, and has adopted several initiatives and policies that provide a regulatory framework to facilitate greater green, social and sustainable financing. Malaysia's market has driven further diversification by encouraging more versions of a wider range of sustainable projects.

7-1 The reality of issuances of green sukuk in the State of Malaysia:

Malaysia is a leading country in the field of sustainable Islamic finance, which carries enormous potential given its satisfaction with the needs of a wide range of investors. It also supports investments that contribute to sustainable development. The Malaysian Securities Commission was the first to develop a framework for green sukuk in 2014 and has intensified its efforts in supporting Malaysia's sustainable finance programme in cooperation with a technical team from Bank Negara Malaysia.

The year 2017 was the turning point in Malaysia with the issuance of the world's first green instrument by Tadau Energy Power Company in Guellia worth Rm250 million Malaysian RM58 million; followed by a Quantum Solar Park company in October with a RM1 billion Malaysian version equivalent to USD 236 million, These instruments have been allocated to finance solar projects in the country, following which Malaysia's issuances have increased and so far have achieved the largest number of versions of green sukuk in the world, as shown in the following table :

Table 2 : Issuances of Green sukuk in Malaysia

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Issuer name	Issue date	Amount issued	Issuer type	Use of proceeds
Tadau Energy Sdn Bhd	Jul 2017	MYR250m (USD58m)	Non-financial corporate	Energy
Quantum Solar Park (Semenanjung) Sdn Bhd	Oct 2017	MYR1,000m (USD236m)	Non-financial corporate	Energy
PNB Merdeka Ventures Sdn Bhd	2017 Dec	MYR690m (USD170m)	Government- backed entity	Buildings
SEGI Astana Sdn Bhd	Jan 2018	MYR415m (USD104m)	Non-financial corporate	Buildings
Sinar Kamiri (Mudajaya Group Berhad)	Jan 2018	MYR245m (USD63m)	Financial corporate	Energy
UiTM Solar Power Sdn Bhd	Apr 2018	MYR222m (USD57m)	Government- backed entity	Energy
Pasukhas Green Assets Sdn Bhd	Feb 2019	MYR17m (USD3.9m)	Non-financial corporate	Energy, Buildings, Water, Waste, Land use, Unallocated A&R
PNB Merdeka Ventures Sdn Bhd	Jun 2019	MYR445m (USD108m)	Government- backed entity	Buildings
Telekosang Hydro One Sdn Bhd	Aug 2019	MYR590m (USD208m)	Non-financial corporate	Energy
Edra Solar Sdn Bhd	Oct 2019	MYR245m (USD58m)	Non-financial corporate	Energy, Land use
Cypark Ref Sdn Bhd	Oct 2019	MYR550m (USD131m)	Non-financial corporate	Energy
PNB Merdeka Ventures Sdn Bhd	Dec2019	MYR435m (USD105m)	Government- backed entity	Buildings
Leader Energy Sdn Bhd	Jul 2020	MYR260m (USD61m)	Non-financial corporate	Energy
Solar Management (Seremban) Sdn Bhd	Sept 2020	MYR260m (USD64.4m)	Non-financial corporate	Energy

Source : (Davidson, 2021, p. 13) .

Through table 2, the issuance of green sukuk for the year 2017 amounted to three issues with a total of USD 464 million. The year 2019 marked a significant jump in the issuance of Malaysia's green instruments, with six issues mostly in the renewable energy sector. Four of the five exporters who had made their debut, reflecting Malaysia's expanding trend to develop sustainable finance, PNB Merdeka Ventures was able to strengthen its position in the field of green sukuk having become Malaysia's first frequent exporter with two other issuances totalling USD 213 million. The year 2020 saw a slight decline in the volume of releases, due to the repercussions of the coronavirus pandemic. New market entry for two new exporters totalling USD 125.4 million.

We also note that the Malaysian Green Sukuk market has generally focused on financing projects related to renewable energy and low-carbon buildings, representing respectively about 69% and 23% of the total issuances, and the remaining 8% is distributed to the water, waste

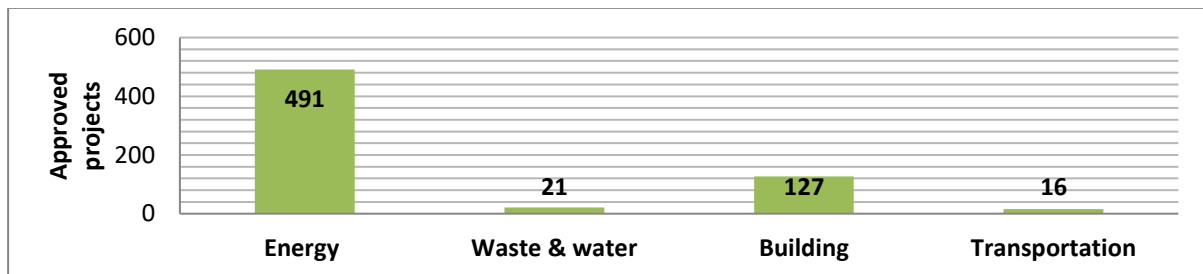
and land use sector. Permodalan National Berhad (PNB Merdeka Ventures) is the largest exporter in the building sector. The largest exporter in the renewable energy sector is Quantum Solar Park. All 13 Green Sukuk deals have been issued in Malaysian local currency United States dollar equivalent sizes range from about USD 50 million to USD 500 million, This demonstrates the maturity of Malaysia's domestic green sukuk market's efforts to achieve global and regional leadership in Islamic sustainable finance.

7-2 Malaysia's Green Technology Financing Reality:

The Malaysian Government launched a Green Technology Financing Programme (GTFS) for the first time in 2010, with a total target funding capacity of 3.5 billion RM to support the development of green technology in Malaysia. In March 2019, the Ministry of Finance approved the extension of the program as GTFS 2.0 with 2 billion Malaysian ringgit allocated until 2020 project, a low-cost financing scheme to facilitate the financing of green technology projects providing easier access to private funds. The scheme targeting both green technology producers and users a government guarantee of 60% of the funded amount and a 2% annual discount on the interest/profit rate charged by financial institutions. The programme has contributed to the creation of some 5,000 green jobs and reducing 3784 million tons of carbon dioxide each year. It resulted in the participation of 28 banks and financial institutions with loans amounting to approximately 875 million USD as of July 2018, and of all funded projects, about 53% of the traditional funding came from Islamic sources. (Davidson, 2021, p. 14)

The Green Technology Financing Scheme aims to promote green investments in eligible sectors such as energy and water, buildings, transport and waste, as shown in the following format:

Figure 10: Green Technology Financing Scheme performance by sector during 2010-2019.



Source: (Davidson, 2021, p. 14)

We note through figure 10 that from its launch in 2010 to 2019, the GTF Green Technology Finance Scheme has funded as many green projects as 655 Renewable energy projects accounted for about 75%, followed by sustainable water and waste management projects of about 19%, while sustainable buildings and clean transportation together accounted for about 6%.

7-3 The Reality of Green Levies in Malaysia:

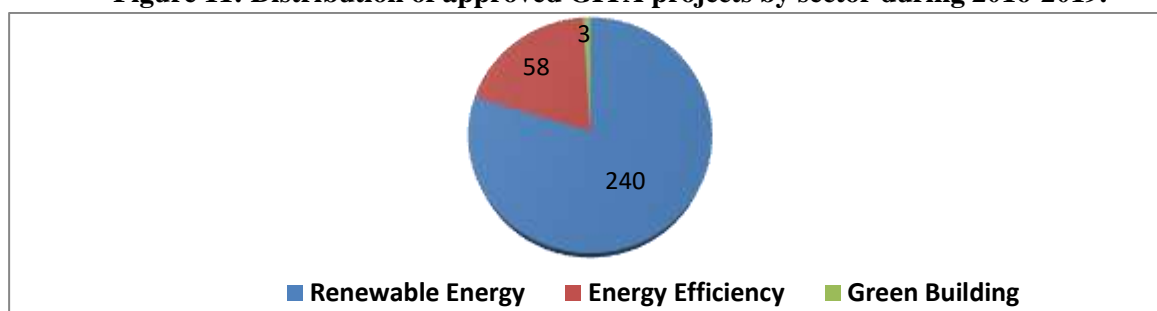
In 2014, the Malaysian government introduced two green technology tax incentives to promote the development of green technology in Malaysia, including green investment tax provisions (GITA) and Green Income Tax (GITE) exemption. Where companies that acquire green technology assets, implement green technology projects and green technology service providers can apply for these incentives (Davidson, 2021, p. 38), and these stimulus policies

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demonstrate the Government's commitment to a successful transition to a more sustainable and low-carbon economy.

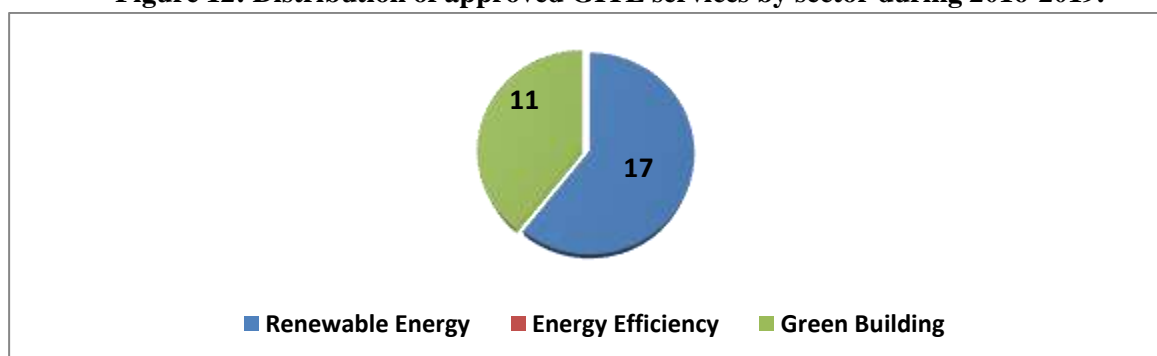
Several projects and services related to greenhouse gas mitigation have approved under both GITA and GITE, mostly renewable energy and energy efficiency projects, and this shows us in the two pro forms:

Figure 11: Distribution of approved GITA projects by sector during 2016-2019.



Source: (Green Tech Malaysia, 2020, p. 38).

Figure 12: Distribution of approved GITE services by sector during 2016-2019.



Source: (Green Tech Malaysia, 2020, p. 38)

Through figures 11 and 12 we show that during 2016-2019, the Green Investment Tax Allocation Policy was approved (GITA) for a total of 301 projects, most of which were in the energy category with a total of 298 projects, of which 240 were in the field of renewable energies, which accounted for approximately 80% of the total. While 28 applications for green income tax exemption services were approved (GITE), mostly directed at the renewable energy sector with a total demand of 17, while the sustainable building category benefited from the approval of 11 applications.

Conclusion:

Sustainable finance represents a new funding trend that seeks to provide low-cost, long-term financial support and aims to reduce environmental disasters, poverty problems, avert environmental and societal collapse. Low carbon renewable energy projects are the first way to achieve its environmental goals as clean energies that do not affect the environment and play an important role in achieving sustainable development.

Hypothesis validity test:

We made three hypotheses at the beginning of the study, and after dealing with the subject we can confirm or deny the validity of the hypotheses as follows:

- In terms of the first hypothesis, after addressing the realities of the global energy mix, it became clear that investing in renewable energies was an important place in global energy agendas and scenarios. Large investments have been made, with new composite additions in this sector exceeding non-renewable energy additions, but yet the productive renewable energy still accounts for a small proportion of the global energy mix that does not exceed the 29% threshold, which confirms the validity of this hypothesis;

-Regarding the second hypothesis, through our analysis of the realities of global and Malaysian green bond issues and sukuk and their sectoral orientations; we found that the renewable energy sector accounted for the highest proportion of total yields of global bonds and green instruments; it accounted for more than 30% during 2019 ; in addition to integrating its technologies into other sectors that make up a significant proportion of the total such as buildings and transportation, and thus this hypothesis has been validated;

- About The third hypothesis, after studying Malaysia's programmes and strategies in this area and attempting to evaluate them, showed that the Malaysian Government has initiated a number of actions and national programmes for the development of the renewable energy sector, allocated a significant budget for their development and success, and achieved good results in this area. This confirms the validity of our hypothesis.

Results of the study:

In examining Malaysia's experience, we have seen that Malaysia has been a pioneer in adopting a sustainable finance policy and supporting investment in renewable energies, and we have achieved the following results:

-The actual productive capacities of renewable energies remain insignificant and far from the aspirations and objectives of international schemes, with currently only a small 29% threshold of the global energy mix ;

-Investing in renewable energies and accompanying green technology contributes to the achievement of sustainable development and finance bilateral by contributing to the preservation of the environmental and energy heritage of future generations;

-The Malaysian Government considered renewable energy as the country's fifth fuel resource under its fuel diversification policy and sought to intensify and develop its use, through the formulation of a strategic framework and the development of a renewable energy road map;

-The Malaysian Government has launched a national green technology policy based on renewable energy technologies, which aims to promote their application in most sectors and has launched a special funding programme, enabling the advanced policy and scheme to promote green investments in eligible sectors;

-Combined efforts have been made by all actors in the Malaysian financial system to develop sustainable finance, with both the banking system and the Capital Market Regulator establishing a strong regulatory and policy framework to support intermediaries to take advantage of the depth of their experience in Islamic finance.

-The Malaysian Government has developed a structured vision in coordination with all actors aimed at establishing Malaysia as a leading international centre for sustainable finance and establishing it as a regional centre for sharia-compliant funds as a sustainable and responsible investment.

Study recommendations:

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Through our study, we have concluded to propose the following recommendations for the development of investment in renewable energies in other countries:

- The need to establish a national database on the energy sector linking various universities, research institutions and all national and international organizations active in energy matters;
- Increased awareness of the importance of green technology and the promotion of its use across sectors, through increased efficiency and creativity in this area and reliance on innovative financing mechanisms and programmes that provide guarantees and incentives to users of green technology, while ensuring that sectoral policies aimed at integrating such technology into their priorities are developed;
- Spreading awareness about the importance of the Islamic green instruments and their potential of pooling the heads of funds in line with the principles of the Islamic Shari'a, geared towards renewable energy projects and infrastructure ;
- The need to stimulate investors to move towards green activities, especially in the field of renewable energy and energy efficiency;

The need to adopt a national policy for sustainable financing and to involve banks in financing sustainable projects with their environmental products and to open the way for cooperation in developing a framework for promoting and integrating sustainable green investments and identifying new and innovative measures, products and services.

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