Preferences of Green Sukuk in Environmental Projects (Case Study in Indonesian Power Industry)

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Abstract. Increasing interest in climate change adaptation requires countries to integrate financial instruments into more sustainable initiatives. The green sukuk, as one of the Islamic financial instruments used for this purpose, has not met expectations even though others continue to show exponential growth. Therefore, this study aims to analyze the factors causing the low issuance of green sukuk and simulate the green sukuk issuance scenario for project financing. It was achieved through a mixed-method methodology conducted with the participation of players in the Indonesian power industry. As a result, it was revealed that the most significant factors in deciding to issue green sukuk are issuance costs and incentives, which were not optimal. This study provides the simulations which impact decreasing issuance costs and increasing the available cash flow ratio for the coupon.

Keywords*:* Green Sukuk, Indonesian Power Industry, Project Financing, Debt Services Coverage Ratio, Coupon.

1 Introduction

Adapting to the consequences of increasing emissions is necessary to save the resources most vulnerable to climate hazards. Various countries have carried out several initiatives to mitigate climate change. The Climate Change Conference of the Parties (COP26), which was held in Glasglow, Scotland, on November 13, 2021, resulted in several agreements, including stopping coal energy power plants, accelerating mitigation of the climate crisis by reviewing commitments in each country to reduce the emissions and providing financing for adaptation to the climate crisis. Developing countries, on average, need annual funds from 2015-to 2030 of around US$2.5 trillion per year to realize the SDGs [1]. Given that large-scale capital is required for a low-carbon transition, the need for climate finance is more pressing now than ever. Indonesia, as one of the contributors to the world's emission levels and a country committed to the Paris Agreement, is considered insufficient to achieve the target and the emission trajectory towards 3 degrees Celsius, which exceeds the commitment set by 1.5-2 degrees Celsius [2]. The energy sector is projected to be the most significant contributor to GHG emissions in 2030, with 58-71% of the total national GHG emissions [3]. GHG emissions in the energy sector are sourced from various sub-sector activities, including transportation, industry, burning fuel oil, and generating electricity using fossil fuels. One of the largest sources of emissions lies in burning fossil fuels for power plants [4].

Given that Indonesia's emission reduction commitments still need to be optimized, the transition to using environmentally friendly energy is a path that must be taken. However, until 2021, the Ministry of Energy, Resources and Minerals noted that 43 renewable energy power plant projects had not yet reached the Commercial Operation Date (COD) schedule. The failure to achieve COD for the power plant project was due to several factors such as permits, land acquisition, funding sources, and technical aspects of construction implementation, both from natural conditions and the impact of the COVID-19 pandemic [5]. The Ministry of Energy and Mineral Resources of the Republic of Indonesia in a Press Release Number 692.Pers/04/SJI/2019, dated December 4, 2019,

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informed that renewable energy investments of up to US$36.95 billion are needed to achieve the energy mix in 2025 with an energy creation of 3.5 GW.

Green Sukuk is expected to be one of the answers to funding problems in renewable power projects. Its product has received tremendous attention for Islamic financing in Islamic countries and the Organization for Economic Cooperation and Development (OECD) [6]. Green Sukuk is considered capable of accommodating the values desired by investors with sharia characteristics and environmental protection [7]. In Indonesia, As a country with the largest Muslim population in the world, about 231.06 million Indonesians are Muslim, equivalent to 86.7% of Indonesia's total population [8]. The green sukuk financing transition should be smooth. However, its development still shows a relatively small number of issuances. Only the Indonesian Government and PT Sarana Multi Infrastruktur are interested in issuing Green Sukuk [9] [10].

Many studies have been carried out on the issuance of green sukuk, but none has proven the significant impact of green sukuk on power generation financing schemes. Several studies reveal the challenges faced in the green sukuk market: poor green taxonomy, difficulties in implementing green assets and time, and cost consumption [11]. The issuance of green sukuk also does not directly impact performance after assignment [12]. There are contradictions and limitations of green sukuk in contributing to the state development [13]. Several strategic actions have been taken in Singapore and Malaysia from the government side to minimize the cost of issuing green sukuk [14]. However, more attractive schemes are still needed for renewable energy projects, especially in Indonesia, which is still lacking in providing incentives. This study focuses on the factors causing the low issuance of green sukuk and simulates the green sukuk issuance scenario for the project financing, increasing the preference for green sukuk issuance. To address this gap, we use mixed methods in research design which combines qualitative and quantitative to gain new insights into a problem. This option was chosen to integrate design analysis through data aggregation and annotating data from one data set to another in a larger framework [15]. In particular, we endeavor to address endeavoring research questions:

"What factors can increase the preference for green sukuk issuance, and what scenario simulations can provide an optimal project funding mechanism for Indonesia power companies."

This study strives to close the gap and answer the research questions mentioned above with a research model based on the theory built on an exploratory qualitative study by offering solutions to the factors that influence the issuance of green Sukuk based on interviews with several power generation companies in Indonesia.

2 Literatur Review

The Asian Development Bank projects that the development of the Asian region will require US$210 billion per year from 2016 to 2030 to finance investment needs to sustain growth, reduce poverty and respond to climate change. Furthermore, infrastructure investment takes at least US$26 billion to be responsible for reducing carbon emission problems and increasing regional resilience to climate change [16]. Over the past decade, Sukuk has become the most prominent Islamic financial instrument product and a significant source of high profitability for companies, along with investor attracting factors such as religious principles, sharia instruments, and interest-free financing (riba) [17]. Through diversification of investment portfolios, green sukuk emerged to answer the current climate change financing needs.

2.1 Sukuk

Sukuk is an Arabic word that is the plural form of sakk with a certificate or "payment order" that follows Islamic law [18]. Sukuk are instruments with a similar value (which can be redeemed) that show the entire investment or service [19]. According to the Fatwa of the National Sharia Council (DSN) No. 32/DSN-MUI/IX/2002, sukuk is issued by issuers based on sharia principles to pay to sharia bondholders in the form of profit-sharing, margins, and fees and to repay bond funds at maturity. This fatwa is the basis for Islamic securities in Indonesia. The fatwa states that bonds justified according to sharia bonds are based on sharia principles. Sharia principles include types of agreements/contracts, types of business, income, and ownership. Law No. 19/2008 stipulates that sharia agreements can be used, including 1) Mudharabah, 2) Musyarakah, 3) Istishna, and 4) Ijarah. The types of business activities that are contrary to sharia are regulated through DSN Fatwa No. 20/DSN-MUI/IV/2001, including a) Gambling or trading business which is prohibited, b)

Conventional financial business (ribawi), including conventional banking and insurance, c) Business that produces, distributes, and trades haram food and beverages, d) Businesses that produce, distribute, and/or provide goods or services that damage morals and are harmful. Furthermore, the income obtained by Islamic bonds is under the contract used, and ownership of Islamic bonds follows the type of transaction used.

2.2 Green Sukuk

Green Sukuk is a unique instrument because it must comply with sharia and green requirements. This green bond indicates that the sukuk issued is committed to the environment through projects, assets, and business activities [20]. Sukuk must have an independent reviewer's second opinion or green certification and a post-issuance impact report [21]. The structure of sukuk is inherent in project financing due to its asset-backed nature; green sukuk is also suitable for green funding projects such as renewable energy power plants, green buildings, environmentally friendly mass transportation, and other projects that are beneficial to the community environment [20]. Green sukuk financing for the wind energy sector reached the required network level in Italy. It is profitable and bankable, presented with a sensitivity analysis [22].

Furthermore, a propensity score matching approach of 121 green bonds was issued in Europe from 2013 to 2017 and found that green bonds were more solid and reliable than non-green bonds [23]. Meanwhile, green certifications get lower interest costs than companies without green certificates [24]. In the capital market, green bonds also recorded a positive response from investors when they began to be traded in the secondary market [25]. Furthermore, using funds also results in a better internal rate of return when financing an investment than bank loans [26]. Those arguments proved that the issuance of green instruments always positively impacts investors and companies in terms of financial performance.

2.3 Green Sukuk Issuance Scheme

The green sukuk issuance process combines traditional sukuk issuance with green elements [21]. Under these conditions, the allocation of Green Sukuk in Indonesia refers to the Financial Services Authority regulation No.3/POJK.04/2018, while green compliance stipulated through the Financial Services Authority regulation No. 60/PJK.04/2017, further discussion is needed to answer whether a new regulation is required to regulate green sukuk, considering that Indonesia has only held the green bonds [27]. The green sukuk issuance scheme involves four steps which are identifying green projects that are sustainable and possible to be measured by the issuer, applying "green" criteria to select specific projects or activities, and managing bond yields to provide clarity on the type of temporary placement of the remaining unallocated net funds, issuing impact reporting to provide project progress and underlying assets [20]. This impact report will include quantitative and qualitative elements such as measures of avoided CO2 emissions, the issuer's sustainability goals, and how the project financed will meet these goals [28].

2.4 Environmental Project

The issuance of green sukuk is carried out to meet environmental, social, and governance requirements as a sustainable development field mandate [29]. To articulate such a sustainability strategy, companies must understand the project's objectives for issuing these green sukuk because there is no legal "green" promise to fulfill obligations [30]. Indonesia's Financial Services Authority stipulated the principle of projects financed with green bonds in regulation No. 60/PJK.04/2017 with activities related to a) renewable energy, b) energy efficiency, c) pollution prevention and control, d) natural resource management and sustainable land use, e) land and water biodiversity conservation, and f) transportation. Furthermore, to say that the project being financed is environmentally sound, an external reviewer is needed who provides an independent assessment of the green sukuk and assists potential investors in determining the suitability of their portfolio issuance [31]. As one of the external reviewers, CICERO has carried out a shading methodology to provide transparency to investors to compare the exposure of green bonds and green Sukuk to the climate risk [32]. CICERO categorizes these exposures into four types, namely: a) Dark Green, focusing on projects that have a long-term vision, such as renewable energy power plants, b) Medium Green, projects that already have a long-term vision but not enough, such as buses with hybrid technology, c) Light Green, the project does not have a long-term vision but has environmentally friendly solutions such as efficient use of fossil fuels for development, and d) Chocolate, the project is against climate change initiatives [33]. Meanwhile, Vigeo Eiris provides a review of environmentally sound projects with three-level dimensions, namely: a) advanced for

projects that have a solid commitment to maintaining social responsibility, b) Good for projects with a reasonable level of risk management, c) Limited for some projects that have management weak risk and d) Weak for projects that do not have evidence of problem-solving and a weak level of management [34].

3 Research Design

This study focuses on the financing process of Indonesian power companies with renewable power plant projects. It is divided into two study phases. In the first phase, qualitative studies consist of three main steps: literature review, expert interviews, and project case studies. The literature review was conducted to examine a financing model that can provide an overview of the source and identify the characteristics of the situation and the problems experienced by Indonesian power companies. The qualitative part was done mainly through interviews with experts knowledgeable about financing in practice.

Six expert interviews were examined and analyzed within their project financing study. Those people work in companies with renewable power plants, including Finance Manager from PT Medco Power Indonesia (PTMPI), Senior Analyst from PT Pertamina Geothermal Energy (PTPGE), Chief Financial Officer from PT Vale Indonesia Tbk (PTVI), and Blended Finance Practioner from PT Sarana Multi Infrastruktur (PTSMI). The choice is intended to provide an in-depth overview of the feasibility of green sukuk financing for renewable energy projects. In addition, this study interviewed people who work in the Ministry of Finance involved in the Indonesian government's green sukuk issuance process and practitioners who work in the Climate Policy Initiative, which intensively advocates the green economy transition in Indonesia. All informants are domiciled in Indonesia. Since everyone interviewed also represented the organization's views, an official letter from the university requesting an interview with some of them was sent. Due to the covid-19 situation, the interview platform uses video conferencing media such as Zoom and Whatsapp. Interview time is not limited but not more than 90 minutes.

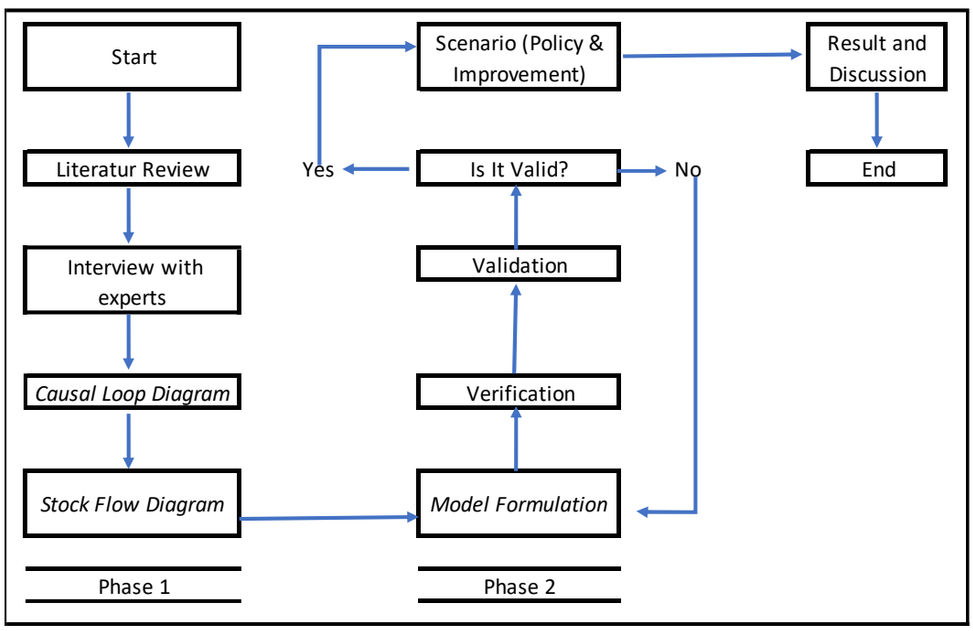

Fig. 1. Research design.

As depicted in Figure 1, the literature review and qualitative field studies were performed independently; Nonetheless, the three steps were connected as an iterative process between qualitative data collection and analysis [35]. Through interview sessions, the model was developed from mapping factors experienced by Indonesian power companies. The interviews were recorded and transcribed. Identified issues were gathered in a pool using a causal loop diagram by Vensim

applications and aligning them with prior matters identified from the literature review. The constructs were improved with the stock-flow diagram model throughout these steps, and the model formulation was developed. Its model should have been verified in two phases. First, examine if the model is miscoded or incorrectly simulated. Codification refers to equations, adopted functions, sub-model structure, unit consistency, and selection of numerical integration methods. Second, analyze whether the model's output matches the objectives of the modeling study. The steps are followed and elaborated with the behavior pattern test method. The behavior pattern test validates the model to determine whether our proposed model is valid or not by calculating the Mean Absolute Error (MAE) of the varying investment needs for renewable power projects.

To emphasize the green sukuk financing, the sub-model, consisting of sub-model green sukuk issuance and sub-model debt services coverage ratio, is explored with several simulation scenarios. The scenario included a structured plan and parameter scenario into optimistic, most likely, and pessimist scenarios. The exploration process uses excel processing with several considerations of financial indicators; it can also be said as a quantitative prescriptive method involving the application of mathematical models in optimizing a decision [36]. The optimization obtained is also a study finding and can be used to improve existing theories and policies. It can make companies that have not issued green sukuk interested in using green Sukuk in financing a project.

4 Result and Discussion

4.1 Development of Green Sukuk in Indonesia

The development of corporate green sukuk in Indonesia has not shown significantly. At the corporate level, almost no Indonesian companies are interested in issuing green sukuk. Lastly, only PT Sarana Multi Infrastruktur, which issues sukuk for the benefit of INKA's train cars, will be used to support Jabodebek (Jakarta Bogor Depok and Bekasi) LRT (Light Rapid Transportation) operations and financing to PT PLN (Persero). The expert from PTSMI said that:

> *"We can't, for example, issue one trillion sukuk but only five hundred green ones. So then we claim that this is green. Although in Indonesia's Financial Services Authority regulation, a minimum limit of around seventy percent applies to green bonds, if green sukuk do not refer to that regulation."*

At the initial initiation of the issuance of green bonds, PTSMI already had a green bond and a green sukuk framework. However, PTSMI took careful steps because 50% of the sukuk funds allocated to PLN could not be ascertained whether it was used to finance power plants or other business activities. Government should arrange the specific regulation for green sukuk so that issuers get legal certainty, especially from the corporate side.

4.2 Factors Influence of Issuing Green Sukuk

This study will describe the specific factors that Indonesian power companies consider issuing green sukuk or green financial instruments. The elements found will then be characterized through a causal loop diagram, while the stock-flow diagram will be used to emphasize the models.

4.2.1 Causal Loop Diagram (CLD)

The initial step in making a dynamic system simulation is to formulate a model according to the existing conditions of the issuance of green sukuk for renewable power plants. The most critical consideration in making the concept of CLD is identifying and relating each variable that affects the distribution of green sukuk based on interviews and literature. Figure 2 is a caustic diagram figure.

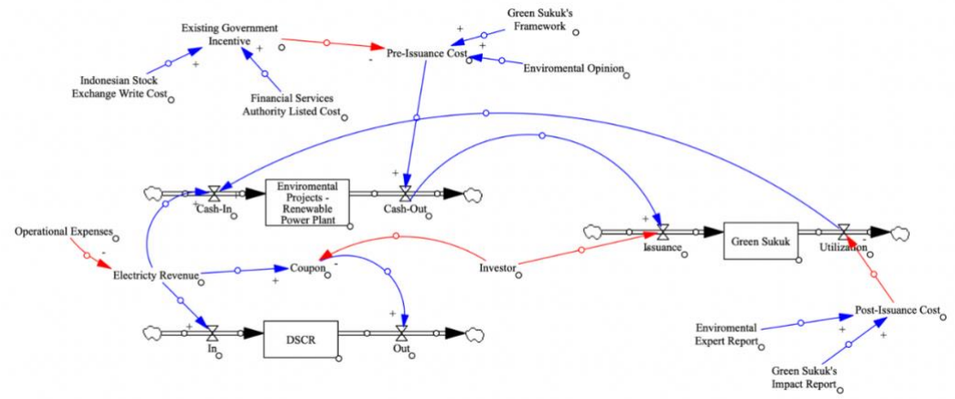

Fig. 2. Causal loop diagram from issuance Green Sukuk.

As depicted in Figure 2, The negative relationship in the picture above occurs in the provision of existing government incentives for the pre-issuance costs, reduction of electricity revenue for project operational costs, allocation of coupons to investors, and the use of green sukuk issuance for environmentally sound projects. In contrast, a positive relationship occurs in the addition of pre-issuance costs, additional income for calculating the debt services coverage ratio, and investors' purchase of green sukuk.

The cost of distribution is the first factor that causes the low issuance of green sukuk. In collecting funding in the capital market, the issuance cost is a variable that the company will always consider to taking a funding policy. The expenses that the issuer had to pay consist of two major cost frameworks. First, the pre-issuance fee includes the preparation of a green sukuk framework of approximately 1/10 basis points and obtaining an expert environmental opinion on the underlying assets of 4 basis points. Second, the post-issuance fee includes obtaining a review from environmental experts who explain that the issuance of green sukuk has been allocated according to the expected impact, and no allocation is outside its designation. Its fee is approximately two basis points. The last is the preparation of reports on the effect of green sukuk with costs depending on the level of company size. This study used medium companies. According to the Chairman’s Decree of The Indonesian Institute of Certified Public Accountants No. KEP.024.IAPI/VIII/2008 approximately USD26.000.

Then the second factor to be considered is incentives that are not optimal. In principle, Indonesia already has a roadmap for sustainable finance and regulations governing the issuance of environmental projects [37]. However, there are not many incentives aimed at encouraging companies in Indonesia to issue green financial instruments as other countries in the Asia-Pacific Region have done. There are only two incentives for issuing green bonds in Indonesia: reducing registration fees with Indonesia's Financial Services Authority and listing prices on the Indonesia Stock Exchange. However, to simulate several scenarios, this study describes several incentive schemes for issuing green financial instruments, specifically green bonds in the Asia-Pacific Region, as compiled by the Climate Bonds Initiative [38]. The incentive scheme used is a scheme that has proven successful in increasing the issuance of green instruments in the country. China has provided a coupon subsidy of 2% to investors. Hong Kong has a unique green bond certification agency whose task is to assess the issued green bonds, as well as Japan, Singapore, and Malaysia, which provide reduced pre-issuance costs.

The third factor that influences the issuance of green sukuk is the yield given to investors who place/buy green sukuk issued by the company. So far, there is no yield measure for green sukuk because the market has not been formed effectively. However, in the simulation context, the reference percentage of green sukuk coupons for the government savings series ST008 of 4.80% can be used as a reference.

The fourth and fifth factors that influence the issuance of green sukuk are the income and operational costs of renewable power plants. This factor arises with the assumption that most power generation companies already have power generation projects, so the need for the issuance of green sukuk is in the context of refinancing/refinancing. This variable will affect the conditions for calculating cash

flows available for returns on paying green sukuk funding. This study retrieves data on power plant revenue and operating costs through Wood Mackenzie's internal reports from 2018 to 2021. From the relationships between these factors, this study emphasizes the two sub-models described by the stock-flow diagram.

4.2.2 Stock Flow Diagram (SLD)

This study focuses on making flow diagrams related to the cost and effectiveness of incentives and the impact of yields on green sukuk on renewable power plants in Indonesia. These are the sub-model of green sukuk funding for power plant projects (Figure 3) and the sub-model for calculating the debt services coverage ratio (DSCR) (Figure 4). The following is an implementation of making a flow diagram:

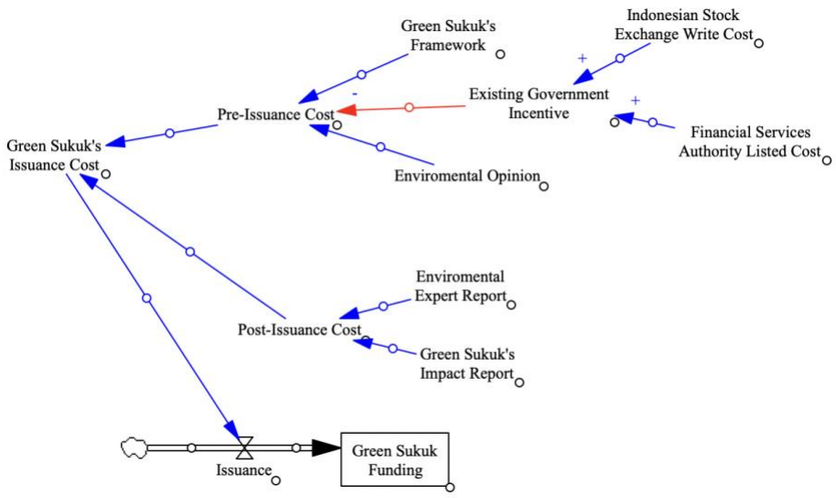

Fig. 3. Sub-Model Green Sukuk Issuance.

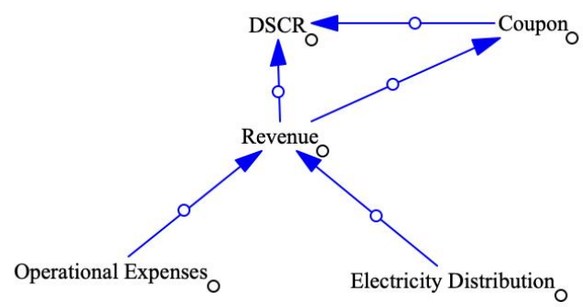

Fig. 4. Sub-Model DSCR.

Based on the two-sub models above, the simulation created will be discussed in two levels are:

Green Sukuk Funding for Green Projects

This level is a renewable power plant (PTL) project owned by Indonesian power companies. The influencing factors for this level are:

a. The pre-issuance costs and post-issuance costs will increase the costs for PTL. However, this cost can be minimized by the incentives for pre-issuance and listing in Indonesia's Financial Services Authority and Indonesia's Stock Exchange.

b. The costs after the issuance will add to the expenses for PTL, which consist of making a report from environmental experts and the cost of preparing an impact report on the allocation of green sukuk.

Debt Service Coverage Ratio (DSCR)

This level is the ratio of the availability of fund coverage to pay a coupon. Because this level is operational, all variables involved in income and expenditure also appear during PTL operational activities. As explained in the initial model in the previous, the influencing factors for this level are:

a. Sales of electricity become a variable that affects income and the DSCR ratio.

b. PTL's operational costs will be a routine expense that must be incurred. The costs arising after issuing green sukuk include preparing green sukuk impact reports and environmental expert opinions. This fee is an annual fee issued by the PTL issuer during the term of the green sukuk.

c. The coupon compared with the total electric power sales and the power plant's operating costs.

4.2.3 Verification and Validation

Model verification is carried out to ensure that the computer program through the Vensim application user does not occur bugs or errors. At this verification stage, each auxiliary and constant level is checked and ensured that the model could be run with the appropriate calculations. Model validation aims to confirm whether the output or behavior corresponds to reality and is acceptable. This study validates by calculating the quantitatively measured variables' mean absolute error (MAE). The model is valid and shows the same trend if the MAE <10% [39]. This study use data on power plant investment needs through the Wood Mackenzie report from 2018 to 2022. The results of the calculation can be seen as follows:

Table 1. Comparison of reference data with power plant investment in 2018-2022.

Year	Hydro	Simulation	MAE	Wind	Simulation	MAE	Solar	Simulation	MAE	Geothermal	Simulation	MAE
2018	0,73	0,77	0,04	0,15	0,13	0,01	0,14	0,29	0,16	0,52	0,96	0,44
2019	0,73	0,76	0,03	0,16	0,14	0,02	0,20	0,28	0,07	0,93	0,95	0,03
2020	0,70	0,75	0,05	0,12	0,13	0,02	0,29	0,28	0,01	1,29	1,02	0,27
2021	0,85	0,77	0,08	0,12	0,13	0,01	0,37	0,30	0,08	1,19	1,05	0,14
2022	0,84	0,78	0,05	0,12	0,13	0,01	0,46	0,33	0,13	0,87	1,02	0,15
Average			5%			1%			9%			20%

As depicted in table 1, renewable PTL investment shows that the variables Hydro, Wind, and Solar can be used because they show numbers below 10%; thus, the simulation uses the variables above as valid models. The simulations of the factors that influence green sukuk issuance and several recommendations for incentive schemes have been carried out. The simulation results can assist in developing a more optimal green sukuk issuance policy and DSCR. The green sukuk policy simulation will explain what incentives will be suitable to increase green sukuk and impact Indonesian power companies.

4.3 Green Sukuk Issuance Scenario Simulation

After the simulation results data on the basic model are valid with the original data, the next step is to carry out the scenario development stage. There are two scenarios in the system simulation: the structural and parameter scenarios. Structural designs are carried out by changing the model structure on the variables that influence the simulation objectives. Meanwhile, the development of parameter scenarios is carried out by changing the parameters of essential variables to determine the possibility of future conditions, either optimistic, pessimistic, or most likely. The design created aims to increase the issuance of green sukuk for renewable power plant projects in Indonesia based on the influencing factors. The following scenario has been created:

4.3.1 Structure Scenario 1 - Green Sukuk Issuance Assistance

The Financial Services Authority has collaborated with the Ministry of Environment to publish a Green Taxonomy 1.0, which can be used as a guideline for regulating the classification of green businesses in Indonesia. Publishers can use this guide to reduce costs by making frameworks and environmental opinions. The green taxonomy is equipped with criteria and thresholds for each type of business activity. Determining the category of business activities in the green and yellow sectors is prepared using a method to classify business categories. Due to implementing the green taxonomy 1.0 by the Financial Services Authority, this study could eliminate the variable cost of pre-issuance (see Figure 5).

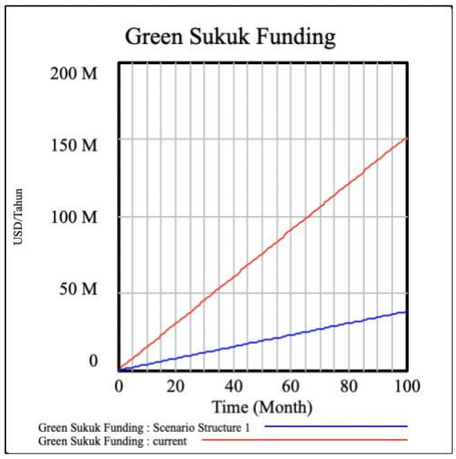

Fig. 5. Green Sukuk issuance assistance to increase Green Sukuk funding.

As depicted in figure 5, this study finds that eliminating pre-issuance costs can reduce the cost of issuing green sukuk by up to USD110 (150-40) million per year. If calculated with the need for renewable power generation resources of USD1.4 billion, this amount is still within competitive limits (3%) compared to Indonesia's project loan interest rate of 7.71% [40]. However, there has been no implementation of how this guidance can be used. The assistance process from the government needs to be carried out considering that the green sukuk market is still categorized as a new financial instrument. This mentoring process can imitate the scheme that has been carried out by the state of Hong Kong, where a certification body was established that aims to set the same standards when companies want to issue green instruments. This agency will also be able to provide recommendations to the government to provide incentives to these companies.

4.3.2 Parameter Scenario 1 – Optimistic

In this scenario, the value parameter that most influences the pre-issuance cost is changed, which is expected to grow optimally. This study changed the variable of reducing registration fees at the Financial Services Authority to 100% after only 75% and listing fees on the Indonesia Stock Exchange to 75% after only 50%. (see Figure 6).

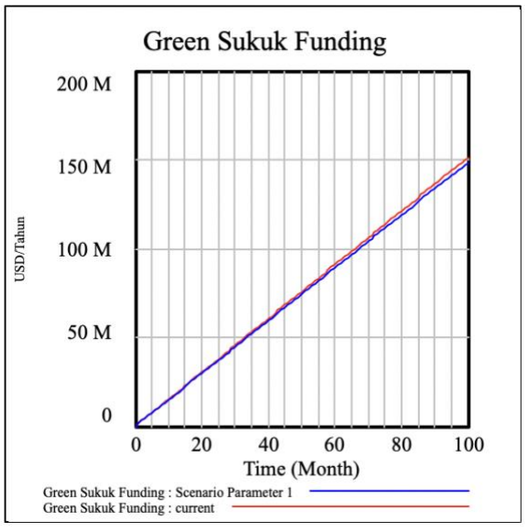

Fig. 6. Green Sukuk scenario optimistic.

This result proves that the existing incentive cannot significantly reduce the total pre-issuance cost, so even though its implementation is optimistic about being carried out, it will not directly impact the issuance of green sukuk. In response to these conditions, this study recommends the macroprudential application of the green taxonomy 1.0 classification later, such as by distinguishing

credit interest rates between business activities that are "green" and those that are "red". With this application, it is hoped that the grinding of business activities that do not pay attention to environmental effects will decrease.

4.3.3 Parameter Scenario 2 - Most Likely

In this scenario, the value parameter that affects the pre-issuance cost is changed, which may be applied considering that countries in the Asia Pacific Region have made the green incentive scheme. This study changed the pre-issuance cost in the form of a preparation framework by external review with an incentive of a maximum cost reduction of USD73 thousand following the implementation in Singapore and Malaysia (21) (see figure 7).

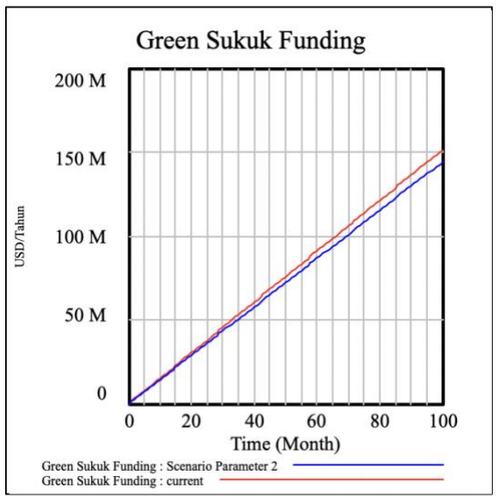

Fig. 7. Green Sukuk scenario most likely.

In this scenario, the cost reduction is only around USD10 (150M-140M) billion, with the investment requirement for renewable power plant projects amounting to USD1.4 billion; the decrease does not look competitive (10%) when compared to infrastructure project loans' interest rate of 7.71%. This study recommends the provision of tax incentives in the form of tax exemptions for costs associated with the issuance of green sukuk during the period of green sukuk issuance. Thus, the company can reduce these costs without worrying about tax audits that the tax authorities may carry out. The issuer also implemented of corporate income tax rate lower than the regular rate by 22% by 3% to 19%. Nonetheless, to create a balanced market condition (on the demand side), additional regulations are needed to regulate the obligations of other companies to place a certain percentage of their funds in environmental business activities (such as the allocation for purchasing government bonds).

4.3.4 Parameter Scenario 3 – Pessimistic

In this scenario, the value parameter that affects the impact of green sukuk issuance is changed where the coupon from the green sukuk issuance project gets a 2% subsidy from the government. This scheme follows the description of the scheme carried out in China to increase DSCR. This study places this parameter scenario with a pessimistic status because the ecosystem has not yet been formed in the green sukuk capital market (see Figure 8).

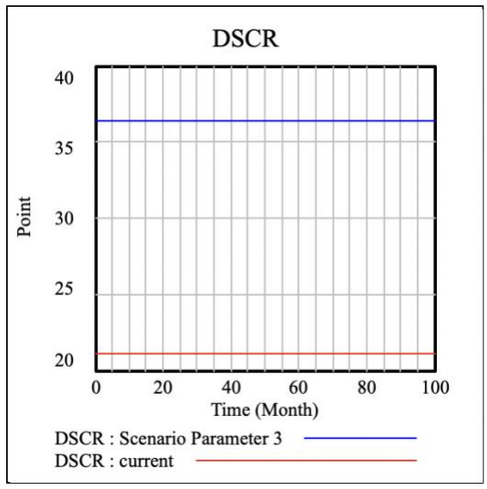

Fig. 8. Green Sukuk scenario pessimistic.

In this scenario, the DSCR rate increases from 20 points to 37 points when coupon subsidies are provided to green sukuk issuers. Although this condition cannot be realized soon, at least there is a confidence that the ecosystem's better condition will impact prospective green sukuk issuing companies.

5 Conclusion

This study offers a meaningful contribution to research and practice. Although it is recognized that the development of green sukuk issuance is not significant, not too many issuing companies can be included in the simulation model of green sukuk funding. This study focuses on developing a model that can be used to predict an equivocal situation when evaluating and deciding on green sukuk funding. This study contributes by synthesizing and consolidating extant literature on green bond/green instruments by subscribing to system dynamic theory. The study starts with an exploratory phase at inductively deriving the factors that influence sukuk issuance. Current knowledge is advanced by using an evaluation frame drawn from green financing literature; a conceptual model is illustrated that captures the critical issues of project evaluation and aligns these issues with the identified factor influences of green sukuk issuance. The qualitative field studies provide firm foundations for the proposed model. This study contributes to the relationship of factor influence in green sukuk issuances from the causal loop and stock-flow diagrams. The association was presented in the simulation model. The simulation model made in this study is valid because it has passed the validity test with the MEA conditions of less than 10%. Thus, the simulation model can be a reference for determining policies related to the issuance of green sukuk.

The quantitative analysis shows the path coefficients and their significance for each antecedent. It is revealed that the salient drivers of equivocal situations lie within the issuance cost, an incentive of green sukuk, coupon, electricity revenue, and operational expense. Those drivers elaborated on the scenarios regarding the determination of the sukuk funding scheme. The scenarios created are structural and parameter scenarios. The structural design consists of reducing the variables to see whether the initial mentoring pattern at the time of issuance can affect the funding of green sukuk. The parameter scenarios include the optimistic, most likely, and pessimistic plans. Likewise, within the structure scenario, the establishment of the green taxonomy 1.0 standard could be eliminated the pre-issuance costs if there is any assistance from the government due to the new financial instrument. Within the parameter scenario, the optimistic scenario shows that increasing incentives does not significantly reduce total pre-issuance costs. This study recommends providing a difference in interest rates for activities that have been classified as green and those that are still red. This condition can be applied if the green taxonomy 1.0 policy is well implemented. The most likely scenario can be elaborated with tax deductions and exemptions granted to prospective green sukuk issuers. Within the pessimistic scenario, the provision of coupon subsidies can be given because it can increase the debt services coverage ratio.

Additionally, this study offers invaluable insight for the government to implement green taxonomy 1.0 for all business classifications because the benefits can affect the increase in green sukuk. Additional studies should focus on analyzing the potential heterogeneous activity within the data. Furthermore, the data collected via interview may be biased; therefore, conclusions based on this study must be interpreted with caution. Finally, until this research is completed, no company is still interested in issuing green sukuk. Therefore, in the future, other studies can explore further the effectiveness of using green sukuk for companies that already use green sukuk as a source of financing for environmental projects.

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