

Renewable Energy in Islamic Countries: A Research Map

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This research aims to examine the development of research on the topic of Renewable energy in Islamic countries and research plans that can be carried out based on journals published with that theme. This research uses a qualitative method with a bibliometric analysis approach. The data used are secondary data sourced from the Scopus database, with a total of 46 journal articles. Then, the data is processed and analyzed using the VosViewer application with the aim of understanding the bibliometric map of research development. The results of the research found in the bibliometric author mapping that the authors who have published the most research on the theme of Renewable energy in Islamic countries are Latip, Normah Abdul; Karim, Rehmat; Marzuki, Azizan; and Aurko, Shafquat Yasar. Furthermore, based on bibliometric keyword mapping, there are 4 clusters that can be research pathways related to (1)Islamic finance and renewable energy in Islamic countries, (2)increasing electricity production capacity and renewable energy in Islamic countries, (3)energy consumption and renewable energy in Islamic countries, and (4)economic growth and renewable energy in Islamic countries.

Keywords: Renewable energy, Islamic countries, Research map

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INTRODUCTION

Renewable energy has the potential to transform the world's energy systems and provide a sustainable future. Renewable energy sources are natural resources that can be converted into electricity, heating and cooling for buildings and water, as well as transportation. The advantages of renewable energy are numerous and have impacts on the economy, the environment, national security, and human health. Renewable energy has the significant potential to reduce prices and dependence on fossil fuels in both the short and long term. The technical potential of renewable energy is enormous and can meet a substantial portion of the world's energy needs.

This was also highlighted by [Cristóvão et al \(2021\)](#), [Sugiawan & Managi \(2016\)](#), and [Raihan & Voumik \(2022\)](#) that renewable energy sources produce minimal or even no greenhouse gas emissions, thus aiding in reducing the negative impacts of climate change. Furthermore, the development and implementation of renewable energy technologies can create job opportunities and stimulate economic growth ([Al-Kayiem & Mohammad, 2019](#); [Cristóvão et al, 2021](#)). Islamic countries also have increasing energy consumption needs related to economic development and population growth. The utilization of renewable energy technologies is indicated as a viable alternative to meet a significant portion of future energy demands in specific energy-consuming sectors ([Gabbasa & Sopian, 2013](#)).

In the research conducted by [Siswanto & Mahmud \(2023\)](#), it was found that the development of Islamic finance, including Islamic banking and Sukuk, can have a positive impact on renewable energy production in Islamic countries. [Muhammad et al \(2017\)](#) also argue that the consumption of renewable energy has a positive and significant effect on economic growth in OIC countries. This explains that renewable energy technologies have the potential to provide sustainable energy sources for the broader population in developing Islamic countries that currently lack access to clean energy ([Gabbasa & Sopian, 2013](#)).

Although renewable energy has the potential to provide sustainable and clean energy sources, there are several issues related to its development and implementation. [Baykara et al \(2020\)](#) explained that environmental and social issues are among the main challenges hindering the development of renewable energy. While renewable energy sources are generally considered cleaner and more sustainable than fossil

fuels, they can still have negative impacts on the environment and society. For example, large-scale wind and solar power projects can disrupt ecosystems and habitats, and hydroelectric power projects can displace communities and affect water resources.

[Sen & Ganguly \(2017\)](#) and [Rasoulinezhad & Taghizadeh-Hesary \(2022\)](#) also explained that the initial costs of developing renewable energy infrastructure can be high, and funding can be a challenge for many projects. However, the prices of renewable energy have decreased in recent years, making them more competitive compared to fossil fuels. On the other hand, [Iweh et al \(2021\)](#) integrated renewable energy into existing electricity grids can be a challenge, especially for distributed power generation systems like rooftop solar panels. Electricity grid operators need to balance supply and demand in real-time, and renewable energy sources can be intermittent and unpredictable. Furthermore, government policies and regulations can have a significant impact on the development and implementation of renewable energy. For example, subsidies and tax incentives can encourage investment in renewable energy, while regulations can restrict the use of certain technologies ([Sen & Ganguly, 2017](#); [Ouedraogo, 2019](#)).

Therefore, it is important to assess the current state of Renewable Energy in Islamic Countries through research, and one of the methods that can be used to examine research progress is bibliometrics using VosViewer. This method is capable of creating and displaying maps of author journals and research paths based on co-citation data or keyword maps based on co-occurrence data. Some of the research related to Renewable Energy in Islamic Countries include [Mahmud \(2023\)](#) analyzing the impact of Islamic finance development on renewable energy production in Islamic countries. [Muhammad et al \(2017\)](#) investigate the cause and effect relationship between economic growth, renewable energy consumption, and oil prices using data from 29 OIC countries. [Behboudi et al \(2013\)](#) investigate the contribution of renewable and non-renewable energy consumption to economic growth in OIC countries. [Vaghefi et al \(2015\)](#) examine the issues, approaches, and challenges of the green economy in Islamic countries. [Taqi \(2020\)](#) maps the development of research published in the field of energy economics. [Al-Wesabi et al \(2022\)](#) explain the current energy situation in Yemen, challenges, strategies, and prospects for the use of renewable energy systems. [Bahrami & Abbaszadeh \(2013\)](#) discuss renewable energy in Iran.

This research is conducted to complement existing research and fill the gaps in previous research, as well as to expand the literature related to Renewable Energy in Islamic Countries through research paths. Specifically, the aim of this study is to examine the development of research on "Renewable Energy in Islamic Countries" published in journals with that theme and to identify future research opportunities by formulating a research agenda.

The rest of the paper is arranged as follows. Section 2 examines the literature on the relationship between renewable energy in Islamic countries. Section 3 discusses the data, methodology, and data analysis technique. Section 4 provides the empirical results. Finally, Section 5 provides the conclusion and policy implications from the empirical findings.

LITERATURE REVIEW

Renewable energy has become a significant focus in addressing two major challenges today: climate change and energy sustainability. The use of fossil fuels has resulted in greenhouse gas emissions that harm the environment and contribute to global warming. Renewable energy sources, such as solar, wind, hydro, and biomass, are considered more environmentally friendly solutions because they produce minimal or even zero carbon emissions. [The United Nations \(2023\)](#) further explains that renewable energy is energy derived from natural resources that can be replenished within human time scales. These resources include sunlight, wind, water movement, and geothermal heat. Renewable energy is often referred to as clean energy because it doesn't produce direct pollution or carbon emissions. It can be used for electricity generation, heating and cooling, water heating, and transportation. The main types of renewable energy sources are biomass, hydropower, geothermal, wind, and solar. Renewable energy comes from naturally occurring processes that are continuously renewed. In various forms, this energy originates directly from the sun or from heat generated deep within the Earth. Renewable energy is virtually inexhaustible over a certain time frame but is limited in the amount of energy available per unit of time.

Renewable energy is an important topic in Islamic countries, and there have been several studies on this topic. [Siswanto & Mahmud \(2023\)](#) argue that the development of Islamic finance, including Islamic banking and Sukuk, can have a positive impact on renewable energy production in Islamic countries. [Muhammad et al. \(2017\)](#) also suggest that the consumption of renewable energy has a positive and

significant impact on economic growth in OIC (Organization of Islamic Cooperation) countries. This explains that renewable energy technologies have the potential to provide sustainable energy sources for the broader population in developing Islamic countries that currently lack access to clean energy ([Gabbasa & Sopian, 2013](#)).

Therefore, a clear regulatory framework and incentives are needed to promote environmentally friendly Islamic investment and financing in the renewable energy sector ([Siswanto & Mahmud, 2023](#)). This is because the development of renewable energy technology is a crucial element for sustainable development in Islamic countries ([Sopian et al., 2011](#); [Gabbasa & Sopian, 2013](#)). Several countries with a majority Muslim population, such as Morocco, Turkey, and the United Arab Emirates (UAE), have been actively developing renewable energy projects. For example, Morocco has constructed one of the largest solar power plants in the world in the Sahara Desert, while the UAE has made significant investments in solar and wind power plant development. Turkey has also engaged in renewable energy production and research.

The utilization of renewable energy can be influenced by cultural and social aspects. For instance, in some Muslim communities, there is an awareness of environmental values and sustainability principles found in Islamic teachings. Concepts like "amanah" (responsibility) towards the universe and concern for the well-being of humanity can encourage the acceptance of renewable energy as a better choice. However, similar challenges can also be encountered in Islamic countries as elsewhere in the world, including financial issues, infrastructure, and policies supporting renewable energy. Nevertheless, awareness of the importance of renewable energy and sustainability is increasing in various Muslim communities, and many countries are working to integrate renewable energy sources into their energy mix for a more sustainable future.

There have been several studies related to renewable energy focusing on Islamic countries. Among the relevant research, [Taqi \(2020\)](#) mapped the development of research published in the field of energy economics. The research findings indicate that the number of publications on the development of research in energy economics continues to increase, with diverse research methods and countries as the objects of study. Network visualization shows the research development map in energy economics divided into 5 clusters. Cluster 1 consists of 7 keywords, cluster 2 consists of 7 keywords, cluster 3 consists of 5 keywords, cluster 4

consists of 5 keywords, and cluster 5 consists of 2 keywords. It was found that the most common keywords are Country, Renewable Energy, and CO2 Emissions. Other findings based on text mining include the analysis of the Kaya Identity in Islamic countries and solutions involving the use of sustainable energy.

[Jaber et al \(2015\)](#) analyzed the growth of research activities in the field of "Renewable Energy" originating from Arab countries. The research results indicate that research on the topic of Renewable Energy continues to show an increasing trend. The highest number of articles related to "Renewable Energy" came from Egypt (20.6%), followed by Saudi Arabia (16.7%). The maximum number of citations was 244 for papers from Oman. The most productive journal was Renewable Energy. This study identified 723 (44.6%) papers that were collaborations between Arab and foreign countries. The most productive institution was the Centre de Developpement des Energies Renouvelables in Algeria.

[Sopian et al \(2022\)](#) explain that the energy demand has been met primarily by fossil fuels, and the combustion of fossil fuels has had negative global environmental impacts. The most significant impacts include acid rain, stratospheric ozone depletion, and global climate change. To address these issues, sustainable, clean, and safe energy policies that can meet the energy needs of the 21st century must be implemented. Renewable energy resources appear to be one of the most efficient and effective solutions, making them a primary source of energy for the future. There is a close relationship between renewable energy and sustainable development.

[Al-Wesabi et al \(2022\)](#) explain the current energy situation in Yemen, the challenges, strategies, and prospects for the use of renewable energy systems. The study states that the Republic of Yemen is one of the countries with the highest levels of sunlight in the world, and its climate is divided into two seasons in almost every part of the country: spring and summer. Yemen, besides being located in a sunny region with long hours of sunlight and high levels of insulation, also offers many benefits for solar energy and solar technology.

[Bahrami & Abbaszadeh \(2013\)](#) discuss renewable energy in Iran. The research further explains that Iran, as a major oil-producing country, is increasingly paying attention to non-fossil energy resources, especially renewable energy, for its long-term energy plans. In this regard, 11 solar energy projects are being utilized or implemented by the Iranian Ministry of Energy. The total installed photovoltaic capacity in 2004 was 14,020 MW. This figure reached 67 MW by the end of 2010.

Furthermore, two geothermal projects are currently under construction in Ardabil Province. By the end of 2010, the Meshkinshahr geothermal power plant project showed a progress rate of 50%. Similarly, the package construction project in Ardabil showed a progress rate of 32%. Due to financial difficulties in the Fourth Development Plan, the completion of these projects was extended until the end of the Fifth Development Plan. The installed capacity of biogas power plants in Iran is 1,860 MW, with a total installed capacity of 1,665 MW. According to the Fuel Cell Development Technology Strategy Document ([Approved by the government in 2004](#)), Iran has made good progress in fuel cell projects. The private sector has signed contracts to build more than 600 MW of biomass systems and 500 MW of new wind energy development. The nominal capacity of wind farms that can be established at available sites with incredible wind potential in Iran is approximately 6,500 MW, using wind turbines with a nominal capacity of 60,000 MW. The estimated annual average capacity factor of these wind farms is 33%.

Another relevant study is [Mahmud \(2023\)](#), which analyzes the impact of Islamic finance development on renewable energy production in Islamic countries. [Muhammad et al. \(2017\)](#) investigate the cause-and-effect relationship between economic growth, renewable energy consumption, and oil prices using data from 29 OIC countries. [Behboudi et al. \(2013\)](#) investigate the contribution of renewable and non-renewable energy consumption to economic growth in OIC countries. [Vaghefi et al. \(2015\)](#) examine issues, approaches, and challenges related to the green economy in Islamic countries.

RESEARCH METHODOLOGY

In this study, various scholarly journal publications related to the theme Renewable energy in Islamic countries from around the world were used as data sources. Data were collected by searching for journal publications indexed in the Scopus database using the keyword "Renewable energy Islamic countries." Subsequently, relevant scholarly articles or journals related to the research theme were selected based on the collected publication data. Journals equipped with DOIs were the criteria for the data filtering and processing process using software. There were 46 journal articles published within the research theme Renewable energy in Islamic countries. The trends in publications related to the research topic were analyzed using VOSviewer software, which can

generate bibliometric maps and enable more detailed analysis.

In the process of building a map, VOSviewer uses the abbreviation VOS, which stands for Visualizing Similarity. In previous studies, the VOS mapping technique has been used to obtain bibliometric visualizations that were subsequently analyzed. Furthermore, VOSviewer is capable of creating and displaying maps of journal authors based on co-citation data or keyword maps based on shared incident data. Therefore, this research will conduct an analysis of journal maps related to Renewable energy in Islamic countries, including author and keyword maps, which will then be analyzed for research paths that can be pursued in the future through clusters in the keyword mapping.

This research employs a descriptive qualitative approach with meta-analysis and descriptive statistical literature studies based on 46 journal publications discussing the theme of Renewable energy in Islamic countries. Furthermore, the method used in this research is also referred to as a constructive method, where the data collected in the research process will be constructed into themes that are easier to understand and meaningful. The sampling technique used in this research is purposive non-probability sampling, aimed at obtaining specific information in line with the desired research objectives. Other studies using bibliometric analysis can be found at [As-Salafiyah et al., \(2021\)](#), [Maulida & Rusydiana \(2023\)](#), [Taqi et al., \(2021\)](#), [Maulida & Ali \(2023\)](#), [Uula & Kassim \(2023\)](#), and [Rusydiana et al., \(2021a, 2021b\)](#).

RESULT AND ANALYSIS

This research discusses Renewable energy in Islamic countries by utilizing 46 journal article publications indexed in Scopus. Bibliometrics is a method used to measure and evaluate scientific performance, taking into account factors such as citations, patents, publications, and other more complex indicators. Bibliometric analysis is conducted to assess research activities, laboratories, and scientists, as well as the performance of countries and scientific specialization. Several stages in bibliometric analysis include identifying the research background, collecting the database to be used, and determining the key indicators to be used in the research.

This section will further elaborate on the results of visual mapping graphs depicting the 46 journals related to Renewable energy in Islamic countries. In this study, mapping is conducted by analyzing keywords and important or unique terms found in the journal articles. Mapping is a process to identify elements of knowledge, dynamics, dependencies, and interactions among these elements. The results of the network visualization of the 46 journals with the theme Renewable energy in Islamic countries will be explained in more detail in the following section.

By utilizing bibliometric analysis using VOSviewer software, a mapping of authors contributing to the field of "Renewable Energy in Islamic Countries" was obtained. The generated image provides a visual representation of this mapping, where larger and brighter points marked with yellow indicate a higher number of journal publications related.

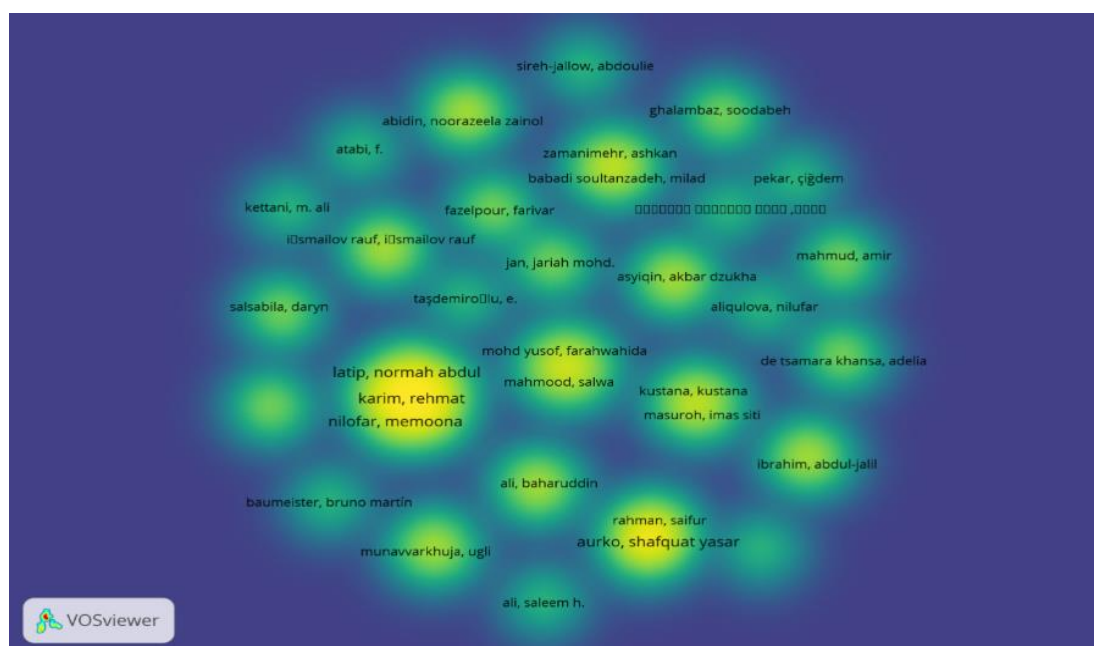


Figure 1 Bibliometric Author Mapping

The figure 1 above illustrates that the cluster density in the bibliometric map depends on the intensity of the yellow color shown. The yellow color on the map is determined by the number of items related to each other. This section is crucial for gaining an understanding of the general structure of the bibliometric map, which is considered important for analysis. From this, we can identify the authors who have published the most of their work.

Generally, each author or researcher has different tendencies in each of their publications. In some instances, an author may appear as a sole author, while in other instances, they may collaborate with other authors or researchers. This can affect the density of clusters, and some clusters may show different densities. However, authors with a relatively large cluster density identify that they have published the most research

related to "Renewable Energy in Islamic Countries" compared to authors with lower cluster densities. Therefore, the results of this analysis can serve as a reference for other researchers in the future. From the analysis, it is evident that the authors who have published the most on the topic of "Renewable Energy in Islamic Countries" include Latip, Normah Abdul; Karim, Rehmat; Marzuki, Azizan; and Aurko, Shafquat Yasar.

Research Map

The figure 2 describes the trends in keywords that have emerged in research on the topic of "Renewable Energy in Islamic Countries," with the larger shapes representing the keywords most frequently used in journal publications on the theme of "Renewable Energy in Islamic Countries."

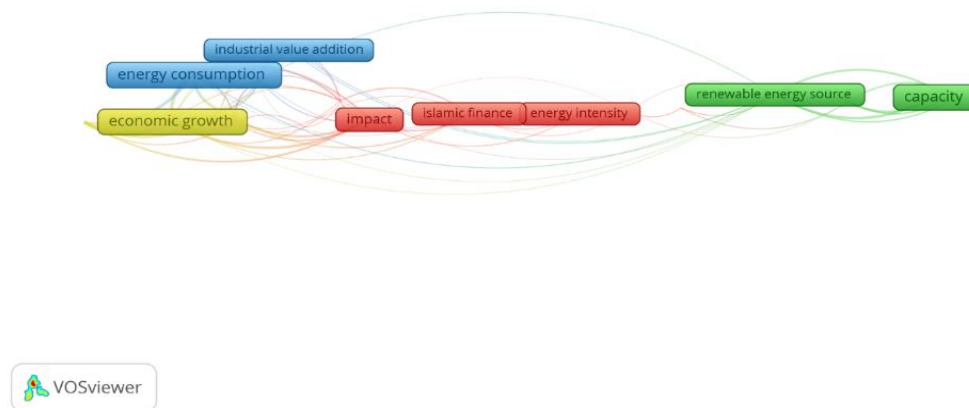


Figure 2 Bibliometric Keywords Mapping

In the mapping, the most frequently appearing keywords in publications on "Renewable Energy in Islamic Countries" include capacity, energy

consumption, economic growth, and impact. These keywords are further divided into four clusters, as follows:

Table 1 Keywords per Cluster

Cluster	Keywords
Cluster 1 (8 items)	Energy intensity, environment, impact, importance, Islamic banking, Islamic country, Islamic finance, oic member country
Cluster 2 (5 items)	Capacity, electricity, kwh, renewable energy source, wind
Cluster 3 (4 items)	Effect, energy consumption, environmental deterioration, industrial value addition
Cluster 4 (3 items)	CO2 emission, economic growth, renewable energy consumption

The research map that can be created is based on the four clusters of keyword mapping, which are as follows:

Cluster 1 : Islamic finance and renewable energy in Islamic countries

Topic 1 relates to Islamic finance and renewable energy. Research on this topic is still relatively limited, among the relevant studies are [Siswantoro & Mahmud \(2023\)](#), which analyzed the impact of Islamic finance development on renewable energy production in Islamic countries. The research findings indicate that Islamic countries with a well-developed Islamic banking and Sukuk system tend to experience an increase in renewable energy production. Other findings suggest that economic growth, CO₂ emissions, and the consumer price index are variables that influence renewable energy in Islamic countries.

[Liu et al \(2021\)](#) analyzed the development of green Sukuk. The research results show the international adoption of green Sukuk. While this has achieved the development goals of Malaysia, particularly through the expansion of the Malaysian Sukuk market and its enhanced status as a leader in Islamic finance innovation, the potential for improving the existing environmentally friendly bond regime is increasingly uncertain. The main limitation lies in the application of existing Environmental Bond Principles, which not only allow green Sukuk to be internationally accepted but also make them vulnerable to greenwashing.

[Morea & Poggi \(2016\)](#) analyzed the dependence-incentive of ground-mounted PV systems to achieve grid balance based on Italy's advanced legislation and proposed alternative financing instruments available in Islamic Finance. The research presents the use of Sukuk, Islamic Finance instruments used for realizing real assets in Shariah-compliant Finance, which prohibits interest rates as in conventional financial markets. The cost of PV electricity generation capable of achieving grid balance has been identified. Sukuk can limit the leverage level associated with financing. The minimum fixed share threshold that makes the investment profitable and bankable will be presented. The results show the practical use of Shariah-compliant Sukuk instruments to enhance technology innovation processes in the energy production sector, and can provide policymakers with an overview of various financing instruments available for the renewable energy sector in the context of energy reduction, GHG emissions, and climate change impact mitigation.

Other relevant research includes [Setiawati & Salsabila \(2022\)](#), which explains the development of

Islamic Finance and its relationship with carbon emissions. Specifically, this research aims to determine whether the development of Islamic Finance can reduce carbon emissions. Then, [Ibrahim et al \(2021\)](#) examines the impact of Islamic Finance Development on energy intensity. The main finding of this research explains that the development of Islamic banking significantly increases energy intensity in the sample countries. Finally, [Dorsman et al \(2016\)](#) discuss energy and finance, sustainability in the Energy Industry. Specifically, this research examines socially responsible investments and the increasing importance of Islamic Finance in relation to the transition to renewable energy.

Cluster 2 : Increasing electricity production capacity and renewable energy in Islamic countries

Research on this topic is still relatively limited. An example of relevant research on this topic is the study by [Saidur et al \(2011\)](#), which examines the impact of wind energy on the environment. Since the early days of industrialization, energy consumption has increased much faster than the world's population. It is known that energy consumption is very high, and fossil-based resources may not be able to provide energy for the entire world as these resources will be depleted in the near future. Therefore, renewable energy is expected to play a crucial role in meeting energy needs and preventing environmental pollution. The impact of wind energy on the environment is important to study before wind power plant construction or decisions are made by companies. Although many countries show great interest in renewable or environmentally friendly energy generation, negative perceptions of wind energy are becoming increasingly evident, which can hinder the installation of wind energy in some countries. The research findings suggest that this energy source will reduce environmental pollution and water consumption. However, it also causes noise pollution, visual disturbances, and negative impacts on wildlife.

[Sopian et al \(2011\)](#) explains the strategy for implementing renewable energy in the member countries of the Organization of Islamic Cooperation (OIC). The study highlights that the current energy needs are met by fossil fuels, which have had negative global environmental impacts. The most significant impacts include acid rain, stratospheric ozone depletion, and global climate change. To address these issues, sustainable, clean, and secure energy policies that can meet the energy needs of the 21st century must be implemented. Renewable energy resources appear to be

one of the most efficient and effective solutions, making them a primary source of energy for the future. There is a strong connection between renewable energy and sustainable development. The current status of renewable energy implementation, its strategies, and obstacles in selected Islamic countries have been presented. Several strategies for promoting the widespread adoption of renewable energy technologies are explained. These strategies include establishing education and capacity-building programs, creating renewable energy markets and financing mechanisms, enhancing appropriate energy policies, and building databases and international collaborations to promote renewable energy technologies.

Cluster 3 : Energy consumption and renewable energy in Islamic countries

Research specifically focusing on energy consumption and renewable energy in Islamic countries is still limited. Among the relevant studies, [Karim et al \(2020\)](#) analyzed the influence of energy consumption and industrial value-added on environmental degradation. The study found that economic growth, industrial value-added, and energy consumption have a positive impact on CO₂ emissions. Additionally, high energy consumption to meet the energy needs in transportation and production sectors leads to increased environmental pollution. The coefficient of industrial value-added indicates a significant long-term impact on environmental degradation.

[Shaari et al \(2020\)](#) examined the impact of energy consumption and national output on CO₂ emissions. Energy has become a topic of debate among policymakers and economists. Energy plays a crucial role in stimulating economic activities. However, it can have adverse environmental impacts due to increased carbon dioxide (CO₂) emissions. The main findings of this study indicate that, in the long run, overall national output contributes to higher environmental degradation. However, in the short term, overall national output does not affect CO₂ emissions. The results also show that the population can reduce CO₂ emissions in the short term but has no impact in the long term. Furthermore, gas consumption and oil consumption can have adverse environmental effects. The impact of oil consumption is greater than that of gas consumption on the environment. Therefore, it is important to consume more renewable energy sources such as solar power, biodiesel, and hydropower to replace non-renewable energy sources, especially petroleum, in efforts to preserve the environment.

[Islam et al \(2022\)](#) investigate the contributions of renewable and non-renewable energy to sustainable development while considering financial developments and institutional quality in ASEAN countries from 1980 to 2018. Energy consumption for sustainable development has become a crucial issue in recent years. The anthropogenic impact of traditional (non-renewable) energy sources underscores the need for renewable energy and efforts to promote its use, which has become a strategy for policymakers to achieve sustainable development. At the same time, institutional stability is an essential element required to achieve sustainable development through improved resource management and technology diffusion. This study reveals a significant positive influence on renewable energy and a significant adverse impact on non-renewable energy in relation to sustainable development in ASEAN countries. Furthermore, the research findings indicate that institutional quality and financial development have a negative impact on sustainable development.

Cluster 4 : Economic Growth and renewable energy in Islamic countries

Similar to the previous research topic, in cluster 4, the discussed topics are also relatively rare. Among the relevant studies, [Vaghefi et al \(2015\)](#) examine the issues, approaches, and challenges of the green economy in Islamic countries. This research explains that developing countries, like many Islamic nations, require an economy that promotes growth and development, preserves natural capital, creates jobs, enhances human well-being, and eradicates poverty and inequality. Such an economy is referred to as a green economy. The main challenges hindering the implementation of a green economy in many Islamic countries include weak governance, increasing poverty, local and border conflicts, a high economic dependence on natural resources, and growing food insecurity. Governments as policymakers can introduce policies, regulations, and incentives to promote the green economy.

[Gamoori et al \(2017\)](#) investigated the relationship between foreign investment, economic growth, and energy consumption. The importance of energy on one hand and its scarcity on the other necessitate greater attention from economists to utilize this production factor more efficiently. Due to differences among various energy resources and differences in countries' performance in utilizing energy resources from technical and technological perspectives, researching the relationship between energy consumption and macroeconomic variables, especially in Islamic countries,

is an unresolved issue. The research findings indicate that foreign trade, investment, and financial development have a positive and significant impact on energy consumption in the studied countries. Additionally, the largest impact is attributed to foreign trade.

Muhammad et al (2017) examined the cause-and-effect relationship between economic growth, renewable energy consumption, and oil prices using data from 29 OIC (Organization of Islamic Cooperation) countries. The research findings indicate the existence of cointegration among the variables. The impact of renewable energy consumption on economic growth is positive and significant. Panel Granger causality suggests a unidirectional causal relationship between renewable energy consumption, oil prices, and economic growth.

Behboudi et al (2013) investigated the contribution of renewable and non-renewable energy consumption to economic growth in OIC countries. Unit root tests show that all series are non-stationary and integrated of order one. Furthermore, panel cointegration test results reveal a cointegrating relationship among real GDP, renewable energy consumption, non-renewable energy consumption, real gross fixed capital formation, and the labor force. Dynamic OLS (DOLS) estimator results indicate that both renewable and non-renewable energy consumption have a positive and significant impact on GDP, but the impact of non-renewable energy is greater than that of renewable energy. Additionally, the impact of real gross fixed capital formation and the labor force on economic growth is positive and statistically significant.

Mahmoodi & Mahmoodi (2011) explain the consumption of renewable energy and economic growth in 7 developing Asian countries. Causality tests reveal a unidirectional causal relationship from economic growth to renewable energy consumption in 4 countries, namely India, Iran, Pakistan, and the Republic of Syria. The research findings in Bangladesh and Jordan support a two-way causal relationship between renewable energy consumption and economic growth, but in Sri Lanka, no evidence of a cause-and-effect relationship could be found.

CONCLUSION

This research aimed to assess the extent of development in research related to Renewable energy in Islamic countries. The results of the study indicate that there are 46 journal articles indexed in Scopus. Furthermore, based on the author mapping bibliometrics analysis, it is evident that Latip, Normah

Abdul; Karim, Rehmat; Marzuki, Azizan; and Aurko, Shafquat Yasar are the authors who have published the most on the theme of Renewable energy in Islamic countries. Based on keyword mapping bibliometrics, it is divided into 4 clusters with the most frequently used words being capacity, energy consumption, economic growth, and impact. Based on these commonly used keywords, they can be further grouped into 4 research map clusters with topics discussing: (1) Islamic finance and renewable energy in Islamic countries; (2) increasing electricity production capacity and renewable energy in Islamic countries; (3) energy consumption and renewable energy in Islamic countries; and (4) economic growth and renewable energy in Islamic countries. It is imperative that future research and policy initiatives prioritize these clusters to foster sustainable energy solutions and promote economic growth within the context of Islamic countries. These findings, therefore, provide valuable insights and directions for shaping the research and policy landscape in the renewable energy sector for years to come.

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