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ISLAMIC FINANCING FOR RENEWABLE ENERGY IN INDONESIA: UNLOCKING POTENTIAL DEMAND FROM GCC INVESTORS

Rahmatina A. Kasri[1], Ronald Rulindo[2], Muhammad Rizky Prima Sakti[3], Muhammad Rifqi[4] and Adela Miranti Yuniar[5]

[1] Faculty of Economics and Business, University of Indonesia, Indonesia, rahmatina@ui.ac.id
[2] Faculty of Economics and Business, University of Indonesia, Indonesia, rulindoku@gmail.com
[3] Faculty of Economics and Business, University College of Bahrain, Bahrain, mrizky@ucb.edu.bh
[4] Research Group, Indonesia Deposit Insurance Corporation, Indonesia, rifqilazio@yahoo.com
[5] Faculty of Economics and Business, University of Indonesia, Indonesia, adelamiranti@gmail.com

ABSTRACT

This study examines the interest of Gulf Cooperation Council (GCC) investors in financing renewable energy (RE) projects in Indonesia using Islamic financing schemes. It employs a multi-criteria decision-making (MCDM) method and Analytical Hierarchy Process (AHP) model with expert respondents representing institutional investors from the GCC states. To validate and enrich the analysis, it also conducted Focus Group Discussion and additional interviews with industry players and Indonesian regulators. The main finding indicates that the return on investment is the most crucial factor in selecting appropriate RE projects, followed by risk and impact of the projects. Furthermore, while the GCC investors do not have sufficient knowledge about the potential and sources of RE in Indonesia, they consider the solar panel project as most preferable. Next, the study finds investment return, Shariah compliance and liquidity as the main criteria in choosing Islamic financing instruments, where equity-based are the most preferred instrument, followed by asset-backed securities and blended financing instruments. In addition, tax incentives, cross subsidy and feed-in-tariffs are the most preferred incentives needed by the investors. The additional interviews that we conducted further affirm these findings. The results are expected to provide insights for the Indonesian policy makers, particularly fiscal and financial/monetary authorities, and the GCC investors to invest in Indonesia for financing RE projects using Islamic financing schemes.

Keywords: Renewable energy, Islamic finance, GCC investors, Multi-criteria decision-making (MCDM) method, AHP model.
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I. INTRODUCTION

Renewable energy (RE), or energy derived from natural sources that are replenished at a higher rate than consumed (UN, 2022), has increasingly attracted global attention. RE is essential for minimizing gas emissions, reducing waste pollution, and preserving the environment. Therefore, RE has become a vital consideration in discussions of sustainable development globally, which requires a supply of clean energy sources that do not harm the environment and society (UN, 2022).

From an Islamic point of view, the concept of RE is in line with Islamic finance principles. Generally speaking, Islamic finance refers to financial practices that comply to shariah rules such as prevention of harm (*zarar*), squander (*israf*), and waste (*itlaf/tabzir*) as well as encourage cleanliness (*nizafah*) (Mansour, Hassan, and Bagheri, 2017). As such, the abovementioned RE concept is very consistent with the Islamic finance principles. The RE practice is also aligned with the concept of *Maqasid al Shariah* initially proposes by Imam Al Ghazali (d. 1111M) which emphasizes the protection of fundamental aspect in life including religion (*din),* wealth *(maal)* and posterity (*nasl)* to achieve higher objectives of Islam (Ghazali, 2017) as RE emphasizes preservation of the natural resources and environment which is vital for future generation.

Practically, the shariah-compliant finance is one of the fastest growing financial sectors globally. According to the Islamic Finance Development Report 2023, the global Islamic finance industry increased its assets size by 11% to US$4.5 trillion in 2022, with Islamic banking holding 72 % of total industry's assets. The industry also grew by 163% since 2012 and is expected to grow by US$6.7 trillion by 2027 (ICD, 2023). It has also been used to finance almost all economic sectors. Islamic finance has also offered several instruments that can be used to finance RE projects, such as equity instruments (Islamic stocks), sukuk (Islamic Bond), asset-backed securities (EBA), asset securitization, Islamic bank financing, blended financing, and multilateral development financing (Butu et al., 2021; Ari & Koc, 2021; Campisi et al., 2018). Nevertheless, it appears that there are still limited use and studies on Islamic finance's role in promoting RE, particularly exploring potential cross-border investment across Muslim countries (ICD, 2023).

The importance of RE is also increasingly acknowledged in Indonesia. Indonesia needs a lot of energy to foster its economic development. At the same time, it also has many potential types of RE, such as solar panels, hydro and wind power (see Table 1). However, according to the Indonesian government, only 0.3% of the potential is utilized as at 2021 (Ditjen EBTKE, 2022).

Table 1.
Potential and Usage of RE in Indonesia

Types of RE	Potential (GW)	Usage (MW)
Solar Panel	3.295	217
Hydro	95	6.637
Bioenergy	57	2.284
Wind	155	154
Geothermal	24	2.293
Tidal Wave	60	0
Total	3.686	11.585

Source: Ditjen EBTKE, Indonesia (2022)

As such, the government has made the development of RE a top priority in the National Development Planning 2020-2024. The energy transition towards RE has also become one of the focuses of Indonesian government to be the main foundation of Indonesian economy in the future, as this energy transition initiative has been stated in the National Development Planning 2025-2045 under the "implementation of green economy" (Bappenas, 2023). The growth of RE is expected to increase Indonesia's energy mix and ultimately contribute to improving people's income levels, education levels, and access to public facilities as well as to reducing poverty (Bappenas, 2020). Furthermore, according to Government Regulation No. 79 of 2014, the government states its target in which the portion of RE in the nation's energy mix to reach 23 percent in 2025, and 31 percent in 2050. To support this, the government has issued several regulations such as regulation No. 112/2022 which includes a number of incentives, including mainly fiscal incentives such as relaxation of income tax, import duty, and land tax to facilitate the developers of RE power plants.

Indonesia requires massive financing to establish and support RE projects to achieve this target. It is estimated that the investment needed for developing RE projects amounted to USD 1,177 million (Ditjen EBTKE, 2022). In this respect, the government has issued several financial instruments, such as bonds and Green Sukuk (Islamic bonds), to finance RE projects. However, the current financing amount is considered insufficient. Therefore, the government has recently promoted Public-Private Partnership (PPP) schemes, including Islamic PPP, to finance infrastructure development including the RE project (MoF, 2022).

Nevertheless, it is realized that funds from local investors, especially local Islamic financial institutions, are insufficient to finance all the targeted projects. This is primarily because of the limited resources possessed by the institutions. Bank Syariah Indonesia, the largest Islamic bank in the country, for example, only has assets amounting to IDR 261 trillion (around USD 17 million), which is far below the needed investment. As such, attracting Foreign Direct Investment (FDI) from Gulf Cooperation Council (GCC) investors could be a potential solution.

The relationship between Indonesia and GCC states has a long-rooted history. According to the Indonesian Ministry of Foreign Affairs, the scope of RI-GCC economic cooperation includes exports, investment, counter-terrorism cooperation, health issues, and political support for Palestine. Indonesia's total trade with GCC countries in 2022 was USD 16 billion, up from USD 11.99 billion in 2021 (Ministry of Trade, 2023). Meanwhile the investment value of the GCC countries in Indonesia in 2022 was USD 25 million, up from USD 21 million in 2021 (MFA, 2023). In relation to this, it is worth noting that GCC state engagement in Far-East Asian countries including Indonesia is predicted to be dominated by hydrocarbon exports to the region. Furthermore, Indonesia was also the largest target country for charitable donations from King Salman Humanitarian Centre, Saudi Arabia (Mason, 2023).

Currently, most investors for the RE projects in Indonesia come from developed countries such as the USA, Japan and Korea. There is only one GCC corporation invested in the projects, namely Abu Dhabi Future Energy Company (MASDAR). MASDAR is a subsidiary of Mubadala Investment Company, an investment company owned by the United Arab Emirates (UEA) government. It has invested

and owned 49% of shares in the floating solar power plant (PLTS Terapung) Cirata in West Java Province of Indonesia. While the partner holding 51% of the share is PT PJB (*Pembangkitan Jawa Bali*), the subsidiary of Indonesia Power Company (PLN). The estimated investment cost was USD 145 million (Dirjen EBTKE, 2022). While this might be surprising, considering that Indonesia and GCC (especially UAE) have relatively strong economic cooperation, this adds a motivation to investigate the GCC investors' behaviour.

The small interest and low number of GCC investors invested in the Indonesian RE projects could be influenced by many factors, such as lack of knowledge about investment in Indonesia, high project risks, low project return, and types of contracts (Dirjen EBTKE, 2022). However, some developments and trade pacts show the interest of the GCC countries or corporations to invest in Indonesia (Lai, 2022). The interest aligns with the nature of the RE projects, which are essential for minimizing gas emissions, reducing waste pollution, and ensuring the sustainability of the environment and society. They can also be structured using Islamic financial contracts, which GCC investors presumably prefer. Therefore, there is a need to assess the interest and willingness of the GCC investors to invest in RE projects in the world's largest Muslim country.

With this background, this study aims to understand the interest of GCC investors in financing RE projects in Indonesia using Islamic financing schemes, as well as understanding the types of RE investment/projects and incentives preferred. It employs a multi-criteria decision-making (MCDM) method and AHP model. The respondents are experts representing GCC institutional investors. To validate and enrich the analysis, it also conducted an additional FGD and interview with Indonesian regulators and industry players.

Our results have several important implications to unlock the potential demand of GCC investors to finance RE projects in Indonesia. First, the main findings suggest that return on investment (ROI) is the main criteria in selecting Islamic financial instruments for financing RE projects. These results imply that the government, particularly financial/ monetary and fiscal authorities, should design and implement appropriate policies and incentives that provide good return on the green investment. Second, as the study also finds that shariah compliance is the second most important criteria in selecting the Islamic financial instruments, the authorities must ensure shariah compliance of the Islamic financial instruments issued. Third, it is suggested that the main interest of the investors is solar, wind and hydro RE projects. However, it is also revealed the lack of knowledge has influenced the GCC investors' selection of RE projects in Indonesia. Therefore, while designing RE projects that accommodate the investors' interest, it is also important that the government conduct more regular and extensive investment promotion to enhance the investors' knowledge about the investment potentials and the available RE projects in Indonesia. Fourth, the study indicates that the types of Islamic financial instruments demanded are equity, and asset-backed and blended financing instruments. However, most of the instruments are not widely available in Indonesia. As such, the authorities could issue or encourage issuance of such instruments by market players. The government could also employ the Islamic PPP models to encourage private participation. Fifth, the government (particularly fiscal authority) should provide better fiscal (tax and

subsidy) incentives and feed-in-tariff due to the investors' preferences towards the incentive schemes which have direct impact on investment's returns. Overall, the results and implications are expected to contribute and provide insights for the Indonesian policy makers and the GCC investors to invest in Indonesia for financing RE projects.

Following this introductory section, we review several relevant literature and previous studies in Section two. Section three explains the data and research methodology. Section four provides the study's findings and analysis. Section five offers conclusions and recommendations of the study.

II. LITERATURE REVIEW

2.1. Determinants of Investment in Green and RE Projects

To understand the interest of investors in RE projects, one can look at several literatures documenting the determinants of green investment. Some studies document the determinants of green investment either at the macroeconomic level (Eyraud, et al., 2013), at the firm level (Ambec & Lanoine, 2007) or at the sector level (Brunnermeier & Cohen, 2003). Meanwhile, others discuss the determinants of green investment in the manufacturing industry (Martin et, al., 2011). The studies generally find that macroeconomic factors such as economic growth, sound financial system conducive to low interest rates, high fuel prices and sector/firm level factors such as environmental concern and innovation boost green investment. However, as far as we concern, almost no study has attempted to evaluate in-depth behavioral aspects of firms or investors, especially those observing high levels of religious value such as the investors from the GCC states.

In relation to policies, some studies discuss the policy aspects of green investment. At the theoretical level, Stiglitz (1998) and Stokey (1998) describe the policy designs including their costs and benefits to the environment. Then, empirical evaluation by Eyraud, et al. (2013) finds that policy interventions such as carbon pricing schemes or "feed-in-tariffs" have a positive and significant impact on green investment. Practically, the studies also point out that several important aspects related to RE should be understood, including project selection, instrumentation, and incentives (Emerson, 2021; Narayanan et al., 2021; Kilinc-Ata and Dolmatov, 2023). Regarding project selection, several factors influence an investor's decision to choose the RE project. They could be clustered into three groups: the level of risk present within any given investment opportunity, the potential financial return that the opportunity offers, and the "risk appetite" of the investors whose capital is being allocated (Emerson, 2021). Impact and sustainability are also essential when selecting the project. However, when making decisions that require trade-offs between economic outcomes (financial returns), environmental impact (carbon emissions), and stakeholder pressures, managers will place a greater weight on economic outcomes over the other factors (Narayanan et al., 2021). This implies that returns are the most critical factors in making investment decisions. Moreover, other factors that positively influence RE selection are economic growth, policies, and expenditures (Kilinc-Ata and Dolmatov, 2023).

More specifically, in terms of financial instruments that can be offered to investors to fund RE projects, Islamic finance has enormous potential to become an additional resource for RE projects. In this case, Islamic finance provides several instruments that can be used to finance RE projects, such as equity instruments (Islamic stocks), sukuk (Islamic Bond), asset-backed securities (EBA), asset securitization, Islamic bank financing, blended financing, and multilateral development financing (Butu et al., 2021; Ari & Koc, 2021; Campisi et al., 2018).

Several studies highlight the significant role of these instruments for RE. Campisi et al. (2018) show the importance of Sukuk instruments for sustainable investments in the wind energy sector. This instrument is crucial in the framework of current efforts against climate change and efforts to reduce greenhouse gas (GHG) emissions. In Indonesia, green sukuk has also been issued to finance several projects that contribute to the country's objectives of reducing GHG emissions, adapting to climate change, and preserving biodiversity. For example, 121 Solar Power Plants (PLTS) and mini/micro-hydro power plants have been developed in Indonesia.

In addition, blended financing instruments are very potential for RE projects. Blended financing refers to using commercial and social sources of funds to fund the RE project. In Indonesia, UNDP, National Zakat Authority (BAZNAS), and a local bank have worked together in a blended financing scheme. BAZNAS and the local bank contributed zakat and CSR funds to implement micro-hydro power plant projects; UNDP blended these resources with the Global Environment Facility (GEF) to support RE initiatives. These have benefitted over 5,000 beneficiaries or 900 households (UNDP, 2022).

Furthermore, investors consider several factors before selecting preferable financial instruments. As mentioned earlier, risk, return, and impact influence the investment decision-making process, including determining the investment's instruments (Narayanan et al. 2021, Kilinc-Ata and Dolmatov 2023). Investors also consider liquidity a vital factor when choosing instruments because it measures how quickly and easily an asset can be bought or sold on the market. For example, Scholz et al. (2015) find that asset liquidity is a relevant pricing factor that explains return variations in real estate equity markets, and hence liquidity should receive special attention from investors.

Muslim investors also consider Sharia compliance in selecting financial instruments. Studies reveal that investors value Sharia compliance when selecting investment instruments (Mulia et al., 2021). Jaballah et al. (2018) also find that being Sharia-compliant has a significant impact on stock market valuation, even though the impact of additions on market valuation is negative in the US but positive in Muslim countries. It also influences customers' decision-making preferences (Kontot et al., 2016).

Various interventions are needed to encourage investment in RE projects, including increasing returns and reducing potential investment risk in RE projects. One such intervention is the implementation of incentive strategies. Investment incentives include financial incentives, such as grants or loans; fiscal incentives, such as tax holidays or reduced tax rates; and other incentives, such as Feed-in Tariffs (FITs) and subsidized infrastructure (OECD, 2007).

In terms of investment, tax incentives are considered an essential and attractive financial incentive for private investors as they increase investor liquidity directly (Abolhosseini and Heshmati, 2014). Indeed, Azhgaliyeva et al. (2023) find that tax incentives have a significant positive impact on private investment, albeit they entail greater policy uncertainty than FiTs, as they do not require a long-term commitment from the government. Moreover, government subsidies have a positive effect on RE investment due to their impact on promoting the investment behavior of RE enterprises. Government subsidies have a promotional impact on enterprise investment behavior, providing a financing channel for enterprises (Yang et al., 2019). A similar study by Nie et al. (2016) also finds that adequate governmental subsidies promote renewable energy development.

Several studies have also identified different incentives applied to the implementation and investment of RE. Chirambo (2016) and Azhgaliyeva et al. (2023) suggest that Feed-in Tariffs (FiTs) are the most effective policy for encouraging rapid and sustained deployment of RE, as they offer guaranteed prices for fixed periods for electricity produced from RE sources. In this case, the Tanzanian Government has developed Standardized Power Purchase Agreements (SPPAs) as part of its FiTs policy for purchasing associated electric energy between buyers and small power project producers (Chirambo, 2016). Therefore, power purchase agreements provide RE generators with a steady source of income by guaranteeing how much energy will be bought, sold, and generated. They also help to mitigate market risks, mainly related to fluctuations in energy prices. Moreover, Wall et al. (2019) emphasize that the FITs, followed by Fiscal Measures (FM), such as tax incentives and Renewable Portfolio Standards (RPS), are the most significant policy instruments that attract foreign direct investment in the RE sector globally.

In addition, the government needs to provide adequate facilities and infrastructure to develop RE projects. They can optimize investment to build a smart grid connection. This electricity network uses digital and other advanced technologies to monitor and manage electricity transport from all generation sources to meet the varying electricity demands of end-users (IEA, 2021). Import duty facilities can also be used as incentives to attract RE investment, as they reduce costs and make it easier to develop RE projects. Indonesia is one country that applies this incentive, where import duty exemptions apply to taxable goods imported to develop RE projects as long as no substitutes are manufactured in Indonesia (MoF, 2010). Meanwhile, through PPP financing, Madagascar uses financial incentives to promote RE development (mini-hydro and solar power plants) (ESDM, 2021). This incentive can attract more private sector participation and pave the way for the development of the RE sector.

2.2. Previous Studies

Several studies have discussed RE issues in general. Ng and Tao (2016) examine the cause of the financing gap for RE investment and propose bond financing to address the problem. The results show that the financing gap in Asia is mainly due to the lack of financial diversity and immature capital markets and suggest the expansion of bond instruments to bridge the financing gap. Qadir et al. (2021) find

that the financing gap for RE can be reduced by involving financial institutions in supporting the public willingness to invest in RE in the form of, e.g., soft loans or the creation and facilitation of crowdfunding and crowdsourcing platforms. Similar studies by Lee and Zhong (2015) and Miller and Carriveau (2018) also suggest alternative instruments for RE projects such as a hybrid bond, which financially supports the initial capital costs and manages the associated risks with RE investment, while Ari and Koc (2021) propose a waqf-owned (that could also be called philanthropy-, endowment-, trust-, foundation-, and third sector-based) financial intermediary (WOFI) as an alternative equity-based financing model for RE investments. This study proves that waqf-based institutions have a great potential to contribute towards sustainable development goals by considering long-run social implications, economic growth, and environment-friendly projects.

Along with the potential instruments, several studies also examine the strategy to overcome RE financing and development issues. Nie et al. (2016) find that government subsidies raise RE firms' outputs and play a critical role in RE development because the environmental efficiencies of subsidies decrease with the subsidy degree. However, Iskandarova et al. (2021) find that subsidies represent more enabling than impeding factors. The analysis reveals that traditional and entirely new, innovative, market-based financial mechanisms enable newcomers to invest in RE. Moreover, Chang et al. (2016) find that policies such as RE certificates (REC) and net metering should be implemented further to realize the RE potential, especially in East Asia. The use of a combination between (adapted) price guarantee schemes, cross-subsidies, and environmental taxes to support initiatives aimed at supporting the country's development of renewable energy sources can also be implemented, especially in the least developed country (Chirambo, 2016).

Furthermore, several studies address society's willingness to invest in RE projects. Broughel and Hampi (2018) investigate the impact of socio-demographic and socio-psychological characteristics on individuals' willingness to invest in community RE projects. The results show that most respondents would be willing to invest CHF/EUR 1000 to 10,000 in such a project. Elie et al. (2021) also support the results as it is found that private sources provide an essential part of RE investment globally. Results from a study conducted by de Brauwer and Cohen (2020) also indicate that EUR 176 billion could be obtained from citizen-led finance in community-administered wind farm developments, enough to halve the investment gap to achieve a 32% RE share in final energy consumption by 2030. This result is agreed by Menyeh (2021), who also investigates the preferences of household investors for RE investments using Ghana as a case study. This study finds that young people (18–34 years) are likelier than other counterparts to invest in RE. It is also emphasized that developers' track record is the most valued attribute associated with the highest marginal willingness to pay for RE projects. Interestingly, this study finds that the rate of return, although valued, is not essential in investment decision-making.

Several studies also discuss RE in the GCC area. Hassan et al. (2023) describe the energy consumption of the Middle East and the viability of potential RE sources. The result shows that the Middle East region is rich in potential solar and wind energy, which is the most probable option to satisfy future energy demands via a regional transmission system owing to its severe climate. Moreover, Makki

and Mosly (2020) explore the factors affecting public willingness to adopt RE technologies in the Western region of Saudi Arabia. The results cluster all aspects into five main components affecting the willingness to adopt RETs: cost and government regulations and policies, public awareness and the local market, environment and public infrastructure, residential buildings, and RE technology systems.

Based on the previous studies explained above, it appears that only a few empirical studies have examined the potential of Islamic finance instruments for RE investment. Most studies only focus on the potency of conventional finance instruments to overcome RE financing issues and mainly discuss the evaluation of existing RE strategies and individual willingness to finance the RE projects. Furthermore, it is notable that almost no empirical studies explore GCC investors' perspectives on performing RE investments in other Muslim countries like Indonesia. Despite that, as explained earlier, some official documents have mentioned about the possibility of economic cooperation between GCC states and Indonesia in financing RE projects. As such, this study fills in the gap by investigating the potential demands of Islamic finance for RE projects from expert-investor perspectives.

2.3. GCC Economies and Investors

The GCC economies have a strong economic development, which is fueled primarily by abundant natural reserves and a well-trained working population. The area enjoys higher average incomes and a relatively modest unemployment percentage compared to similar growing nations. Moreover, these countries have also effectively expanded their financial sectors and welcomed foreign investments. Furthermore, the GCC substantially relies on oil and gas commodities and has expanded investment opportunities to diversify their economies.

The GCC has often been a place of economic prosperity, with recent years seeing a surge in its reputation as an economic powerhouse. The nations have evolved as international powerhouses for foreign money and local entrepreneurship, from oil resources to the tourist industry. However, the influx of foreign investments has facilitated these countries to re-establish a solid economic trajectory. This surge has primarily taken the aspect of foreign direct investments (FDI) (Al-Zoubi et al., 2018). Based on the 2016 World Investment Report (WIR), MENA nations accounted for 3% of global FDI inflows, especially capital gains fueled by a host of GCC states (UNCTAD, 2016). It has been suggested that FDI is among the prime drivers of economic growth for GCC nations (Babai & Lacovara, 2017). These investment decisions increase production and create job possibilities for citizens and expats, resulting in a more robust economic and social condition for these countries.

Many consider that GCC financial investments are driven by strategic choices to broaden their portfolios away from their domestic markets and also in seek of investment alternatives (Al-Zoubi et al., 2018); however, others suggest that a growing proportion of semi-sovereign and financial investors from the GCC is trying to engage with worldwide substitute assets groupings like venture capital,

private equity, and hedge funds, in certain instances carrying growth businesses to initial public offering (Al-Zoubi et al., 2018).

In recent years, the GCC countries have seen tremendous advancement and growing wealth. The countries are witnessing fast socio-economic development as the oil Sheikhdom of the United Arab Emirates (UAE), Kuwait, Qatar, Bahrain, and Saudi Arabia grow more prosperous. Such a shift has also resulted in an inflow of individuals from neighboring countries, notably North Africa and the Middle East, as well as other regions such as Far East Asia.

It is worth noting that GCC state engagement in Far-East Asian countries including Indonesia is predicted to be dominated by hydrocarbon exports to the region (Mason, 2023). Currently, there has been a GCC corporation invested in Indonesian RE projects, namely Abu Dhabi Future Energy Company (MASDAR). It is expected that the GCC investment in RE projects in Indonesia will increase significantly in the future.

III. DATA AND METHOD

This study aims to understand the interest of Gulf Cooperation Countries (GCC) investors to finance renewable energy (RE) projects in Indonesia using Islamic financing schemes. To achieve the objective, it employs Analytical Hierarchy Process (AHP) method, one of the methods commonly used in multi-criteria decision-making (MCDM). The AHP is applied using experts' opinion as respondents representing institutional investors from the GCC region. It reviews a number of literatures related to types, projects, instruments, and incentives that will be tested to gain investors' perspectives. It then conducts a Focus Group Discussion (FGD) with regulators and industry players from Indonesia. The results are then used to construct the frameworks for the AHP. Finally, to validate and enrich the analysis, additional interview with an Indonesian government official is conducted. More discussion is provided in the explanation below.

3.1. Data

To determine the preferences of investors, this study conducts a literature review related to types, projects, instruments, and incentives, where then investors' perspectives and views are sought. Next, to check the validity of criteria and options, it conducts a Focus Group Discussion (FGD) with regulators and industry players from Indonesia. The participants include representatives from the Ministry of Finance, Ministry of Energy and Mineral Resources, Ministry of National Planning (Bappenas), Indonesian Electricity Company (PT. PLN), Infrastructure Fund (PT. SMI), Infrastructure Guarantee Fund (PT. PII), Indonesia Hajj Finance Fund (BPKH) and Indonesian Islamic Banking Association (ASBISINDO). The results are then subject to the Analytical Hierarchy Process (AHP).

In employing the multi-criteria decision-making (MCDM) method, 21 experts on the RE investment projects from institutional investors in the GCC have participated in the survey. The experts are mid-to-senior-level professionals with considerable work exposure to RE investment projects. They have invested or are willing to invest in RE projects. They are asked to fill in a questionnaire mainly

related to their investment preferences including questions related to project selection, instruments selection and incentives preferences. The profiles of the experts are provided in Table 2. [1] Furthermore, to explore on the abovementioned aspects and enrich the analysis, we conduct an additional interview with one of the GCC investors.

Table 2.
Profile of Respondents

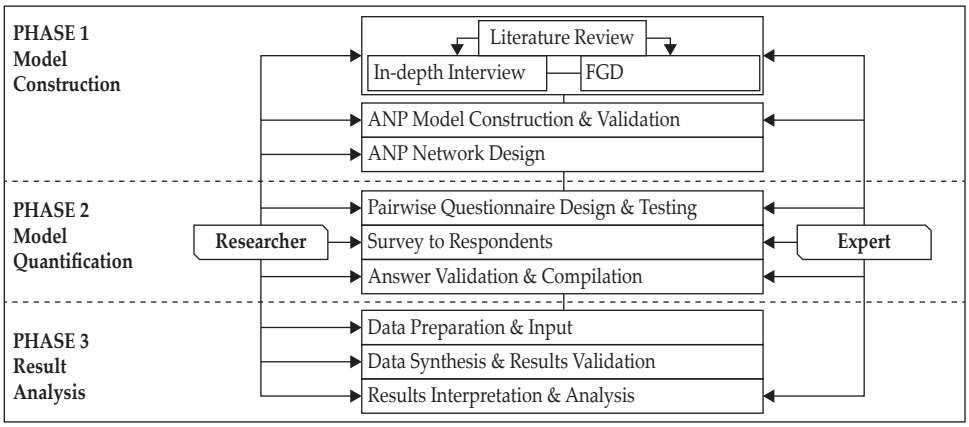
Category	Sub-category	Frequency	Percentage
Age	20–30 years old	2	9,5
	30-40 years old	16	76,2
	40-50 years old	2	9,5
	> 50 years old	1	4,8
Gender	Male	15	71,4
	Female	6	28,6
Country	Bahrain	11	52,4
	Kuwait	2	9,5
	Oman	1	4,8
	Qatar	1	4,8
	Saudi Arabia	6	28,6
Years of Experience	< 5 years	3	14,3
	5-10 years	10	47,6
	10-15 years	5	23,8
	15-20 years	2	; 9,5
	> 20 years	1	4,8
Education	Bachelor Degree	6	28,6
	Master Degree	14	66,7
	Professional Certificate	1	4,8

Finally, to validate the findings and enrich the analysis, we conduct an additional interview with an Indonesian government official who is a member of the energy transition task force. The energy transition task force is an institution in charge of instruments and policies/incentives related to energy transition in Indonesia. The questions discussed during the interview include, among others, development and challenges in developing RE in Indonesia, factors influencing RE investment/financing in Indonesia (including from GCC investors), and policies to encourage investors (particularly GCC investors) to invest or finance RE projects in the world's largest Muslim country.

1 Due to confidentiality reasons, we cannot reveal the company names. However, they are available upon request from the authors.

3.2. Analytical Hierarchy Process (AHP) Framework

Based on the problems identified earlier, this study applies the qualitative approach of the Analytical Hierarchy Process (AHP) to determine the preference for RE projects, the preference of financial instruments, and the preference of incentive strategies expected by the potential GCC investors. The AHP is a Multi-Criteria Decision Making (MCDM) rank method developed by Saaty (1977, 1980). Ansari et al. (2019) describe the AHP as a method based on the hierarchical analysis for selecting a particular problem. It helps to decompose the hierarchical problem (commonly called a "framework") and solve it partially. The combination of partial solutions is again combined to get the overall solution to the initial problem. The MCMD procedure is described in Figure 1 below.



Source: Ascarya & Tekdogan 2022 in Billah (2022)

Figure 1.
AHP/ANP Procedure

In this paper, we follow several steps from construction of the AHP model, conducting a survey on the experts, and analyzing their pairwise comparisons. As indicators of the validity of the results, we calculate consistency ratio (CR) to measure whether the experts are consistent in making the comparisons, and Kendall's W to measure the degree of agreement among the experts for each comparison. Consistency ratio (CR) is computed following Tu, et al. (2020). It is deemed that a CR being less than 0.1 as acceptable (Saaty, 2005; Ansari, 2009; among others). As for the calculation of Kendall's W, we follow the procedure as described in Ascarya & Masrifah (2022) in Billah (2022). Additionally, in analyzing the AHP results, it is worth noting that the results are consistent regardless of the sample composition. This is because the inconsistency indicators show low levels of inconsistencies exhibited in each of the AHP frameworks (consistency ratios being lower than 0.1, as documented in section 4.1). Detailed explanations of the AHP frameworks and criteria to use in this study are explained below.

a. RE Project Selection

Based on the literature review and extensive discussion, we can summarize and identify five common criteria for selecting RE projects. Those five criteria are (in no particular order) the risk of the project, return of the project, the impact of the project, government support which includes incentives for the project, and sustainability of the project. Typically, investors decide on the RE project they want to invest in by considering these five criteria. As for the types of RE projects, we refer to the six mains RE projects available in Indonesia (see Table 1). The project's criteria and alternatives can be constructed into an AHP framework, as displayed in Figure 2.

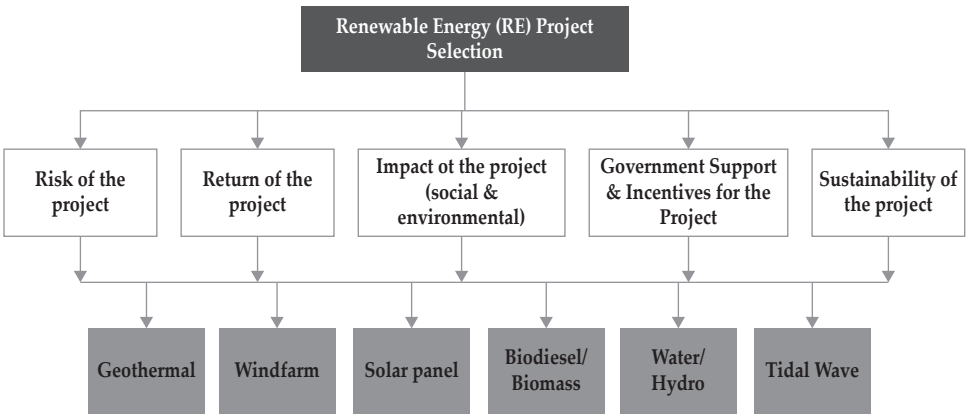


Figure 2.
AHP Framework of RE Project Selection

b. RE Instrument Selection

Relatively similar to the first AHP framework, the second AHP framework for selecting preferred instruments for investing in RE projects involves as many as five criteria. The first three criteria are similar to the first AHP framework, i.e., the project's risk, the project's return, and the project's impact. However, for the remaining two, we identify the concern for the liquidity aspect of the financial instrument, as well as how far the instrument is considered as Sharia compliant. Considering those five criteria, investors decide on the type of instruments for investing in RE projects.

We define the types of instruments based on the broadly available instruments in Islamic Finance, as discussed in part 2.2. There are eight different Islamic Finance instruments, which are the green/blue sovereign sukuk, green/blue corporate sukuk, Islamic bank financing, asset-backed securities or ABS (known in Indonesia as *efek beragun asset* - EBA), limited participation mutual fund, equity, blended financing, and financing from multilateral development agencies. The criteria and the alternatives of the instruments are constructed into an AHP framework, as displayed in Figure 3 below.

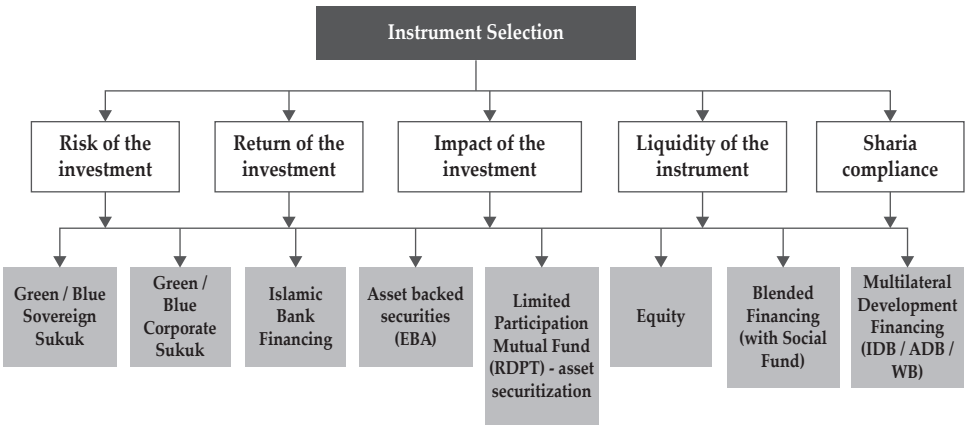


Figure 3.
AHP Framework of Instrument Selection

c. RE Incentive Preference

Several government incentives could be implemented to attract further GCC investors to invest in RE in Indonesia. To see which types of incentives the potential GCC investors are interested in, we identify three main concerns concerning incentives: the contribution of the said incentive to boost the return on the investment, the impact the incentive has on reducing the risk of investment, and its impact on the sustainability aspect of the investment. As for the types of incentives from the government, we identify as many as seven alternatives of incentives that the government could offer. These include tax incentives, a guarantee for the purchase of power being produced by the facilities, a guarantee on the selling price of the energy, cross-subsidy, a smart grid, a guarantee from the government on financing, and incentives related to import duty. The criteria and the alternatives of incentive preferences are constructed into an AHP framework, as displayed in Figure 4 below.

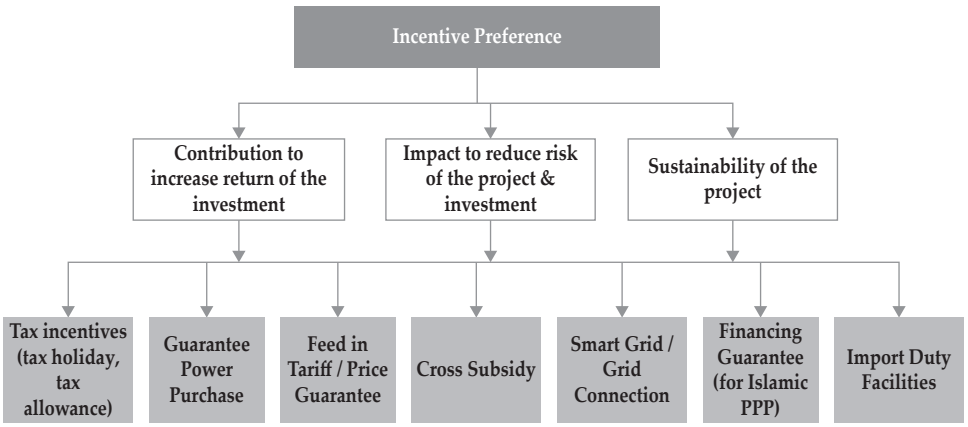


Figure 4.
AHP Framework of Incentive Preferences

IV. FINDINGS AND ANALYSIS

4.1. Main Findings

Using the framework explained earlier, the group of experts provide their comparative judgments on both the criteria and the alternatives, and the inputs are analyzed to determine the relative priority of each element. The results of such analysis are presented below:

4.1.1. AHP #1: Project Selection

Figure 5 provides information about the result of the first AHP framework, i.e. to determine the preferable RE projects. It reports the relative importance of the criteria for the selection of the RE projects. The findings indicate that among the five criteria in the first framework, the experts overwhelmingly emphasize the importance of the project's return in choosing the type of RE project. This criterion weighs around half of the relative importance (0.50). The next essential criteria are the risk of the project and the impact of the project on the social and environmental well-being of the country. On the other hand, the sustainability of the project as well as government support and incentives for the project is considered the least important.

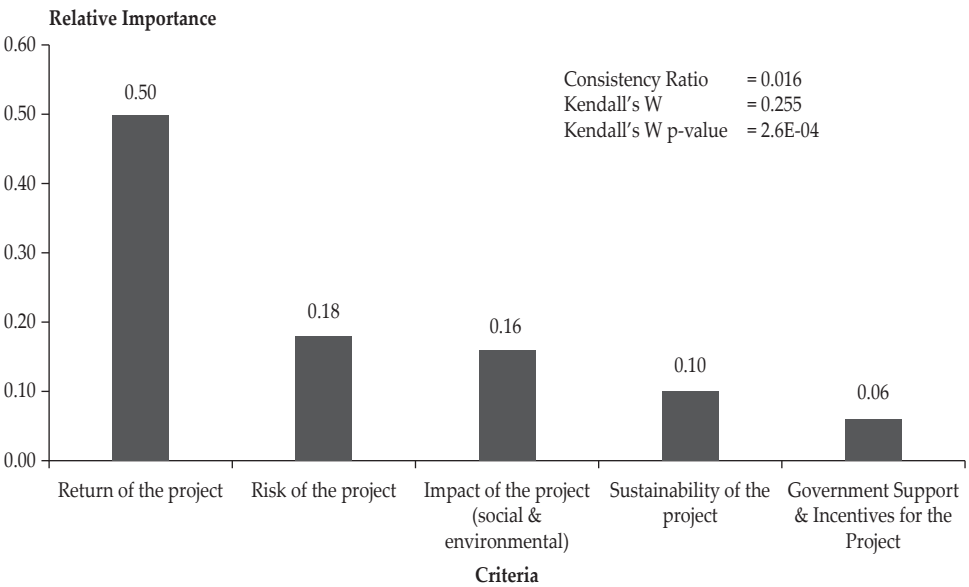


Figure 5.
AHP #1: Relative Importance of Criteria with Respect to Purpose of Selecting RE Projects

To generate investors' preference for alternatives of RE projects, we need to evaluate each alternative according to the criteria weighted according to the investors' preference. The results from the local comparison are then compiled and aggregated into a "global" comparison. The result for global comparison is

reported in Figure 6. The results indicate that the solar panel project is the most globally preferred project for the overall criteria. The overall weight of 0.40 is almost double that of the wind farm, which is placed in the second position with a score of 0.21. RE based on water or hydropower comes in the third position, followed by tidal waves in the fourth position with slightly different values. On the contrary, the GCC investors do not prefer to finance Biodiesel / Biomass and geothermal as it has the lowest value compared to other alternatives. This global cluster for alternatives has acceptable consistency ratio (0.023) and relatively moderate Kendall's W (0.452), indicating that the experts are relatively in agreement on the ranking.

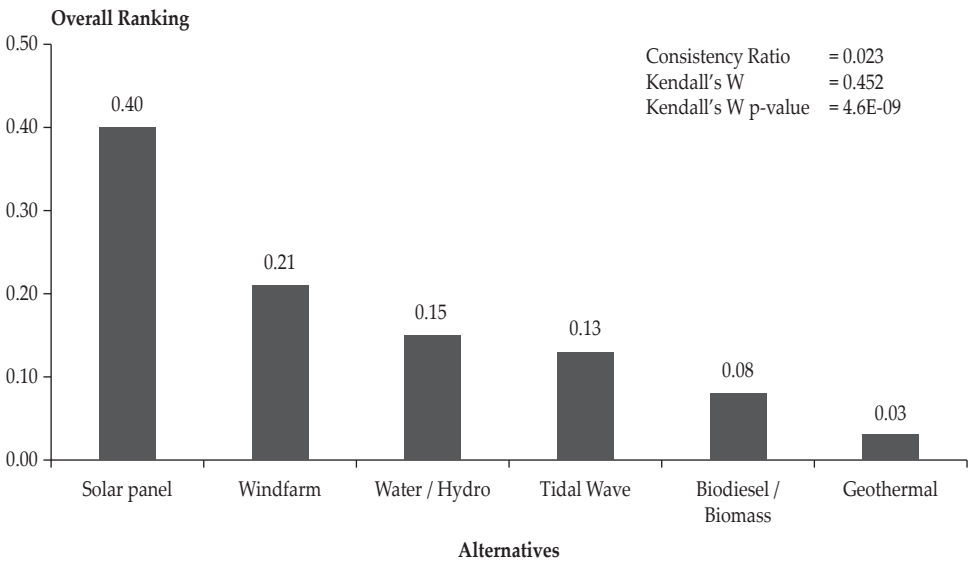


Figure 6.
AHP #1: Global Comparisons of Selecting Alternatives RE Projects

4.1.2. AHP #2: Instrument Selection

The second AHP framework aims to determine the preferable instruments to be used by GCC investors for RE projects. According to Figure 7, among the five criteria in the second framework, the experts view the return on the investment as the most important criterion, followed by Sharia compliance in second place. The next important criterion is the liquidity aspect of the instrument. Interestingly, the risk and impact of investment are regarded as the least important. This result is consistent with previous findings, in which GCC investors focus more on the return than the impact. Interestingly, risk has not also become a major consideration when selecting investment instruments. Investors prefer an instrument that is more liquid so that when they think the investment is at risk, they can quickly sell and liquidate it.

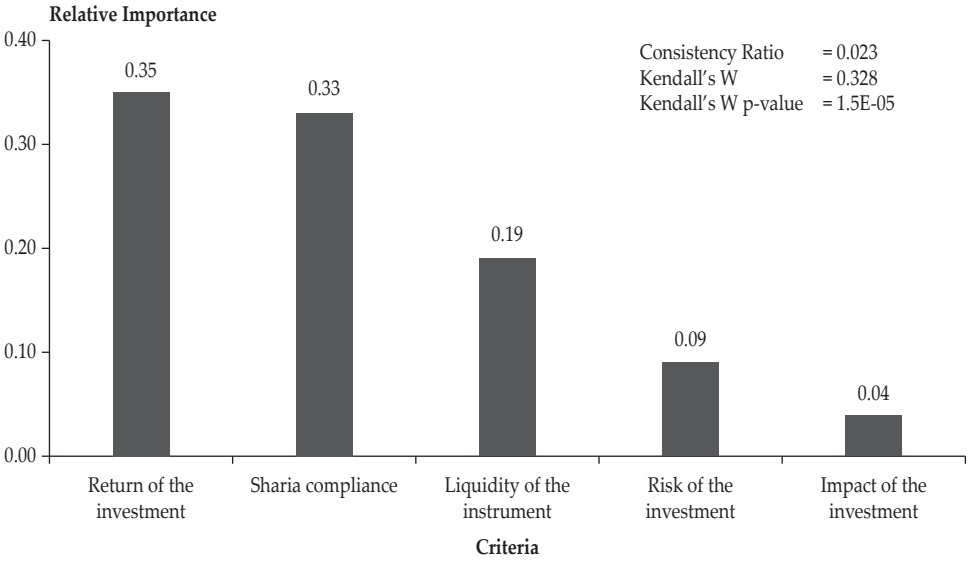


Figure 7.
AHP #2: Relative Importance of Criteria with Respect to Purpose of Selecting Type of Financial Instruments

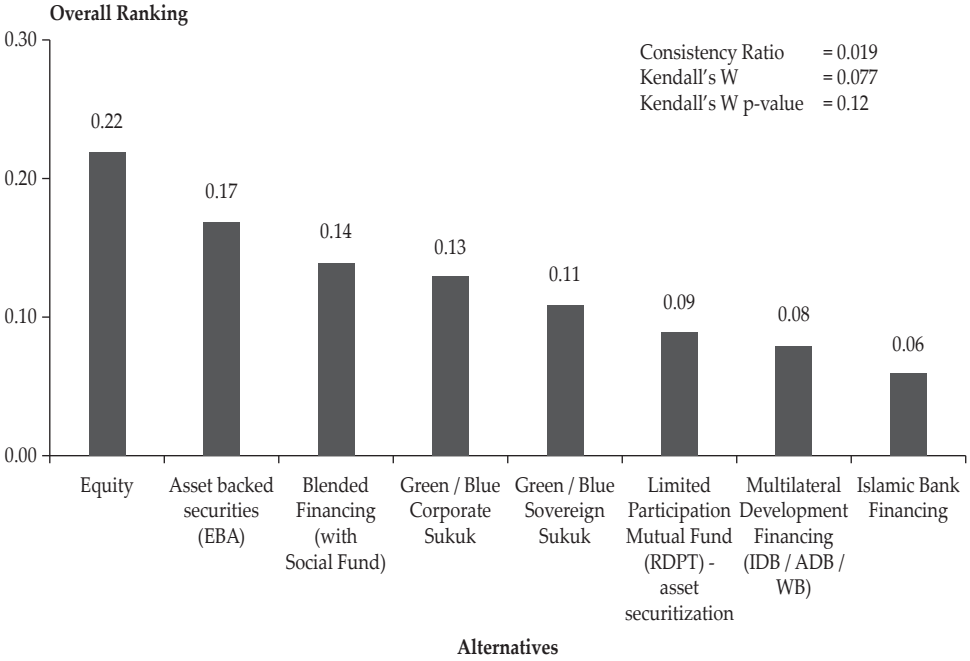


Figure 8.
AHP #2: Global Comparisons of Alternatives in Selecting Types of Financial Instruments

The fact that Sharia compliance is regarded as the top important criterion may provide additional evidence that GCC investors have a strong interest in Islamic financial instruments. This evidence could indicate that GCC people are relatively conservative regarding religion. Therefore, their preference for Sharia compliance instruments is higher.

Figure 8 reports the global comparison results for the second AHP framework. The results indicate no clear and dominating winners in this framework (also evidenced by the relatively low Kendall's W, which indicate low level of agreement between the experts). Despite equity having the highest values of importance (0.22), it is followed closely by asset-backed securities (0.17) and even blended financing (0.14). This result implies that in terms of the instruments to invest in RE projects, the potential investors are somewhat open to alternative instruments. This cluster for alternatives also has an acceptable consistency ratio (0.019).

This result is interesting as GCC investors are willing to invest in equity. This condition can be a perfect solution for Indonesia's companies focusing on improving public infrastructures. Most companies have high Debt to Equity Ratios and thus have difficulty issuing debt-based financing, including Sukuk, considering their rating will be downgraded.

4.1.3. AHP #3: Incentive Preference

The third AHP framework aims to determine the preferable incentives to be provided by the government to attract investors to invest in RE projects in Indonesia. Figure 9 shows the relative importance of criteria concerning preferable incentives. According to the results, among the three criteria, the experts put most of their emphasis on the contribution of the stimulus in increasing the return on investment. This result is followed by the impact of the incentive in reducing the risk of the RE projects and their sustainability. The result is consistent with previous findings, as GCC investors put the return on investments (ROI) as a major significant factor that attracts them to invest their money.

Interestingly, the distance between investor preference for receiving incentives that promote return and incentives to reduce risk is very significant. Moreover, GCC investors seem not to consider incentives to encourage project sustainability as necessary. Therefore, if policymakers provide incentives that promote higher ROI, it may be sufficient to attract the interest of investors.

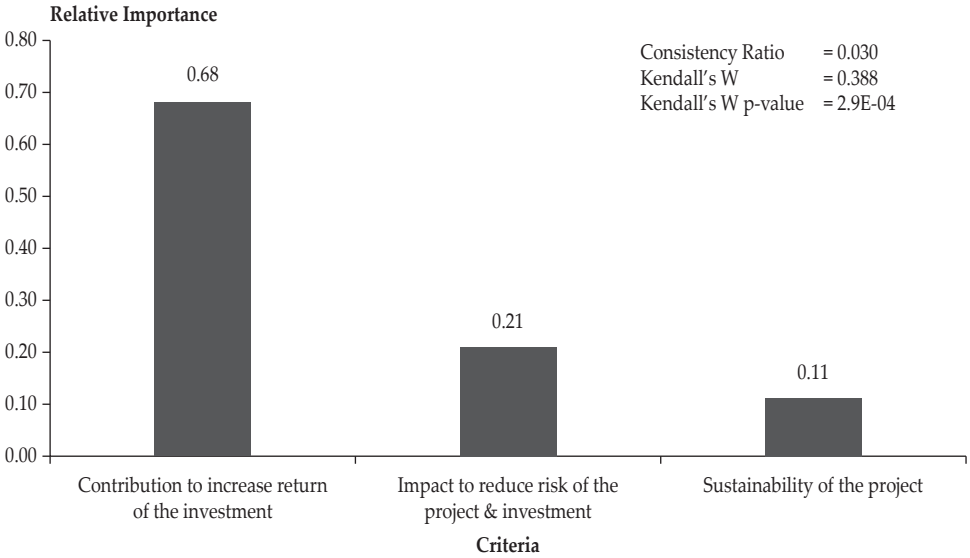


Figure 9.
AHP #3: Relative Importance of Criteria with Respect to the Purpose of Selecting Preferable Incentives

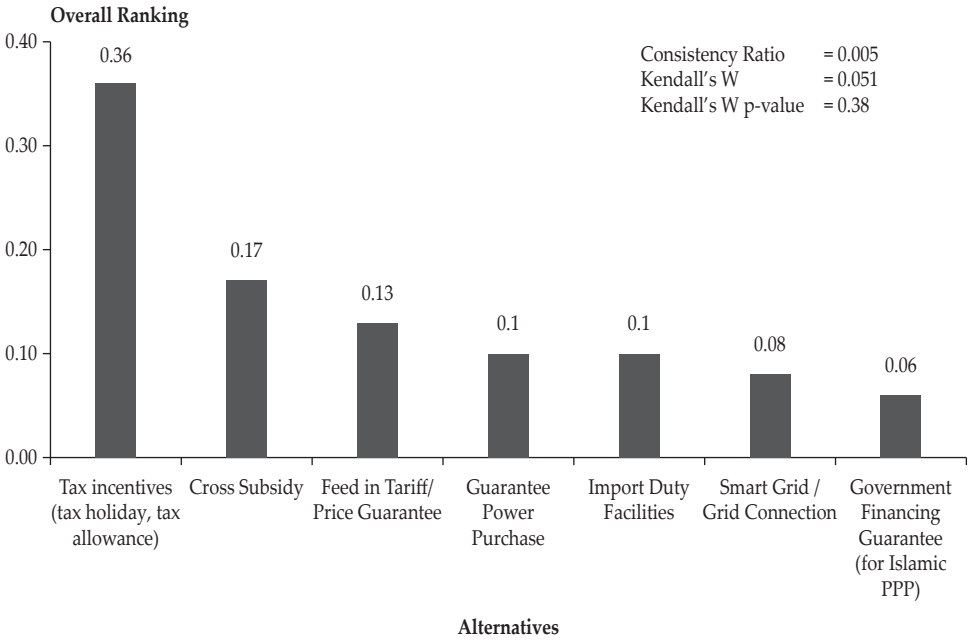


Figure 10.
AHP #3: Global Comparisons of Alternatives in Selecting Preferable Incentives

Figure 10 reports the global comparison results, which indicate that tax incentives are the most preferred method of incentives, followed by cross-subsidy and feed-in tariff/price guarantee with quite a significant distance. This result is consistent with previous findings that GCC Investors primarily focus on generating higher returns. Interestingly, such investors seem not concerned about having government guarantees in financing Islamic Public Private Partnership (PPP) projects. They have more interest in guaranteeing that power of the RE must be purchased by the government, thus ensuring the revenue stream of such projects. Similarly, they also want the government to guarantee the purchase price, providing a steady return they will generate if they invest in the projects.

Another interesting note to be taken from this result is that the degree of agreement (measured by Kendall's W) in this framework is relatively low (0.051). This indicates that our experts do not seem to be in conformity when assigning the ranking for the incentives. This expresses the varying degree of incentive preference among investors in terms of its impact to reduce risk of project and from sustainability perspective.

4.2. Analysis

The priorities of criteria for RE projects are calculated using the pairwise comparison matrix as depicted in Figure 5. The result shows that the return on investment (ROI) is the most crucial consideration in selecting RE projects, followed by the risk of the project, impact (social & environmental), sustainability, and government support. This result is as expected, as Tolliver et al. (2020) mention that high ROI attracts global investors to RE projects. The consideration can further be understood within the realm of risk-return profiles for RE projects. This is because investors may perceive the characteristics of the RE market as high production cost and relatively low ROI than that of conventional fossil energy (Liao et al., 2011). The RE projects require cutting-edge technologies and recent infrastructure; therefore, they are deemed high-cost projects. Rana et al. (2020) find that RE projects are more expensive and less efficient than fossil-based energy. This is confirmed during the interview with the Indonesian government official, who stressed that one of the biggest challenges in developing RE in Indonesia is that, "*RE is something expensive, so that it is economically pale in comparison with [non-RE] sources such as fossil fuels, diesels, etc…[thus] should be accompanied with high return*".

The knowledge and experiences of the GCC investors also influence the preference for RE projects (see Figure 6). The RE generation in the GCC region is primarily through solar panels and wind power (Engin and Bensaid, 2023). While Indonesia has a large potential for solar energy, it is slightly different with the GCC states as it also has considerable potential for hydropower and geothermal energy (Ditjen EBTKE, 2022). The reason is it is a maritime country located under the Ring of Fire, where more than 127 volcanoes are still active within the country (BNPB, 2023). It appears that the GCC investors are still unfamiliar with these conditions and potentials of Indonesia. This is corroborated with an interview with one of the institutional investors in Bahrain who are engaged in the green energy sector, stated that "*.... i didn't know that Indonesia has a lot of potential of geothermal energy*"

The main criteria for instrument selection and preferences are reported in Figures 7 and 8, respectively. The results indicate that ROI, shariah compliance, and liquidity are the critical criteria for the instrument selection. These findings are also reached by a study conducted by Duqi and Tamimi (2019). Several studies also support this study as they find similar findings where Islamic customers and investors highly value Sharia compliance in selecting their instruments or products (Mulia et al., 2021). This result is also expected given that most GCC investors are Muslims. As for the liquidity aspect, Scholz et al. (2015) also emphasize that liquidity should receive special attention from investors as it is a relevant pricing factor that contributes to explaining return variations.

Moving to instrument preferences (Figure 8), we find that equity, asset-backed securities (ABS/EBA), and blended financing are the top three instruments to finance sustainable energy projects. High interest in Asset-Backed Securities (ABS) is also understandable. ABS is relatively secure because tangible assets back it, and this instrument is also liquid because it can be traded in the secondary market. Nonetheless, there is still limited types and amount of ABS and blended finance instruments in Indonesia.

Interestingly, Islamic bank financing is the least preferred instrument by investors to finance RE projects. However, it is understandable because investors need to share the profits generated from the projects with Islamic banks and because of small size of Islamic banks in Indonesia. The same case applies to the Multilateral Development Bank (MDB) financing albeit MDB is known as having low risk (i.e. about as low as the sovereign instruments).

Concerning the incentives preferences (Figure 9), the main criteria imposed by the GCC investors are contributions to increase the return on the investment and impact to reduce the risk of the project/investment. These results corroborate the previous findings suggesting the importance of return on investment (ROI) before undertaking investment decisions. Findings regarding incentives' impact on reducing the project risk also support a study by Esmaeili et al. (2019) showing various incentives have been introduced to help investment capacity and minimize investment risks, such as high investment costs and uncertain future revenue.

Finally, concerning the types of incentives for RE projects (Figure 10), this study finds that investors prefer tax incentives, followed by cross-subsidy and price guarantee/feed-in tariffs (FiT). The preference towards tax incentives is not surprising, considering the direct impact of tax on the return of the investment. These findings align with a result from Azhgaliyeva et al. (2023) that tax incentives significantly positively impact private investment. In the context of Indonesia, the interview with the government official also reveals that the government has issued various fiscal or tax incentives such as tax holidays, tax allowances, VAT exemption, import duty exemption, income tax exemption and land & building tax discount. They are regulated by the Ministry of Finance MoF regulation (PMK) 130/2020, Government Regulation (PP) 78/2019, PP 49/2022, PMK 66/2015, MoF PMK 34/2017 and PMK 172/2016 accordingly. Furthermore, according to ADB (2020), Law 30/2007 on energy authorizes the government to provide facilities and incentives to companies and individuals for RE supply.

This study also supports the results from Wall et al. (2019) that emphasize Feed-in-Tariffs (FiT) as a significant policy instrument in attracting foreign direct

investment in the RE sector globally. Indeed, based on the interview conducted, it was revealed that the FiT policy is considered to be the most effective policy to enhance investment in RE projects in Indonesia. It was clearly said that, "The price [resulting from FiT policy] is the most important policy to attract RE investment in Indonesia". Furthermore, it is also known that the FiT policy was already introduced in July 2016 after the 2013 solar auction programme was declared unconstitutional by the Supreme Court. The FIT regulation targets the development of 250 MW of PV capacity in 22 provinces, and FITs are granted for 20 years in the range of USD 0.145-0.25/kWh and vary by region (IEA, 2021).

V. CONCLUSION AND RECOMMENDATION

This study aims to understand the interest of Gulf Cooperation Council (GCC) investors to finance renewable energy (RE) projects in Indonesia using Islamic financing schemes. It employs a multi-criteria decision-making (MCDM) method and Analytical Hierarchy Process (AHP) model with expert respondents representing institutional investors from the GCC states. To validate and enrich the analysis, it also conducts Focus Group Discussion and additional interviews with industry players and Indonesian regulators.

From the results, we can conclude that the return on investment is the most crucial factor in selecting appropriate RE projects, followed by risk and impact of the projects. The study also finds that investment return, Shariah compliance and liquidity are the main criteria in choosing Islamic financing instrument selection. These findings suggest that the GCC investors put more emphasis on the return of the RE project rather than other factors particularly in choosing the RE projects and the Islamic financing instruments. These results somewhat reflect that, although Islam teaches the importance of promoting a sustainable environment, investors do not consider it to be most important in selecting appropriate Islamic financial instruments. However, the findings that the shariah compliance factor is rank 2nd as the main criteria for selecting IF instruments and that the project impact is rank 3rd suggest that the Islamic investors is influenced by Islamic principles in their investment behaviour particularly towards RE projects.

These results suggest that the government, particularly financial/ monetary and fiscal authorities, should design and implement appropriate policies and incentives that provide good return on the green investment. Moreover, the authorities must ensure shariah compliance of the Islamic financial instruments issued. They should also design and give priorities to implement impactful RE projects, especially those that provide large social impacts on society.

Next, the study finds that equity-type instruments are the most preferred instrument, followed by asset-backed securities and blended financing. However, most of the instruments are not widely available in Indonesia. Furthermore, it is found that the solar panel project is the most preferred RE project amongst the investors. Despite that, it is also revealed that some of the GCC investors do not have sufficient knowledge about the potential and sources of RE in Indonesia.

Following these results, Indonesian government can design RE projects that accommodate the interest of GCC investors, mainly based on solar, wind, and hydro. The government can employ the Islamic PPP models, in which the private

part of these schemes can issue Islamic equity and sukuk to accumulate funding and sell those instruments to GCC investors. In addition, the government can securitize and establish RE projects, usually funded by bank financing, into asset-backed securities financing. Government and regulators could also persuade market players to securitize bank financing (i.e. creates ABS instrument) for such RE projects, sell it to the international market, and use proceeds to finance new RE projects. It can reduce the cost of funds while, at the same time, providing more liquid instruments that also become the interest of GCC investors. Furthermore, it is important that the government conducts more regular and extensive investment promotion to enhance the investors knowledge about the investment potentials and the available RE projects in Indonesia

Finally, we note that tax incentives, cross subsidy and feed-in-tariffs are the most preferred incentives needed by the investors. As such, the government (particularly fiscal authority) should provide more attractive fiscal (tax and subsidy) incentives and feed-in-tariff due to the investors' preferences towards the incentive schemes as they have direct impact on investment's returns. Moreover, the GCC investors need to be made aware not only of such incentives but also of available RE projects in Indonesia. Thus, the primary homework that the government must do after designing an appropriate RE project is to promote it to investors in other parts of the globe, including in the GCC region.

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