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The Sovereign Green Sukuk: An Analysis of Its Process and Barriers to Funding Renewable Energy Projects in Indonesia

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Abstract:

Indonesia launched a sovereign green sukuk in 2018 to fund green projects that can contribute to addressing climate change and achieving the Sustainable Development Goals. This issuance also marked the first sovereign green sukuk issuance in the world. Since then, Indonesia has issued five sovereign green sukuks and has mobilized 3.23 billion USD from these issuances. The money raised from these sovereign green sukuks has been directed to five eligible sectors: sustainable transportation, energy efficiency, renewable energy, waste to energy and waste management, and resilience to climate change for disaster risk areas. This study aims to assess firstly how the money raised by the Indonesian sovereign green sukuk flows to the renewable energy power plant projects. Secondly, this research also aims to identify what kind of barriers influence the flows of green sukuk money to the renewable energy power plant projects. A literature review is carried out to outline the barriers that have been known to exist in green bond and green sukuk financial flows from the previous research. Meanwhile, an exploratory single case study is employed to explore the flow of money and identify the barriers in Indonesia. The findings were analyzed using thematic analysis.

Results show that there are two key actors in implementing the flow of money: the Ministry of Finance and the Ministry of Energy and Mineral Resources. The Ministry of Finance has a role as an issuer of the sovereign green sukuk. On the other hand, The Ministry of Energy and Mineral Resources has a role as the project owner in the renewable energy sector. Therefore, it requires good coordination between them since each ministry has different responsibilities and priorities. Meanwhile, there are three frameworks that determine the mechanism of the flow of finance. Firstly, the state budget. Secondly, the Law No. 19/2008 concerning Sovereign Sukuk and its subordinate legislation, which is the Government Regulation No. 56/2011 concerning Project Financing through Sovereign Sukuk Issuance. Lastly, the Republic of Indonesia Green Bond and Green Sukuk Framework. The involvement of these frameworks shows that the implementation of the sovereign green sukuk must align to the management of the state budget, must be compliant with the sovereign sukuk law and its subordinate legislation, and must follow the green principles according to the Republic of Indonesia Green Bond and Green Sukuk Framework. This study also shows two main barriers: the lack of coordination between ministries and the lack of capacity in some of the regional governments. The lack of coordination between ministries has affected the formulation of the impact report. Since the impact report is one of the key components in the sovereign green sukuk, the delay in delivering the impact report and the lack of quality in providing the information in the impact report can diminish the investor's confidence. Meanwhile, the lack of capacity in some of the regional governments to manage and operate the renewable energy power plants funded by the green sukuk has led these projects could not give the impact as expected in reducing emission and achieving the SDGs target in the rural areas.

Based on these results, this study suggests these recommendations: (1) The Ministry of Finance should consider establishing a directorate dedicated to exclusively handling green finance; (2) The ministries that own the projects should raise their awareness in reporting the impact of the green projects; (3) The coordination between the ministries should be improved in ensuring solid implementation in the issuance, allocation, and reporting phase; (4) The Ministry of Energy and Mineral Resources should ensure that the plan to build renewable energy power plants from the green sukuk are well-planned and well-executed. (5) The regional governments should increase their technical and financial capacity to ensure the sustainability of the renewable energy power plants they manage.

Keywords: sovereign green sukuk, green sukuk, green bond, renewable energy power plant, climate change, sustainable development

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Summary:

As an effort to finance the green projects that can give benefit to address climate change and to achieve the Sustainable Development Goals, the Government of Indonesia launched the sovereign green sukuk in 2018. The sovereign green sukuk itself is a financial instrument that complies with the green bond and the sukuk principles. This instrument is issued by the government institution in which the payment of the bond is guaranteed as well by the government. To date, only Indonesia the country that has issued the sovereign green sukuk with a total accumulation of 3.23 billion USD from five issuances. The money raised from these issuances has been allocated to five eligible sectors: sustainable transportation, energy efficiency, renewable energy, waste to energy and waste management, and resilience to climate change for disaster risk areas. Through this study, the flow process of the money from the issuance to the renewable energy projects and the barriers that affect this flow process were assessed. In assessing this, a literature review was carried out to outline the barriers that have been identified in green bond and green sukuk financial flows from the previous research. Moreover, to explore the flow of money and identify the barriers in Indonesia, an exploratory single case study was employed and the findings were analyzed using thematic analysis.

Based on findings, there are two key actors in implementing the flow of money. The first actor is the Ministry of Finance as the issuer and the second actor is the Ministry of Energy and Mineral Resources as the project owner in the renewable energy sector. Furthermore, there are three frameworks that must be followed during the flow process. Firstly, the state budget since the sovereign green sukuk is categorized as a debt instrument in the state budget. Secondly, the Law No. 19/2008 concerning Sovereign Sukuk and its subordinate legislation, which is the Government Regulation No. 56/2011 concerning Project Financing through Sovereign Sukuk Issuance due to the sovereign green sukuk is part of sovereign sukuk according to this law. Lastly, the Republic of Indonesia Green Bond and Green Sukuk Framework since the sovereign green sukuk must follow the green principles that stipulated by this framework.

In terms of barriers, the results show that two main barriers affect the flow process. Firstly, the lack of coordination between ministries has affected the formulation of the impact report. In the sovereign green sukuk, an impact report is one of the key elements. Therefore, the failure to provide a good impact report during the flow process can affect the investors' trust level towards the issuer. Secondly, the lack of capacity in some of the regional governments has affected the sustainability of the renewable energy projects funded by the sovereign green sukuk. As a result, it has led these projects could not give the impact as expected in reducing emission and achieving the SDGs target in the rural areas.

In addressing the barriers as mentioned above, there are five recommendations to be implemented: (1) The Ministry of Finance should establish a directorate that only focus on handling the green finance; (2) The ministries which own the projects should raise their awareness in reporting the impact of their projects; (3) The coordination between ministries should be improved in ensuring solid implementation in the issuance, allocation, and reporting phase; (4) The Ministry of Energy and Mineral Resources should ensure that the renewable energy projects funded by the sovereign green sukuk are well-planned and well-executed. (5) The regional government should improve their technical and financial capacity to manage the renewable energy power plants funded by the sovereign green sukuk to ensure these power plants can be sustained to benefit the people in the rural areas as well as reducing carbon emission.

Keywords: sovereign green sukuk, green sukuk, green bond, renewable energy power plant, climate change, sustainable development

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1. Introduction

1.1 Background

Indonesia is vulnerable to the adverse impacts of climate change if there is no sufficient intervention to mitigate these problems. For instance, as the largest archipelagic state with approximately 81,000 km of coastline, the sea level rise can profoundly impact many coastal areas in Indonesia (Zikra, Suntoyo, and Lukijanto, 2015). Moreover, climate change can alter the hydrological regime, increasing the probability of having flood and drought disasters in some parts of Indonesia (Barkey, Nursaputra and Mappiase, 2019; Jayanti et al., 2020). Then, as a country located in a tropical area, the change of precipitation and temperature increase can trigger mosquito-borne diseases, malaria, and hemorrhagic fever (Wirawan, 2010). It can also lengthen transmission periods and the transmission zone of some important vector-borne diseases (ibid.).

Regarding the aforementioned impacts of climate change, it is important to address these issues by formulating and implementing appropriate mitigation and adaptation strategies. A solid commitment to reducing greenhouse gas (GHG) emission is necessary. The Government of Indonesia in its nationally determined contributions (NDC) that submitted to the United Nations Framework Convention on Climate Change (UNFCCC) has committed to reducing its GHG emission by 29% (unconditional target) against the business as usual scenario in 2030 and up to 41% (conditional target) subject to international support (Government of Indonesia, 2016).

The energy sector is set to be the second-largest contributor (following the forestry sector) to the total reduction target. Under the unconditional target, it aims to contribute an 11% reduction while it targets 14% under the conditional target according to Indonesia's second biennial update report (BUR) to UNFCCC (Ministry of Environment and Forestry, 2018). The details of Indonesia's mitigation scenarios in reducing emission target are as follows (*ibid.*):

Table 1. Projected Business as Usual and Emission Reduction Scenarios of Indonesia in 2030

No	Sector	GHG Emission Level in 2010	The Projection of GHG Emission Level in 2030 ($MtCO_2e$)			The Projection of GHG Emission Reduction in 2030			
		$MtCO_2e$	BaU	CM1	CM2	$MtCO_2e$		% Total BaU	
						CM1	CM2	CM1	CM2
1	Forestry*	647	714	217	64	497	650	17.2%	23%

No	Sector	GHG Emission Level in 2010	The Projection of GHG Emission Level in 2030 ($MtCO_2e$)			The Projection of GHG Emission Reduction in 2030			
		$MtCO_2e$	BaU	CM1	CM2	$MtCO_2e$		% Total BaU	
						CM1	CM2	CM1	CM2
2	Energy**[1]	453.2	1669	1355	1271	314	398	11%	14%
3	Agriculture	110.5	119.66	110.39	115.86	9	4	0.32%	0.13%
4	Waste	88	296	285	270	11	26	0.38%	1%
5	IPPU	36	69.6	66.85	66.35	2.75	3.25	0.10%	0,11%
	TOTAL	1334	2869	2034	1787	834	1081	29%	38%[2]

Notes:
$MtCO_2e$ = Million metric tons of carbon dioxide equivalent
BaU = Business as Usual
CM1= Counter Measure 1 (unconditional mitigation scenario)
CM2= Counter Measure 2 (conditional mitigation scenario)
IPPU= Industrial Processes and Product Use
*Including peat fires fugitive
**Including fugitive emissions

However, it requires enormous money to achieve Indonesia's emission reduction target in 2030. It is projected that from 2018 to 2030, the financial needs to achieve a 41% reduction of the GHG emission is 247 billion USD, or 19 billion USD annually (Ministry of Environment and Forestry, 2018). Nevertheless, the Indonesian Government is only able to spend a small fraction of the total needs. As reported by the Indonesian Government, the average expenditure per year to respond to climate change in 2018-2020 is 6.83 billion USD (Directorate General of Budget Financing and Risk Management, 2020a). Consequently, there is a vast financial gap since the government expenditure only covers 35.94% of the annual needs.

Furthermore, although the energy sector is the second contributor, it becomes the sector that needs the most prominent investment. This is the case since the energy investment needs must consider population and economic growth factors that influence the final energy consumption (Ministry of Environment and Forestry, 2018). Therefore, it requires huge investment to meet the energy demand following population and economic growth in a way that still allows Indonesia to meet its emission reduction target. According to the calculation, it is estimated that the energy sector

[1] Transportation sector is categorized under the energy sector (Ministry of Environment and Forestry, 2018).
[2] The second BUR that Indonesia submitted to UNFCCC shows a contradictory in terms of conditional mitigation scenario. Indonesia commits to reduce the emission level up to 41% through this scenario but also in the same submission it presents that the actual conditional target only 38%. This contradictory should be clarified by the Government of Indonesia to avoid the confusion (Tacconi, 2018)

requires 236 billion USD, which makes up 95.54% of total financial needs to meet the conditional mitigation scenario in 2030 (*ibid*). This figure is needed to reduce the GHG emission by 398 MtCO2e in 2030. Most of the investment in the energy sector will be allocated to develop renewable energy power plants with a total capacity of 48.9 Gigawatt (GW) and to expand clean technologies (*ibid.*). The financial needs per sector are as follows (Ministry of Environment and Forestry, 2018):

Table 2. Projected Financial Needs from 2018-2030 to Meet the Conditional Target

No	Sector	Financial Needs (in billion USD)
1	Energy	236.214
2	Forestry	5.557
3	Waste	2.907
4	Agriculture	2.164
5	IPPU	0.379
	TOTAL	**247.221**

Due to this shortfall, from the government side, the private entities, until the international institutions attempt to address the funding needs for climate mitigation and adaptation through introducing some innovative financial instruments. As most of the investment in the energy sector should be prioritized in developing renewable energy, the Government of Indonesia has implemented several policies and made public money available to leverage private investment. The first policy is the feed-in-tariff that gives a fixed price that is sufficient for the renewable energy developer to return on investment and provides a grid connection (Bhandary, Gallagher and Zhang, 2021; Yuliani, 2016). There are also fiscal incentives like tax reduction and import duty exemption (Damuri and Atje, 2013). Finally, the government of Indonesia also offers a compensation scheme for the geothermal exploration process (*ibid.*).

Furthermore, some international cooperation and international aid funding is flowing to renewable energy power plants development in Indonesia. For example, the Joint Crediting Mechanism (JCM) between Indonesia and Japan combines the grant from the Government of Japan and the private investment from Indonesian and Japanese corporation (Ichihara and Uchida, 2016). Another example is the Clean Development Mechanism (CDM), which allows developed countries under the Annex I of Kyoto Protocol to create some emission reduction project in developing countries (non-Annex I parties) like Indonesia (Ichihara and Uchida, 2014). The Green Climate Fund (GCF) also offers financing to public and private developers in the geothermal sector, particularly in the early stage of the geothermal project (GCF, n.d.).

Apart from those policies and international support, the Government of Indonesia and the private sector are also looking at funding from green bond and green sukuk markets to finance renewable energy projects. The intention to support sustainable development and seize the opportunity to bring in green investors are two fundamental reasons why both government and private entities issue the green bond and green sukuk in Indonesia (Directorate General of Budget Financing and Risk Management, 2020a; PT SMI, 2020; Star Energy Geothermal Group, 2020). Moreover, in terms of sovereign green sukuk, it also adds state revenue through issuance (Directorate General of Budget Financing and Risk Management, 2020a). It is this sovereign green sukuk that I will focus on in my thesis.

The green bond is a fixed income instrument issued by an institution to raise capital from investors to finance environmental and sustainable development projects (Deschryver and de Mariz, 2020). Meanwhile, the green sukuk is the amalgamation of the green bond and the sukuk concept in which it must comply with both the green bond and the sharia principles (Abdullah and Keshminder, 2020; Anugrahaeni, 2017). The utilization of green sukuk and green bond to fund green projects in Indonesia was pioneered by the Government of Indonesia when they entered the green sukuk market in March 2018 to issue the sovereign green sukuk in the global market (Directorate General of Budget Financing and Risk Management, 2020a). This issuance is also marked as the first global sovereign green sukuk since all previous issuances are categorized as commercial green sukuk (*ibid.*). Not long after, PT Sarana Multi Infrastruktur (PT SMI) – a state-owned enterprise – issued the first commercial and also the first green bond in Indonesia in July 2018 (World Bank, 2018). Currently, the Indonesian sovereign green sukuk's proceeds have been funnelled to hydropower, solar, and bioenergy power plants (Ministry of Finance, 2019; Ministry of Finance, 2020). As renewable energy power plants play an important role to contributing for Indonesia's emission reduction target and to achieving the sustainable development goals in energy sector, this research will assess the implementation of the Indonesian sovereign green sukuk in funding renewable energy power plants in Indonesia.

1.2 Aim

This research has three aims, namely: (1) To assess how the money raised by the Indonesian sovereign green sukuk flows to renewable energy power plants; (2) To identify what barriers that affect the money raised by the Indonesian sovereign green sukuk flows to the renewable energy power projects; and (3) To contribute to the understanding of the possibilities and limitations of the Indonesian Sovereign Green Sukuk to accelerate the renewable energy projects in Indonesia.

1.3 Research Questions

Following the aim of this research, then this study will attempt to answer these research questions:

1. How does the money raised by the Indonesian sovereign green sukuk flow to the renewable energy power plants?

2. What barriers in the issuance, allocation and reporting phases that affect the raising and channeling of money from the Indonesian sovereign green sukuk to the renewable energy power plants?

1.4 Delimitations

According to the Republic of Indonesia Green Bond and Green Sukuk Framework that is created by the Ministry of Finance, the eligible renewable energy project that can be funded by these instruments are hydropower (with the exception for the hydropower plant with capacity > 30 MW), solar, geothermal, wind, tidal, and biomass (Ministry of Finance, n.d.). Meanwhile, based on the Green Sukuk Report 2019 and 2020, the actual use of proceeds of the Indonesian sovereign green sukuk has flowed to hydropower, solar, and bioenergy power plants (Ministry of Finance, 2019; Ministry of Finance, 2020). Therefore, for the purpose of this research and considering time limitation and the actual use of proceeds, this study is delimited to the implementation of Indonesian sovereign green sukuk towards financing hydropower, solar, and bioenergy.

2. Literature Review

2.1 Climate Finance

Climate change poses a very serious threat to human being. Intergovernmental Panel on Climate Change (IPCC) projected that the rise of global temperature more than 1.5°C above pre-industrial level would expose higher risks of extreme weather events, drought, biodiversity loss and ecosystem collapse, climate-related disaster, deterioration of human health, and others social, economic, and environmental problems (IPCC, 2018). Therefore, it requires global actions to tackle this problem as climate change is a global externality since its impacts influence the entire world (Nordhaus, 2019). In this regard, Nordhaus (2019) emphasized the need for strong governance to orchestrate the coordinated action and overcome the potential free-riding by the countries that ignore the impacts of climate change.

In terms of climate governance, the financial aspect emerges as one of the critical themes since the 1990s (Bracking, 2019). Climate finance itself is defined as a "local, national or transnational financing—drawn from public, private and alternative sources of financing—that seeks to support mitigation and adaptation actions that will address climate change" refers to UNFCCC (n.d.). The history of climate finance can be traced back to 1992 during the inception of UNFCCC, when the international policymakers and business leaders envisage how the financial sector facilitates the carbon market (Richardson, 2014).

Moving on to the Fifteenth Session of Conference of the Parties (COP 15) in Copenhagen, it resulted in a bold outcome in mobilizing climate finance under the Copenhagen Accord. Based on this accord, the developed countries agreed to provide 30 billion USD for the period 2010-2012 which will be allocated to adaptation and mitigation action in which the most vulnerable developing countries were prioritized to obtain the adaptation fund (UNFCCC, 2009). Furthermore, the developed countries also promised to mobilize 100 billion USD per year by 2020 to help developing countries address climate change, as stated in the Copenhagen Accord (*ibid*.). The sources of finance will come from various origins such as public, private, bilateral, multilateral and other alternative sources of funding *(ibid.)*.

However, according to the Independent Expert Group on Climate Finance (2020) that mandated by the United Nations Secretary-General, the 100 billion USD target per year would not be reached in 2020. Furthermore, it also must be noted that the pandemic of covid-19 leads governments around the world to prevail emergency relief over Paris Agreement objectives (Obergassel, Hermwille and Oberthür, 2020). Therefore, developing countries like Indonesia need to find many innovative financial instruments since there is an urgency to take immediate action in addressing climate change. In this regard, due to the raising of climate awareness among investors, the issuance of the green bond can be an option to raise the money for funding the adaptation and mitigation projects (Banga, 2019).

Apart from the raising finance side, the spending side also must be put into attention. It is significant to ensure the spending of the climate finance budget can achieve maximum result in addressing climate change (Steckel et al., 2017). Fankhauser and Burton (2011) emphasized that climate finance spending should meet these criteria, which are efficient through achieving the lowest possible cost, effective in reducing the adverse impacts of climate change, and equitable in targeting the countries and population groups to be assisted. In terms of ensuring that the climate finance is effectively spent, Climate Policy Initiative emphasized proper monitoring, reporting, and verification (MRV) system to tracking the climate fund from the sources to recipients (Climate Policy Initiative, 2011). This MRV system should offer an integrated, consistent, and comprehensive framework to compile the climate finance flows, including the effectiveness of the use of available climate finance (*ibid*.).

It must also be noted that estimating the financial needs to address climate change is a challenging task since it can be varied between one with other approaches (Smith et al., 2011). On the other hand, reckoning the total climate finance that has also mobilized is an intricate task as well since one to other studies can use a different approach (*ibid*.). Consequently, Smith et al. (2011) suggested the strong coordination between development and climate change funding to optimize using these available funds to get maximum benefit in tackling climate change. They also encourage developing countries to establish a national funding entity that can coordinate these funds from domestic and international sources (Smith et al., 2011). Lastly, if possible, the flows of international climate finance should be beneficial not only to address climate change issues but also to contribute to a broader dimension like promoting sustainable development (Steckel et al., 2017).

2.2 Green Bond

Recently, the attention on green bonds is rising due to the increasing trend of the transition to the low-carbon economy. The green bond itself is a fixed income instrument issued by an institution to raise capital from investors to finance environmental and sustainable development projects (Deschryver and de Mariz, 2020). As a fixed income, the issuer pays a fixed interest to its investors until the bond reaches the maturity date (Fabozzi, Ferri, and Mann, 2012). At the maturity date, the issuer also redeems the principal of the bond to the investors (*ibid*).

According to the Green Bond Principles by International Capital Market Association (ICMA) that gives voluntary guidelines in the green bond issuance, there are four key components, namely (ICMA, 2018):

1) Use of Proceeds

   It stipulates the utilization of the proceeds of the green bond to the green projects. The green projects that eligible to receive the money from the green bond are the projects that can provide environmental benefits in which these benefits can be assessed and quantified by the issuer. The example of the eligible sectors for the green projects are as follows but not limited to: renewable energy, green building, clean transportation, terrestrial and aquatic biodiversity conservation, energy efficiency, pollution prevention and control, and climate change adaptation.

2) Process for Project Selection and Evaluation

   The green bond issuer should give transparent information to its investors regarding the issuer's environmental objectives and how the issuer manages the selection and evaluation process of the eligible green projects.

3) Management of Proceeds

   It stipulates the green bond issuer to ensure the implementation of the management of proceeds in a transparent manner.

4) Reporting

   The green bond issuer should make an annual report regarding the total allocation of the green bond to the green projects, the description of the green projects, and the expected environmental impact from these projects.

The history of the green bond began when European Investment Bank (EIB) inaugurated the Climate Awareness Bond in July 2007 with a total of EUR 600 million, in which the proceeds flowed to energy efficiency and renewable energy projects (Deschryver and de Mariz, 2020). Then, in 2008 the first green bond labelled as such was issued by the World Bank 2008 (*ibid*). Meanwhile, five years later the first, commercial green bond was introduced in the world by Vasakronan (one of the largest Swedish property companies) in partnership with Skandinaviska Enskilda Banken (SEB) in which they issued SEK 1.3 billion in November 2013 (*ibid.*). The issuance of green bond has rapidly grown through the years, and by 2019 it reached the new record at 257.7 billion USD from 1788 green bond that issued by 496 issuers in which 250 of them were new issuers (Climate Bonds Initiative, 2020). This remarkable growth in recent years has indicated the rise of global awareness of green investments. The green bond issuances throughout the world during the period of 2015-2019 can be seen in the following figure:

Figure 1. Total Amount of Green Bond Issuances in the World 2015-2019 (in billion USD)

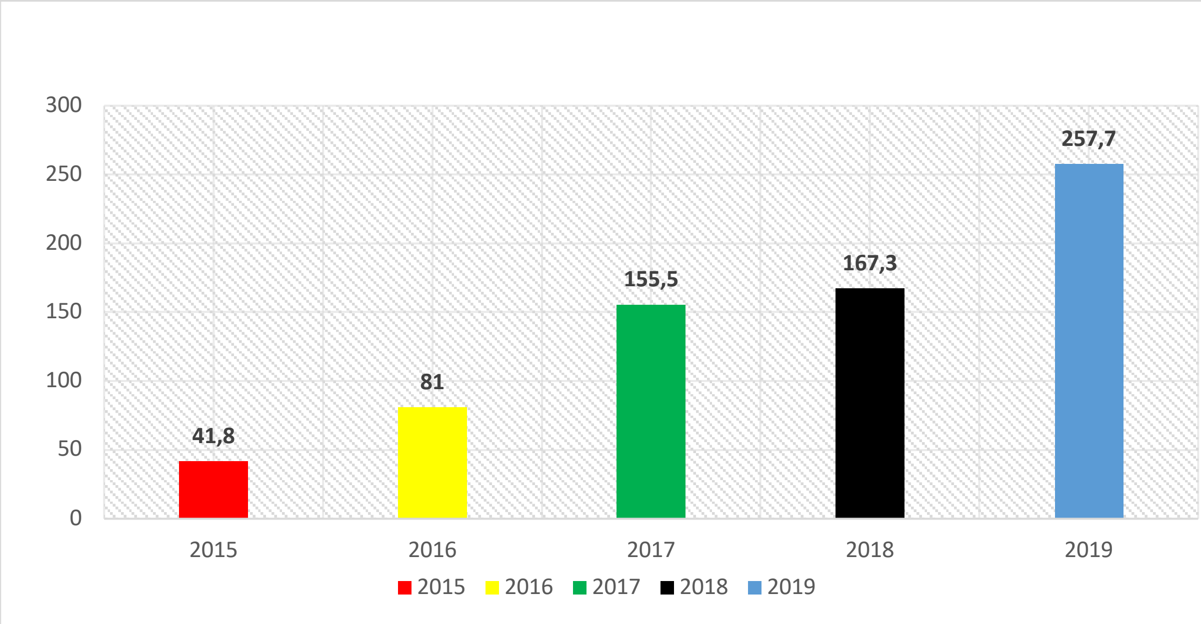


Fig. 1. This figure shows the data of the total amount of green bond issuances according to the study from Climate Bonds Initiative (Climate Bonds Initiative, 2016; 2017; 2018; 2019, 2020).[3]

However, despite this remarkable growth, most of these issuances were performed in developed countries (Climate Bonds Initiative, 2020). The developing countries are more likely to suffer from some of the worst impacts of climate change since they have a strong reliance on climate-dependent natural resources, lack of infrastructure, and lack of finance to conduct the adaptation and mitigation activities on climate change (McSweeney et al., 2010).

Regarding this low achievement in terms of the total amount of green bonds in developing countries and considering Indonesia is still categorized as a developing country, then it will highlight some barriers that obstruct the development of green bond in developing countries from several studies as a basis of an analytical framework. First of all, it occurs in institutional barriers. According to a study from Banga (2019), many developing countries do not have sufficient competence to monitor and assess the proceeds of the green bond. These skills are required to ensure that the green projects comply with the green bond principles throughout the project's lifecycle. Then, the lack of coordination and different priorities between the ministries or agencies

[3] The Climate Bonds Initiative categorizes both of green sukuk and green loan as green bond in their study (Abdullah and Keshminder, 2020).

within a developing country in formulating and executing the policy also hinder the development of the green bond (Banga, 2019).

The second barrier is from the political aspect. In their paper, Obradovich and Zimmerman (2016) asserted that political interest influences the decision-making process in determining what kind of climate policies that will be applied. Furthermore, sometimes the politicians tend to direct climate finance to be allocated to the project that can give them personal benefit, especially in winning the election (Obradovich and Zimmerman, 2016). Subsequently, the projects that popular among the voters are preferred instead of the much-needed programs to address climate change (*ibid.*).

The third barrier comes from the market barrier. Banga (2019) identifies the three substantial market barriers in developing countries that curb the green bond progress in developing countries. These market barriers are the currency of issuance, the concern on minimum issuance size, and the high transaction cost related to the green bond issuance (*ibid.*)

Regarding the currency of issuance, when a developing country needs to raise capital from the international financial market, it is likely that they need to issue in international currency instead of its national currency (Banga, 2019). According to Banga (2019) study on the data from the Climate Bonds Initiative, the three majorities of currencies used were Renminbi, USD, and Euro. Therefore, developing countries face fluctuation issues when they issue bonds in international currency. In this regard, using a currency hedging on the green bond can be a better option to minimize the risk of currency exposure (Schmittmann, 2010).

In terms of concern on minimum issuance size, some developing countries can only issue the green bond in small amount which can be a problem since some of the reputable rating agencies set 250 million USD as the minimum threshold to be qualified in the index inclusion (Chiang, 2017). Moreover, issuance size also matters for the major green bond purchasers such as Merrill Lynch, Credit Agricole, Morgan Stanley, Goldman Sachs and co, BNP Paribas, SEB and so on (*ibid.*). Meanwhile, regarding the high transaction cost related to the green bond issuance, it becomes the case for the small green bond issuers since it requires a high cost to obtain a green label certification and get a review from the allocation of the green bond proceeds (Banga, 2019).

The fourth barrier lies in the legal aspect. A robust regulatory framework and a stable judicial system are critical to bringing legal certainty for both issuers and investors of bonds (WEF, 2015). Moreover, a well-functioning legal system offers legal protection for investors rights when they lend their money through the green bond market (Yamahaki et al., 2020). Apart from a solid regulatory and judicial system, it is also expected that the legal regime can evolve to meet the development of the green bond markets (WEF, 2015). However, many developing countries need to improve their legal framework and their judicial system to facilitate and protect the rights of both issuers and investors of a green bond.

The fifth barrier occurs in the debate whether the green bond should refinance the existing project or not. Some people who resist using the green bond proceeds for refinancing the green projects argue that it gives no additional benefit to the environment since it only funding the existing ones (Bongaerts and Schoenmaker, 2019; Chiang, 2017). Moreover, some people also think that it is a kind of greenwashing form (*ibid.*). On the other hand, some people who back the refinancing idea argue that it can raise awareness of environmental issues (Chiang, 2017). Furthermore, it also increases the green bond supply in the market (*ibid.*). Therefore, the transparency aspect about all aspects, particularly the environmental benefit aspect of the green projects that refinanced by the green bond, should be implemented to mitigate the concerns of the investors (*ibid*).

Overall, these barriers can be varied in each developing country since it depends on the current condition and the future projection in each country. However, apart from these heterogeneous circumstances, all of these barriers should be overcome to unleash the green bond's potential in contributing to the development of the green projects in developing countries, particularly in helping the global efforts in anticipating and combating the adverse impacts of climate change.

2.3 Green Sukuk

Similar to the green bond, the popularity of the green sukuk also emerges in recent years. The green sukuk itself is the amalgamation of the green bond and the sukuk concept in which it must comply with both the green bond and the sharia principles (Abdullah and Keshminder, 2020; Anugrahaeni, 2017). It took a decade long after the introduction of the green bond when Tadau Energy Sdn Bhd from Malaysia became the pioneer by issuing the first green sukuk (and also remarked as the first commercial green sukuk) in the world on 27 July 2017 by MYR 250 million (equal to EUR 51 million according to the currency rate) for financing a 50 MW solar photovoltaic power plant project (Abdullah and Keshminder, 2020; World Bank, 2020). Then, not long after, the Government of Indonesia jumped on the bandwagon by launching the first global sovereign green sukuk on 1 March 2018 through USD 1.25 billion issuances (Ministry of Finance, 2019).

Green sukuk as a sukuk variant or an Islamic bond has two characteristics that distinguishes them from conventional bonds. These distinctive features are the presence of an underlying tangible asset that entitles to the sukuk, and the prohibition to impose interest due to it strictly prohibited in the sharia (or Islamic law) principles (Anugrahaeni, 2017). Instead, the returns on the sukuk rely on the performance of the underlying assets (Zakaria, Md Isa and Abidin, 2012). Then, as the green sukuk also follows the green bond principles, it proceeds are channelled to environmentally sustainable projects (World Bank, 2020). Based on its characteristics, the green sukuk can reach all type of investors compared to other types of bonds. These investors types consist of conventional investors, the sharia-compliant investors, the green investors, and the green sharia-compliant investors (*ibid.*).

Although its popularity has risen recently, the total issuance of green sukuk in the world is relatively small. According to Jivraj (2020) that using data from Climate Bonds Initiative, from the total issuance of USD 257.7 billion of the green bond in 2019, the green sukuk issuance only accounted for USD 3.1 billion or equal to 1.2 % of the total issuance of the green bond. Regarding this small contribution, there are some possible challenges that hamper the development of the green sukuk. In general, some challenges are similar to the challenges that faced by the green bond. Moreover, as the green sukuk is relatively new, consequently the study on the green sukuk still limited. From several studies that focus on the barriers that faced by the green sukuk, here are the challenges. Firstly, some financial institutions in developing countries still not differentiate between green and non-green assets (World Bank, 2020). Secondly, the lack of pricing incentives (Karina, 2019). Thirdly, there is a long gap between the date completion of the green project and the maturity of the sukuk (*ibid*.). Fourthly, a higher cost in issuing green sukuk (World Bank, 2020). Fifthly, lack of environmental, social, and governance (ESG) standards among issuers (Jivraj, 2020). Sixthly, the size of secondary market for trading green sukuk still relatively small (World Bank, 2020). These challenges should be addressed in order to optimize the contribution of green sukuk in financing green and sustainable projects.

2.4 Sovereign Green Sukuk

Similar to the commercial green sukuk, the sovereign green sukuk is relatively new since it was first issued in 2018 when the Government of Indonesia launched the global sovereign green sukuk on 1 March 2018 for USD 1.25 billion with five years tenure (Ministry of Finance, 2019). At that time the proceeds from this issuance flowed to five sectors which were sustainable transportation, energy efficiency, renewable energy, waste to energy and waste management, and resilience to climate change for disaster risk areas (Ministry of Finance, 2019). Moreover, it is not only the sovereign green sukuk that still has young age, but also the sovereign green bond which firstly issued two years before when Poland introduced its sovereign green bond in December 2016 with EUR 750 million (Nordea, 2020).

As a sovereign bond, this financial instrument is issued by the government institution in which the payment of the bond is guaranteed as well by the government (Dittmar and Yuan, 2008). Furthermore, due to its characteristics that comply with the green bond and sukuk principles, then the sovereign green sukuk as a bond issued by a government entity in accordance with the green bond and sukuk principles (Noronha, 2020).

Currently, only the Government of Indonesia has ever issued the sovereign green sukuk.

Meanwhile, the sovereign green bond has been issued by sixteen different countries with total issuances exceeding USD 80 billion (OECD, 2020). These issuer countries are Belgium, Chile, China (Hong Kong), Fiji, France, Germany, Hungary, Indonesia, Ireland, Korea, Lithuania, Netherlands, Nigeria, Poland, Seychelles, and Sweden (*ibid.*). In this regard, OECD categorizes the issuance of the Indonesian sovereign green sukuk as a sovereign green bond. So, if the sovereign green sukuk is differentiated from the sovereign green bond, only fifteen countries have issued the sovereign green bond.

The study on sovereign green sukuk is limited since it was first issued in 2018. There are, however, some studies that have identified challenges for the sovereign green sukuk. First of all, as it is issued by the government, strong coordination and political will from the government agencies that involved are necessary (World Bank, 2020). For instance, in terms of the use of proceeds, the Ministry of Finance needs to cooperate with the ministry for energy for the renewable energy projects. On the other example, in funding the forestry projects, the involvement of the ministry that handle the forestry sector is mandatory. Second, the lack of capacity in identifying the green and non-green projects (*ibid.*). Thirdly, a higher cost in issuing green sukuk should be considered since there is a need to make a green framework and also to hire an external reviewer to give the second opinion (*ibid.*). Fourthly, there is a risk of green default or the change of status when the underlying projects or the use of proceeds is no longer in accordance with green bond principles if there is no sufficient legal basis to protect the investor rights particularly the investors that have green motives (Directorate General of Budget Financing and Risk Management, 2020a; Yamahaki et al., 2020). Lastly, similar to green bond, it should be noted the possibility of the money flows to refinance the existing project. Some investors consider this as something that does not give new benefit to the environment since it finances the existing green projects (Bongaerts and Schoenmaker, 2019; Chiang, 2017).

2.5 Analytical Framework

This analytical framework is developed from the barriers that are found during the literature review on the green bond, the green sukuk, and the sovereign green sukuk. Considering that the green sukuk is a variant of the green bond which complies to both of green bond and Islamic principles and since the study of green sukuk still limited, then this analytical framework will incorporate the barriers in both of the green bond and the green sukuk.

Since the green bond principles do not give reference what kind of phases that must be passed in issuing the green bond (ICMA, 2018), then I set three phases that I think represent the green bond process in many issuance practices. These phases are the issuance phase, the allocation phase, and the reporting phase. The division of these phases is implemented to help the analysis process especially in mapping the location of barrier in each phase. The summary of analytical framework can be seen in the table 3:

Table 3. Analytical Framework for Green Sukuk

PHASE	TYPE OF BARRIERS	SUB-BARRIERS	EXAMPLES	LITERATURE
Issuance Phase	Institutional	Coordination between Ministries	Lack of coordination between ministries and/or state agencies with different responsibilities and priorities	Banga, 2019
		Environmental, Social, and Governance (ESG) Standard	Lack of environmental, social, and governance (ESG) standards among issuers	Aassouli et al., 2018; Jivraj, 2020
		Green Project Identification	The lack of competence in differentiating between green and non-green assets for underlying assets	World Bank, 2020
		The Commitment of National Determined Contributions (NDC)	The strength of NDC influences the issuance size	Tolliver, Keeley and Managi, 2020
		The Quality of Governance	Weak corporate governance	WEF, 2015
		Underlying Asset	It requires enough assets to be underlying for the green sukuk issuances	Suroso et al., 2020
	Market	Cost of Issuance	The high transaction cost to obtain green label certification	Banga, 2019
		The currency of issuance	The currency risk when issuing the green bond in international currency	
		The Minimum of Issuance Size	Some green bond underwriters only attracted to the large size issuance	
	Legal	Regulatory Impediments	The existing regulation that no longer can support the market needs.	WEF, 2015
	Political	Political Priorities	Lack of intention in addressing climate change program	Obradovich and Zimmerman, 2016
		Political Instability	A higher chance of the change of policies due to political instability	WEF, 2015
	Economic	Macroeconomic Condition	The macroeconomic condition influences the issuance size.	Tolliver, Keeley and Managi, 2020
		Financial Incentives	The lack of financial incentives	Karina, 2019; World Bank, 2020

PHASE	TYPE OF BARRIERS	SUB-BARRIERS	EXAMPLES	LITERATURE
Allocation Phase	Institutional	The Quality of Governance	Lack of competence to monitor and to assess the proceeds	Banga, 2019
		Coordination between Ministries	Lack of coordination between ministries and/or state agencies with different responsibilities and priorities	
	Legal	Protection of Investor Rights	An inadequate legal and judicial system to protect investors	Yamahaki et al., 2020
	Political	Political Will	The politician that direct the allocation of climate finance for their benefit	Obradovich and Zimmerman, 2016
		Political Instability	Political instability may influence the follow- up of the allocation of the green bond	Yamahaki et al., 2020
	Economic	Economic Instability	The economic instability that increases the risk to invest in the green bond	WEF, 2015
	Technology	Low Carbon Technologies	Some low-carbon projects rely on the new technologies in which some of these new technologies are more expensive and still under development	Yamahaki et al., 2020
	Other	Refinancing Green Projects	Refinancing of the established projects that give no additional benefit to the environment	Chiang, 2017
Reporting	Institutional	The Quality of Human Resources	The capacity to assess and to estimate the impact of the projects	Banga, 2019
		Data Accuracy	The lack of accuracy due to the lack of relevant and reliable data	Mynhardt, Makarenko and Plastun 2017
		Measurement, Reporting, and Verification (MRV) System	The insufficient quality of the indicators (e.g. reliability and validity) and the lack of standardization which creates a gap between one to another report	
	Legal	Harmonization of Regulation	The lack of harmonization between the regulatory framework	
	Other	Cost of Review	The additional cost to hire the external reviewer and auditor	

3. Methods

3.1 Literature Review

The literature review in chapter 2 was carried out to examine the existing research on the same topic (Bryman, 2012). In applying for the literature review in this study, most of the sources were selected from those published within the last five years. Meanwhile, older sources were also used if they are still relevant to this study or there are no newer sources.

Through literature review, an analytical framework is produced by identifying related themes. It also provides an overview of what aspects are knowns in the green bond and the green sukuk from previous research. Through comparing the existing research with the findings from the case that I study, it gives fruitful insights about what still relevant or irrelevant from previous studies and the new knowledge that has not yet been studied or found in the previous research.

3.2 Research Design

This research employs an exploratory single case study design. According to Yin (2018), a case study can be used to investigate "a contemporary phenomenon in depth and within its real-world context especially when the boundaries between phenomenon and context may not be clearly evident." Meanwhile, Streb (2010) stated that "the exploratory case study investigates distinct phenomena characterized by a lack of detailed preliminary research." With these definitions, an exploratory case study is a relevant research design for this study because of the lack of study in the sovereign green sukuk since it is relatively new.

The case study in this thesis is the sovereign green sukuk in Indonesia. In this case, I mainly focus on the governmental process for issuing and managing the sovereign green sukuk, particularly in channelling the money from this sovereign green sukuk to renewable energy projects. The further detail of this case study will be explained in chapter 4.

3.3 Data Collection

This study uses both primary and secondary sources. The primary sources originated from the interviews and the regulations. The detail of the interviews will be explained in sub-section 3.3.1. Meanwhile, regarding the regulations, I only looked for the regulations that stipulate Indonesian sovereign green sukuk and renewable energy power plants to know how this case should have been implemented from the legal aspect. These regulations are obtained from the ministries and the state agencies official website.

In terms of secondary data, I utilized various sources. Firstly, I utilized scientific articles that discuss green sukuk, the green bond, the Indonesian sovereign green sukuk, and climate finance.

These sources provide a better understanding of the related theory and conceptual. Secondly, I used official government data, government reports, international organization reports, civil society organization reports, news, and any other relevant information. In using these sources, I delimited to the relevant sources related to the implementation of Indonesian sovereign green sukuk in funding the development of renewable energy power plants. These sources were used to complement data from above sources and to enrich the study.

Both analysis method of these primary and secondary sources will be explained in section 3.4.

3.3.1 Interviews

All interviews were conducted through the semi-structured interviewing method. According to Barlow (2010), this method can expand the researcher's understanding of specific topics by exploring respondents' experiences through the evolved questions from the questions prepared before. The informants consisted of the related stakeholders involved in the issuance, the allocation, and the reporting process of the Indonesian sovereign green sukuk. From them, I can get findings based on their concrete experiences in implementing the sovereign green sukuk. Apart from these stakeholders, I interviewed the respondents who work for civil society organizations in this field since their opinions can enrich the perspective for this study. All of the participants are based in Indonesia.

All interviews were carried out in a range of 1 month from 22 March 2021 until 15 April 2021. Since the answers from all interviewees also represent their organization's view, I sent the official letters about the interview request to most of them. Meanwhile, for the informants that I know closely, I just asked them through informal request. In terms of the platform for the interview, I used Zoom and Whatsapp platform. The interviews took 30 – 90 minutes. Zoom was utilized to perform a video interview. All videos were recorded with the consent of every participant. Whatsapp was utilized when I had follow-up questions from a previous video interview in which I asked the participants through Whatsapp chat. The consent also applied in the chat interview. The language used in the interviews was the Indonesian language as the Indonesian language is the first language of all interviewees. For the purpose of this research, all statements and quotes used for this thesis were displayed in the English language after translating it from the Indonesian language. The details of the interviewees and their relevancy in this study can be seen on the following page:

Table 4. List of Interviewees

NO	INTERVIEWEES	POSITION	DIRECTORATE	INSTITUTION	RELEVANCY	DATE OF INTERVIEW
1	Joko Tri Haryanto	Senior Analyst	Center for Climate Finance and Multilateral Policy	Ministry of Finance	His directorate has a role in establishing the Republic of Indonesia Green Bond and Green Sukuk Framework, processing the climate budget tagging data, and formulating the sovereign green sukuk impact report	22 March 2021
2	Manggiarto Dwi Sadono	Head of Section of Instrument Development and Sharia Compliance and Legal Documents of Sovereign Sukuk	Directorate of Islamic Financing	Ministry of Finance	Their directorate has a role in selecting the projects for underlying assets and the projects that will be funded by the sovereign green sukuk, in issuing the sovereign green sukuk and in formulating the sovereign green sukuk impact report. The policies of Indonesia sovereign green sukuk also formulated by this directorate	25 March 2021 (the interview took place at the same time with both of them)
3	Mochammad Rama Septianto	Analyst				
4	Dicky Edwin Hindarto	Chairman of Board of Supervisors	-	Green Partnership Foundation	To obtain input and perspective from civil society organization in climate change, renewable energy, and green sukuk issues	30 March 2021
5	Debi Nathalia	Technical Associate for Climate Finance	Innovative Financing Lab	United Nations Development Programme (UNDP)	UNDP Indonesia has been working closely with Ministry of Finance (including with Center for Climate Finance and Multilateral Policy and Directorate of Islamic Financing) in developing the Indonesian Sovereign Green Sukuk since the first issuance until now	5 April 2021 (the interview took place at the same time with both of them)
6	Mariska Adeline Sukmajaya	Sustainable Finance Associate				
7	Shelty Julia	Analyst	Directorate of Various New Energy and Renewable Energy	Ministry of Energy and Mineral Resources	Her directorate is responsible for making policies in micro and mini hydro power plants and solar power plants and also for building these power plants from the money that raised by the sovereign green sukuk	6 April 2021
8	Elis Heviati	Coordinator of Investment and Cooperation of	Directorate of Bioenergy	Ministry of Energy and Mineral	Their directorate is responsible for making policies in bioenergy power plants and also for building these power plants from the	9 April 2021 (the interview took place at

NO	INTERVIEWEES	POSITION	DIRECTORATE	INSTITUTION	RELEVANCY	DATE OF INTERVIEW
		Bioenergy		Resources	money that raised by the sovereign green sukuk	the same time with three of them)
9	Sigit Haryanto	Sub-coordinator of Environmental Sector of Bioenergy				
10	Fitria Yuliani	Sub-coordinator of Bioenergy Investment				
11	Fabby Tumiwa	Executive Director	-	Institute for Essential Services Reform	To obtain input and perspective from civil society organization in climate change, renewable energy, and green sukuk issues	9 April 2021
12	Wisnu Adipurwoko	Analyst	Directorate of Energy Conservation	Ministry of Energy and Mineral Resources	To obtain information on how the climate budget tagging scheme and the reporting of the impact assessment of renewable energy projects are performed in the renewable energy power plants established by the ministry energy and mineral resources	15 April 2021
13	Istiana Maftuchah	Senior Analyst	Directorate of Multilateral Affairs	Financial Services Authority	To obtain information on how the Indonesian Financial Services Authority regulates the issuance of green bond in the financial services sector in which this information will be used as a benchmark in comparison with the regulation in sovereign green sukuk	8 May 2021
14	Fauziah Rizki Yuniarti	Islamic Economics Lecturer and Researcher	Faculty of Economics and Business	Universitas Indonesia	To obtain input and perspective from an academician that study about sukuk (including the Indonesian Sovereign Green Sukuk)	11 May 2021

3.4 Data Analysis

In analysing the data, I utilized several methods. In answering the first research question, I implemented data triangulation. According to Bryman (2012), triangulation is carried out using more than one method or more than one source to understand the social phenomena. It is also implemented through cross-checking different sources (*ibid.*). In applying triangulation to answer the first research question, I combined primary and secondary sources mentioned in section 3.3 to understand and analyse the business process from the issuance until the reporting stage. Meanwhile, in analysing the regulations, I employed the IRAC method, the acronym of Issue, Rule, Analysis, and Conclusion (Bittner, 1990). In this case study, the implementation of this method was started by identifying the issue of the case. After that, I looked for the relevant rules and implemented them to the issue for drawing a conclusion (*ibid.*).

In terms of the second research question, I employed thematic analysis. Braun and Clarke (2006) defined thematic analysis as a "method for identifying, analyzing and reporting themes within data." Braun and Clarke (2006) also stated that thematic analysis has an advantage in its flexibility, including data collection and research questions. In this research, I analyzed every quote from the interview participants containing information about the barriers mentioned in the analytical framework. Then these quotes have been grouped into themes and sub-themes. In summary, I adopted and implemented six key phases in thematic analysis from Braun and Clarke (2006) to analyze data for answering the second research question, in which the implementation of these six phases can be seen in the following table:

Table 5. The Implementation of Six Phases Analysis from Braun and Clarke (2006)

NO	PHASES	IMPLEMENTATION
1	Familiarizing with data	Transcribing the interviews, reading and re-reading the transcripts, highlighting quotes and noting down the initial ideas
2	Generating initial codes	Developing coding framework, collating data relevant to each code
3	Searching for themes	Identifying and arranging codes into potential themes
4	Reviewing themes	Checking and reviewing the themes
5	Defining and naming themes	Ongoing analysis to define and name the respective themes
6	Producing report	Final analysis, related back to research questions and literature, producing the report of the analysis

.

3.5 Ethical Considerations

According to Diener and Crandall (1978; in Bryman 2012), four principles must be followed in conducting social research: avoid harming the participants, ensure informed consent, respect privacy, and avoid deception. I implemented these principles from the data collection until writing the final report. Since the participants represent their organizations, I also asked the participant to inform me about their answer representing their organization's views and their responses that reflect their personal opinions.

4. Case Study Context:

In this chapter I will provide some contextual information on sovereign green sukuk issuances to date. Through providing some contextual information, it gives an overview on the latest progress of the sovereign green sukuk issuances and the flow of its money from these issuances.

4.1 Sovereign Green Sukuk Issuances

The site of this case is Indonesia as the only country to date which has issued the sovereign green sukuk. After the first launch in 2018, overall, the Government of Indonesia has issued five sovereign green sukuks with a total USD 3,23 billion (Hadiningdyah, 2020). It consisted of three global issuances and two domestic issuances (*ibid.*). The details of these issuances are as follows (World Bank, 2020; Directorate General of Budget Financing and Risk Management, 2019; Directorate General of Budget Financing and Risk Management, 2020b):

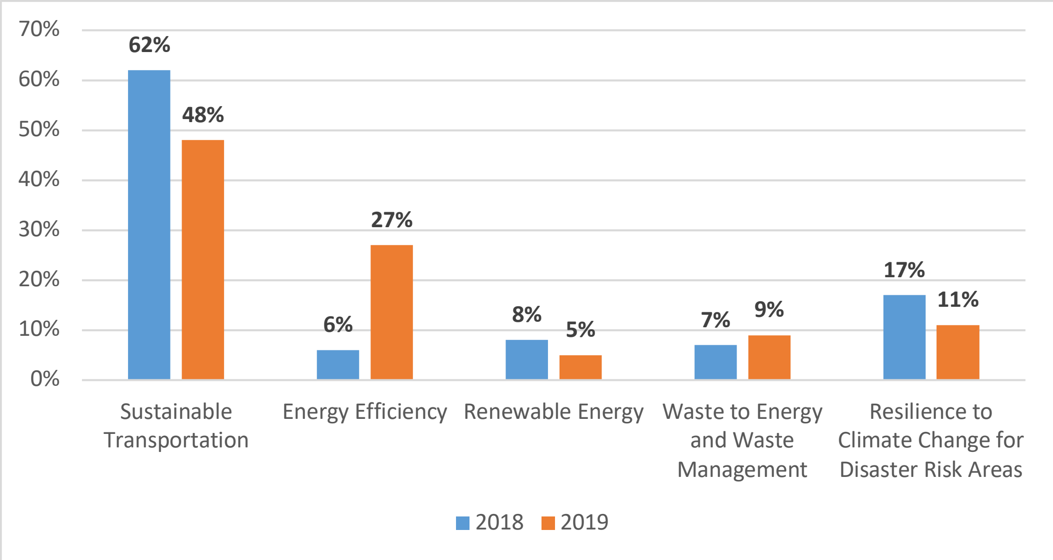
Table 6. List of Sovereign Green Sukuk Issuances 2018-2020

No	Issuer	Currency	Amount Issued (in Million)	Amount Issued (in Million USD)*	Issue Date	Market	Sector
1	Republic of Indonesia (SBSN INDO III)	USD	1250	1250	1 Mar 2018	Global	Green Projects
2	Republic of Indonesia (SBSN INDO III)	USD	750	750	20 Feb 2019	Global	Green Projects
3	Republic of Indonesia (ST-006)	IDR	1,459,880	103.03	28 Nov 2019	Domestic	Green Projects
4	Republic of Indonesia	USD	750	750	17 Jun 2020	Global	Green Projects
5	Republic of Indonesia (ST-007)	IDR	5,421,257	380.84	2 Des 2020	Domestic	Green Projects
		Total		**3,233.87**			

*Based on the currency rates as the date of issuance

At that time, the proceeds from this issuance have flowed to five sectors: sustainable transportation, energy efficiency, renewable energy, waste to energy and waste management, and resilience to climate change for disaster risk areas (Ministry of Finance, 2020). Most of the proceeds are allocated for sustainable transportation projects. Meanwhile, the renewable energy only accounted for 8% and 5% in 2018 and 2019, respectively. The detail of allocation can be seen in the following chart (Ministry of Finance, 2020):

Figure 2. The Indonesian Sovereign Green Sukuk Allocation in 2018 and 2019



In my study I focus on the connection of the sovereign green sukuk to the renewable energy power plant projects that is eligible to be funded by the issuance of this sukuk.

5. Results

This chapter comprises the results from data analysis in three main sections. Firstly, I will address the first research question which is how does the money raised by the Indonesian sovereign green sukuk flow to renewable energy power plant projects in section 5.1. Secondly, I will address the second research question which is what kind of barriers in the issuance, allocation, and reporting phases influence the raising and channeling of money from the Indonesian sovereign green sukuk to renewable energy power plant projects in section 5.2. Lastly, in section 5.3, I will discuss the barriers in more detail thematically.

5.1 Results on the Business Process of the Issuance and the Allocation of the Indonesian Sovereign Green Sukuk

This section presents the findings on how the money that is raised by the Indonesian sovereign green sukuk flows to the renewable energy power plant projects to answer the first research question. In analyzing, I utilize data triangulation as mentioned by Bryman (2012). Through triangulation, I use more than one source of data which are regulations and documents to understand the business process from the planning stage until the reporting stage. I also use the data from the interviews to cross-checking the findings from the regulations and documents. Due to the limitation of the page width, this business process will be explained in two parts: the issuance and the allocation process of the Indonesian sovereign green sukuk and the business process of money flow from the Indonesian sovereign green sukuk to the renewable energy project power plants.

5.1.1 The Issuance and the Allocation Process of the Indonesian Sovereign Green Sukuk

This sub-section explains the issuance process of the Indonesian sovereign green sukuk in general. From my study, I conclude that there are three main frameworks that determine the issuance and the allocation process of the Indonesian Sovereign Green Sukuk. These frameworks are explained in the following table:

Table 7. Framework of the Issuance and the Allocation Process of the Indonesian Sovereign Green Sukuk

THE STATE BUDGET	LAW NO. 19/2008 CONCERNING SOVEREIGN SUKUK AND THE GOVERNMENT REGULATION NO. 56/2011 CONCERNING PROJECT FINANCING THROUGH SOVEREIGN SUKUK ISSUANCE	THE REPUBLIC OF INDONESIA GREEN BOND AND GREEN SUKUK FRAMEWORK
Relations		
Sovereign sukuk is part of debt financing in the Indonesian State Budget. Therefore, the process of the issuance and the allocation must also follow the state budget cycle.	This law and this government regulation are the legal basis that stipulates the governance of the project financing through the issuance of Indonesian sovereign sukuk issuance including through the issuance of the Indonesian sovereign green sukuk.	It becomes the main reference in the issuance and the allocation of Indonesian sovereign green sukuk. This framework consists of four fundamental elements namely use of proceeds, process for project evaluation and selection, management of proceeds, and reporting.
Binding Status		
Legal binding	Legal binding	Non-legal binding
Validity Period		
• It changes every year depends on the review process and the mutual agreement between the President (the Government of Indonesia) and the House of Representatives; • In terms of the House of Representatives do not approve the draft of the state budget, then the Government of Indonesia must use the state budget of the preceding year (The 1945 Constitution of the Republic of Indonesia).	Until these regulations are revoked by the new regulations	Until this framework is changed by the new framework

In general, the governance of the Indonesian sovereign green sukuk refers to the Law No. 19/2008 on Sovereign Sukuk. This law gives a legal basis to finance every activity under the state budget that complies with the sharia principle. Since my study focus on the financing of the renewable energy projects, then it also must to comply with the subordinative regulation of the Law No. 19/ 2008 on Sovereign Sukuk which is the Government Regulation No. 56/2011 concerning Project Financing through Sovereign Sukuk Issuance. However, both of these regulations only define and regulate sovereign sukuk in general without mentioning the sovereign green sukuk. Therefore, the Government of Indonesia releases the Republic of Indonesia Green Bond and Green Sukuk Framework that gives the framework for the Indonesia sovereign green sukuk. This framework is not legally binding, but the Government of Indonesia always commit to following this framework during the issuance until the reporting process of the sovereign green sukuk according to Sadono as the Head of Section of Instrument Development and Sharia Compliance and Legal Documents of Sovereign Sukuk of the Ministry of Finance. Then, it must be noted that the sovereign green sukuk is one type of government debt. Hence the issuance and the allocation of the sovereign green sukuk must also follow the state budget mechanism (Directorate General of Budget Financing and Risk Management, 2015).

In terms of the projects that can be funded by the Indonesian sovereign green sukuk, there are 9 eligible sectors which can be supported by this green sukuk. These eligible sectors are as follow (Ministry of Finance, n.d.):

Figure 3. Eligible Sectors for the Indonesian Sovereign Green Sukuk

The Republic of Indonesia Green Bond and Green Sukuk Framework also gives further protocol that must be adhered to in all sectors, but in terms of this research I only display the further protocol for renewable energy sector which can be seen in this table (Ministry of Finance, n.d.):

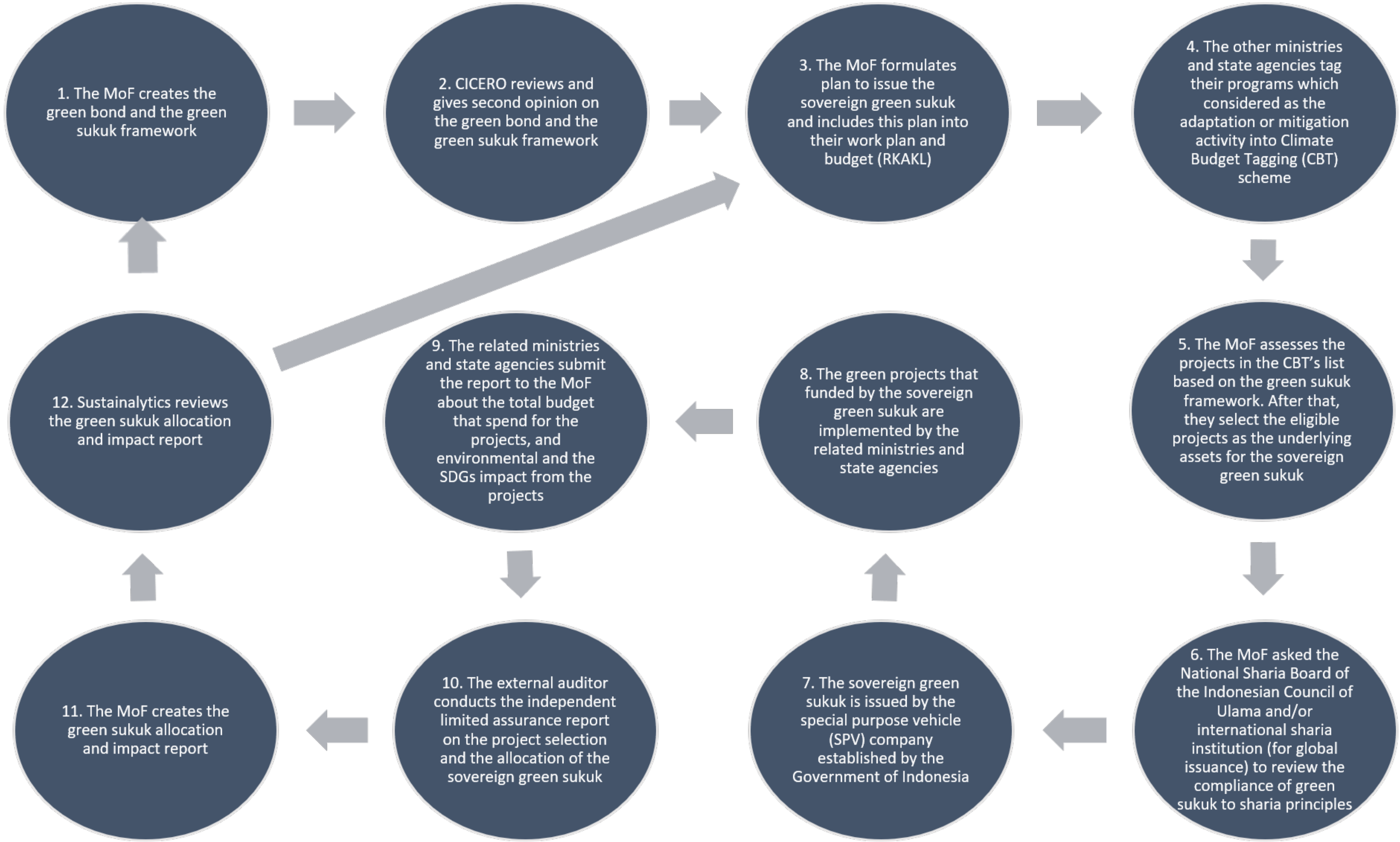
Table 7. Further Details of Renewable Energy Sector in the Eligible Sectors of the Republic Indonesia Green Bond and Green Sukuk Framework

THE SCOPE	RESTRICTION
• Generation and transmission of energy from renewable energy sources such as hydropower, biomass, solar, geothermal, tidal, offshore and onshore wind;	• The exclusion of new fossil fuel based electric power generation capacity and expenditure related to the improvement in the efficiency of fossil fuel based electric power generation;

• Research and development of technology or products for renewable energy generation includes solar panels and turbines.	• The exclusion of the hydropower plants with more than 30 MW capacity; • The exclusion of nuclear power plants and nuclear-related assets.

Regarding the issuance and the allocation process, the flowchart of this process can be seen in the next page (Hanan, 2019; Interviewee Haryanto, Sadono, and Septianto; Sovereign Sukuk Law No. 19/2008; Directorate General of Budget, 2018; Ministry of Finance, 2020d; Ministry of Finance, n.d.):

Figure 4. The Issuance and the Allocation Process of the Indonesian Sovereign Green Sukuk



Notes:
MoF = Ministry of Finance
SDGs = Sustainable Development Goal

Here I will explain some aspects of the flowchart about the issuance and the Indonesian Sovereign Green Sukuk allocation in more detail. Figure four shows the issuance and allocation process of the Indonesian Sovereign Green Sukuk. As the chart shows, the first step is to formulate the green bond and the green sukuk framework by the Ministry of Finance as the issuer. After that, this framework is reviewed by the Center for International Climate Research (CICERO) as the independent assessor, and after that, they produce a second opinion on this framework.

The next important step is the climate budget tagging (CBT). In this step, other ministries and/or state agencies tag their program that considered as adaptation and mitigation activities. Then, the Ministry of Finance selects the programs that will be underlying assets and funded by the green sukuk after they assess it based on the green sukuk framework and the program cost. The limit of the projects that can be selected are determined by the total accumulation of these projects with the total estimation of the revenue from the issuance plans. As the green sukuk also follows the Islamic principle, then it is reviewed and certified by the National Sharia Board of Indonesian Council of Ulama (MUI). Finally, the green sukuk is ready to be issued. The Government of Indonesia appointed the special purpose vehicle (SPV) to execute the issuance process.

Later, the money from the issuance is used for funding the green projects. After completing the projects, the owner of the projects (the ministry and/or state agencies) report the emission and sustainable development goals impact the Ministry of Finance. Next, the Ministry of Finance creates and publishes the green sukuk allocation and impact report. Lastly, this report is reviewed by Sustainalytics as the independent reviewer. In the next issuance, as long as the green sukuk framework still valid or there is no necessity to update the existing framework, then the Government of Indonesia does not need to create a new framework. Therefore, the process can be started by formulating the plan to issue the sovereign green sukuk in the future issuance if the existing framework still can be applied.

There are a few aspects of this process worth mentioning:

❖ <u>The review of the green bond and the green sukuk framework</u>: The framework review is not mandatory. However, the review of CICERO is beneficial to get a good reputation in the green bond market since CICERO is the leading independent reviewer in the green bond (Interviewee Haryanto).

❖ <u>The validity period of the second opinion</u>: The validity period is not mentioned in the second opinion from CICERO for the Republic of Indonesia Green Bond and Green Sukuk Framework. Therefore, I assume that it remains valid as long as the Government of Indonesia does not want to change its existing framework. In this regard, I also tried to compare with other several second opinions from CICERO. From this comparison, there were different findings regarding this validity period. For example, the second opinion for

Ellevio and Volvofinans Bank shows that the validity period is limited until three years (CICERO, 2019a; CICERO, 2019b). On the other hand, there is no validity period in the second opinion for Heimstaden Bostad and LKAB (CICERO, 2019c; CICERO, 2019d). All of four institutions are Swedish private entities.

- ❖ Establishment of sharia compliance: According to the Sovereign Sukuk Law No. 19/2008, it is mandatory to have an official letter or certificate from a national sharia institution that certifies the sharia-compliant of a sovereign sukuk (including green sukuk) issuance. All of previous green sukuk issuances are using the sharia-compliant opinion from the Indonesian Council of Ulama (MUI) (Interviewee Septianto). In terms of international issuance, the Government of Indonesia also involves some reputable international institutions or sharia scholars (apart from a national sharia institution) that can review and certify the sharia compliances despite it is not mandated by this law (Hanan, 2019).

  As the study focus on the project financing of the renewable energy power plant, hence it also must follow the Government Regulation No. 56/2011 regarding Project Financing through Sovereign Sukuk Issuance. This regulation specifically mentioned the National Sharia Board of the Indonesian Council of Ulama as the body that has authority to determine the project criteria in terms of sharia principle.

- ❖ Issuance of the green sukuk: It is possible for the Government of Indonesia to directly issue the sovereign green sukuk according to the Sovereign Sukuk Law No. 19/2008. However, until now, all of the Indonesia sovereign green sukuk have been issued by the SPV. It becomes the case since the transaction from SPV is exempted from the tax (Interviewee Sadono). Furthermore, through SPV, the relationship with other parties become business to business which is beneficial to avoid the risk of the government to business relationship (Interviewee Haryanto and Interviewee Sadono).
- ❖ The structure of sovereign green sukuk: All of the previous issuances used the wakalah structure (Interviewee Septianto). According to Razak, Saiti, and Dinc (2019), wakalah is defined as a contract between two parties in which one party will act on behalf of another party. In this regard the investors agree to appoint the SPV that has prepared by the Government of Indonesia to act as the issuer, trustee, purchaser, and lessor (Ministry of Finance, 2019).
- ❖ The impact report: According to framework, the report is expected to display these impacts from the funded projects such as the amount of GHG emission reduction, the number of parties that get benefit, the resource consumption reduction, and other appropriate measures (Ministry of Finance, n.d.). Currently from the two published impact reports, the Government of Indonesia has informed the total of the GHG emission reduction, the number of parties that get benefit, and the SDGs impacts from the funded projects.

❖ Assistance from external organizations: As part of their main task in promoting sustainable development goals, currently UNDP Indonesia is working closely with Ministry of Finance in many aspects from development of the climate budget tagging scheme until the formulation of the green sukuk allocation and impact report. The role of UNDP is mentioned in this explanation rather than in the flow chart since their involvement is not mandatory despite they have made a significant contribution in developing the sovereign green sukuk in Indonesia. Their roles in supporting the Indonesian sovereign green sukuk are (Interviewee Nathalia–Technical Associate for Climate Finance of UNDP Indonesia):

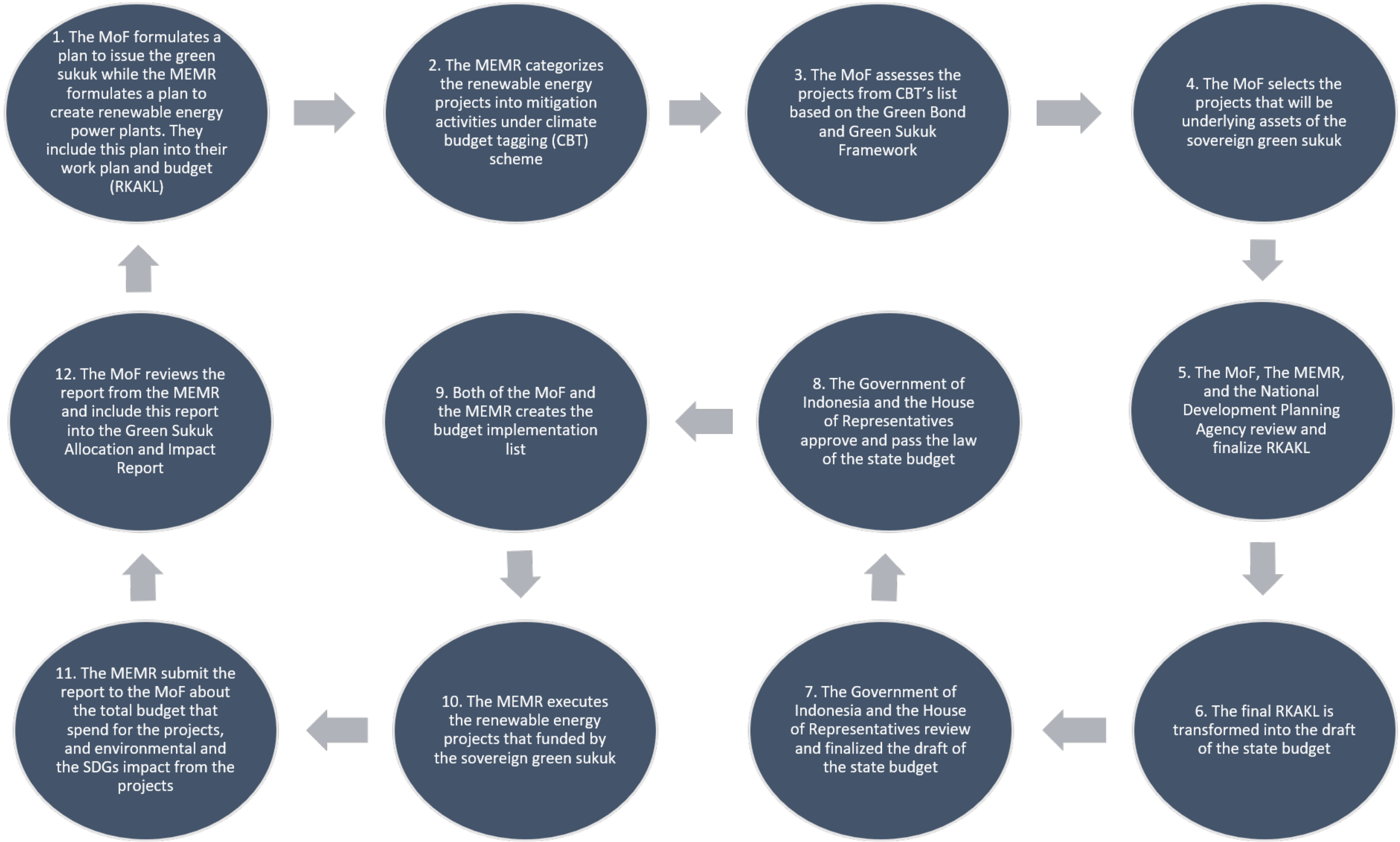
- Participating in the development of the green sukuk framework;
- Providing technical assistance in selecting the green projects for underlying assets;
- Participating in the formulation of the green sukuk allocation and impact report;
- Conducting capacity building for the government officials that involved in the Indonesian sovereign green sukuk;
- Participating in the study of the Indonesian sovereign green sukuk.

The aspects mentioned above are important because they can influence the flow and achievement of the whole process even if this aspect is not mandatory. For example, an issuer can ignore the role of the independent assessor to review their framework to expedite the process and save the cost. However, since it can be beneficial to have a good reputation in the market to attract investors, the issuer chooses to involve the independent assessor. Another example is the involvement of external organizations. Through their assistance, it can help the issuer in technical aspects.

5.1.2 The Business Process of Money Flow from the Indonesian Sovereign Green Sukuk to the Renewable Energy Project Power Plants

This part explains the business process of money flow from the Indonesian sovereign green sukuk to the renewable energy project power plants. In principle, it follows the same procedure like the procedure that must be passed by the issuance and the allocation of Indonesian sovereign green sukuk in general. The distinction lies in the line ministry that involved in this process which is the Ministry of Energy and Mineral Resources as the focal point of renewable energy policies. Therefore, this flowchart will emphasize on the role of the Ministry of Energy and Mineral Resources apart from the Ministry of Finance as the issuer. This flowchart can be seen in the next page (Interviewee Haryanto; Interviewee Sadono; Interviewee Septianto; Directorate General of Budget, 2018; Ministry of Finance, 2020d; and Ministry of Finance, n.d.;):

Figure 5. The Business Process of Money Flow from the Indonesian Sovereign Green Sukuk to Renewable Energy Power Plants



Notes:
MoF = Ministry of Finance
MEMR = Ministry of Energy and Mineral Resources

Here I will explain some aspects of the flowchart in more detail. The process is started when both the Ministry of Finance and the Ministry of Energy and Mineral Resources start to formulate their work plan and budget (RKAKL). Next, the Ministry of Energy and Mineral Resources tags the renewable energy projects under their work program into the mitigation activities in the Climate Budget Tagging Scheme (CBT). After that, the Ministry of Finance assesses and selects the projects in the CBT list based on the Republic of Indonesia Green Bond and Green Sukuk Framework.

As the process also follows the state budget mechanism, then the RKAKL from both the Ministry of Finance and the Ministry of Energy and Mineral Resources are finalized and transformed into the draft of the state budget with the help of the National Development Planning Agency. Then this draft is reviewed and finalized by both of government and legislative body. Once both approve the draft, it is enacted as the law of the state budget.

The law of state budget has given the legal status for the Ministry of Finance to issue the sovereign green sukuk and for the Ministry of Energy and Mineral Resources to execute the projects funded by this sukuk. After completing the projects, the Ministry of Energy and Mineral Resources submits a report about the total money used and the environment and the SDGs impacts from these projects to the Ministry of Finance. Finally, the Ministry of Finance reviews the report and creates the green sukuk allocation and impact report.

The key actors of the business process can be seen in the table 10 (Interviewee Adipurwoko; Interviewee Haryanto; Interviewee Heviati; Interviewee Julia; Interviewee Sadono; Directorate General of Budget, 2018; Ministry of Finance, 2020d):

Table 8. Key Actors in this Business Process

MINISTRY	DIRECTORATE	ROLES
Ministry of Finance	Directorate of Islamic Financing	Formulating policies, selecting projects, issuing the sovereign green sukuk, and formulating the sovereign green sukuk impact report
	Center for Climate Finance and Multilateral Policy	Establishing the Republic of Indonesia Green Bond and Green Sukuk Framework, processing the climate budget tagging (CBT) data, and formulating the sovereign green sukuk impact report
Ministry of Energy and Mineral Resources	Secretariat Directorate General of New, Renewable Energy, and Energy Conservation	Tagging the mitigation activities into climate budget tagging scheme
	Directorate of Energy Conservation	Coordinating the monitoring and evaluation activities of the mitigation activities in the energy sector
	Directorate of Various New Energy and Renewable Energy	Formulating policies in micro and mini-hydropower plants and solar power plants, establishing these power plant projects through state budget, and calculating and reporting the emission reduction of GHG from these power plants
	Directorate of Bioenergy	Formulating policies for bioenergy power plants, establishing these power plant projects through state budget, and calculating and reporting the emission reduction of GHG from these power plants

5.1.3 Analysis of the Green Sukuk Issuance and Allocation Process

Overall, the Ministry of Finance and the Ministry of Energy and Mineral Resources are two key actors that have the most influence on the flow process of the money raised by the Indonesian sovereign green sukuk to the renewable energy power plant projects. In executing the process, there are five key actors which are part of these two ministries. Two of them come from the Ministry of Finance, namely the directorate of Islamic financing and the center for climate finance and multilateral policy. The other three originate from the ministry for energy and mineral resources, namely the directorate of various new energy and renewable energy, directorate of bioenergy, and directorate of geothermal energy.

After observing the role of these actors, the role of the directorate of Islamic financing and center for climate finance and multilateral policy can be performed by only one directorate instead of two directorates to ease the coordination. In this regard, the current role of the center for climate finance and multilateral policy can be attributed to the directorate of Islamic financing to simplify the process. The problem is that the directorate of Islamic financing lacks capacity in terms of green projects, such as identifying and evaluating the impacts as mentioned by Interviewee Septianto–Analyst of the Directorate of Islamic Financing of the Ministry of Finance:*”We are only an instrument provider. Even though this is a green sukuk or green bond in the future, let us say that there is a green bond in the future. Then, we will facilitate the issuance of this green with the issuance of this bond. So, however, in the green format, if there are things beyond our capacity, for example, in terms of measuring the impact, (and) from the side of what is called the selection of the underlying green, we definitely need an expert. It requires expert judgment from UNDP in this regard.”* Interviewee Sadono also added Interviewee Septianto statement with this: *“So until now, we are still coordinating with UNDP, as Septianto conveyed. They assist us by providing experts in the field of environment who familiar with mitigation and adaptation activities in Indonesia (and) how to calculate the impact so that we got that figure*.”

In terms of this lack of capacity, it can be understood since their primary task is handling the conventional sovereign sukuk. Consequently, it will not be an easy mission to handle both conventional and green sukuk simultaneously. Therefore, the Ministry of Finance should consider establishing a new directorate dedicated to formulating and implementing green and sustainable finance policies. If it can be realized, then the issuance until the reporting process of sovereign green sukuk or even the sovereign green bond should be handled by this proposed directorate.

Then, in the future, the Government of Indonesia also needs to anticipate if UNDP's support has ended considering their significant role in the current process. The development of green standard and market trend also needs to be closely monitored to anticipate whether the existing framework still up to date or has been irrelevant to follow the green standard and the investor preference.

In summary, currently, three main frameworks determine the issuance and the allocation process of the Indonesian Sovereign Green Sukuk namely: the Law of State Budget; the Sovereign Sukuk Law; and the Green Bond and the Green Sukuk Framework. The issuance process is started with the formulation of the framework and ended with reviewing the green sukuk impact and allocation report. When it comes to the use of proceeds for funding the renewable energy sector, the key actors are the Ministry of Finance as the issuer of green sukuk and the Ministry of Energy and Mineral Resources as the executor of the projects.

5.2 Barriers that Influence the Flow of Money from the Indonesian Sovereign Green Sukuk into Renewable Energy Power Plants

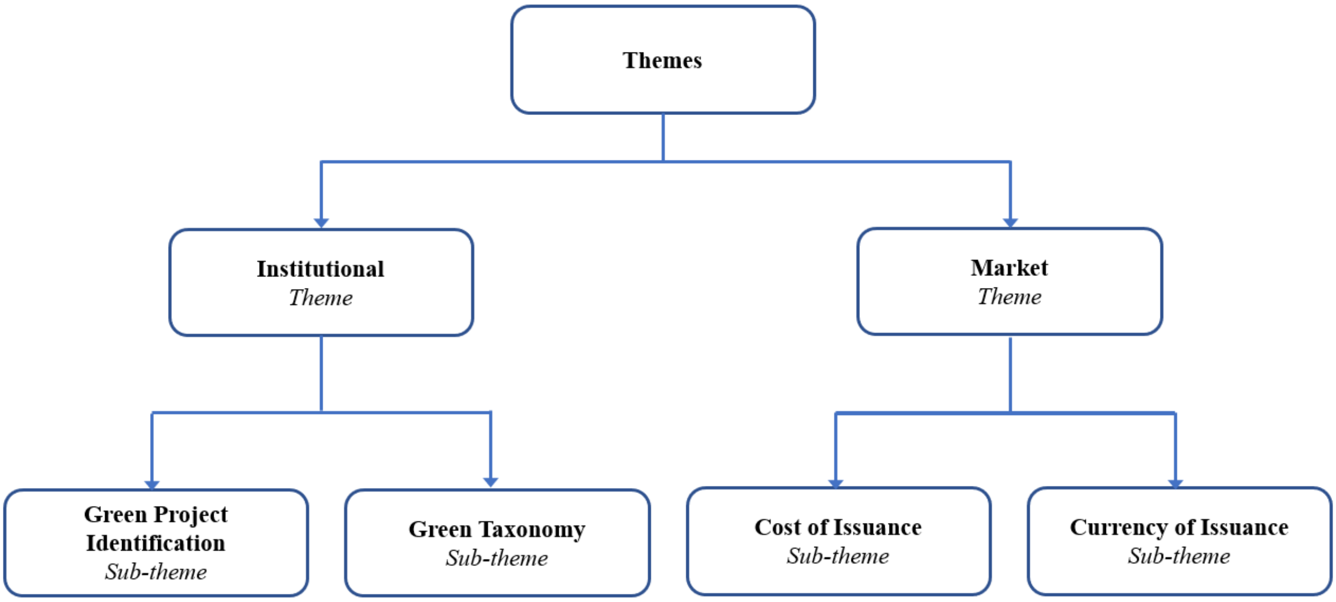
This section captures the barriers that influencing the raising and funneling money from the Indonesian sovereign green sukuk to the renewable energy power plant projects from the lens of key actors and observers. The data analysis on this part is conducted through adopting the six steps of thematic analysis from Braun and Clarke (2016) as I mentioned in Section 3.4. Here I briefly present the barriers identified per phase, namely the issuance phase, the allocation phase, and the reporting phase. I have analyzed every quote from the interview participants that contain information about the barriers as mentioned in the analytical framework. Then these quotes have been grouped into themes and sub-themes. The following sub-sections provide a schematic overview of this process. More detailed information can be found in the Appendices, where I list the quotes and their relevant themes. The discussion of the barriers in this section will be quite short, with a more in-depth thematic analysis presented in section 5.3.

5.2.1 Barriers in the Issuance Phase

In section 2.5, I discussed five possible categories of barriers: institutional, market, legal, economic, and political. From the data analysis, I identify four sub-themes from the institutional theme and the market theme which essential to be further discussed. The institutional theme consists of green project identification and green taxonomy. A green taxonomy is needed to set boundaries for a project qualified to be categorized as a green project (Interviewee Maftuchah–Senior Analyst of the Directorate of Multilateral Affairs of the Financial Services Authority). Apart from the absence of the green taxonomy, I also conclude that there is also a lack of capacity to identify green projects according to Interviewee Septianto and Interviewee Sadono, as mentioned in section 5.1.3.

The market theme consists of the cost of issuance and the currency of issuance. The high cost for hiring an independent reviewer to assess the green sukuk framework was mentioned by Interviewee Haryanto–Senior Analyst of the Center for Climate Finance and Multilateral Policy of the Ministry of Finance as a barrier that can be a serious obstacle for the issuance with a small amount. In terms of currency of issuance, there is a currency risk in the global issuance as Interviewee Yuniarti (Researcher from Faculty of Economics and Business of Universitas Indonesia) stated: *"Since the first global green sukuk issuance in USD (currency), they (the Government of Indonesia) should had utilized hedging. In the last few years, the rupiah (Indonesian currency) has weakened. Not much, but it is fluctuating. So definitely, there is a risk of the exchange rate when the payment is due. If the loss happens, then it will burden the state budget*." Based on the Yuniarti statement, the currency fluctuation makes the issuance in the international currency become risky if the Government of Indonesia does not apply the hedging. The summary of these themes can be seen in the following figure:

Figure 6. Summary of Themes in the Issuance Phase



5.2.2 Barriers in the Allocation Phase

From the data analysis, I conclude that there are four themes in this phase: institutional, technology, *force majeure*, and legal. This *force majeure* theme has not mentioned in the analytical framework (section 2.5). This theme has resulted from the outbreak of covid-19 in 2020. I include this theme because it had disrupted the completion process of the projects funded by the Indonesian sovereign green sukuk in 2020. It is showed by Interviewee Sadono statement: *"Due to covid-19, many projects have stopped because they must follow health protocols and so on, in which it influenced the completion of the green project. Fortunately, we can finish these projects."*

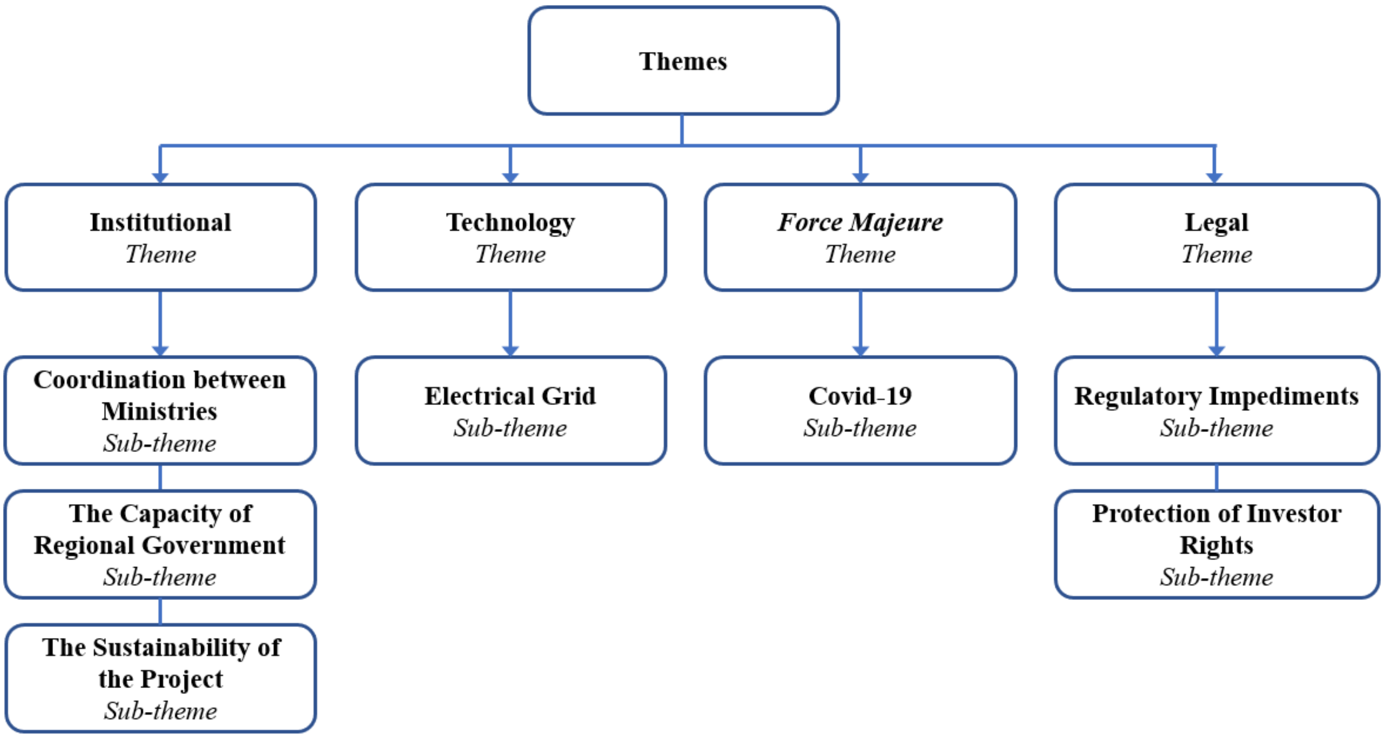
In institutional, there are three significant sub-themes. The first sub-theme is coordination between ministries since it can involve multiple ministries to resolve an issue. For example, there is ongoing negotiation regarding the regulation of domestic level component in the solar power plant component between the ministry of industry and the Ministry of Energy and Mineral Resources since this regulation has hindered the development of the solar power plant project (Interviewee Julia–Analyst of the Directorate of Various New Energy and Renewable Energy of the Ministry of Energy and Mineral Resources). The second and last sub-theme are related, which are the capacity of regional government and the sustainability of the project. As the renewable power plants build by the central government will be transferred to the regional government or community that live around the power plant site, it requires the technical and financial capacity to continue the operation (Interviewee Tumiwa–Executive Director of Institute for Essential Services Reform). Without sufficient capacity to maintain the operation, these established renewable energy power plants can be underutilized or even broken.

In terms of technology theme, the main concern lies in the electrical grid. Interviewee Julia stated: *"The obstacle why renewable energy is hard to be developed is because it is unstable or intermittent. And our (electricity) network is not already the smart grid. Our network is not that smart in responding to the renewable energy network."* Consequently, as long as there is no replacement on the existing electrical grid, it will hinder renewable energy development.

Lastly, in legal theme, I conclude that the regulatory impediments and protection of investor rights are two sub-themes that must be resolved. According to interviews, I identify that two regulations obstruct the implementation of the allocation process such as the mandatory to include the domestic component in a certain percentage for solar power plant projects and the restriction to spend the money raised from sovereign green sukuk in the next fiscal year (Interviewee Tumiwa; Interviewee Sadono). Meanwhile, in terms of protecting investor rights, there is no regulation that protects the investor rights if the money is not allocated to the green projects.

The summary of these themes and sub-themes can be seen in figure 7:

Figure 7. Summary of Themes in the Allocation Phase



5.2.3 Barriers in the Reporting Phase

According to the thematic analysis in the reporting phase, I conclude that only the institutional theme applies to the reporting phase. Five sub-themes materialized from the participant quotes. The first sub-theme is coordination between ministries. The lack of awareness from the related ministries can delay the reporting process. It happened since some related ministries that own green projects still do not perceive the reporting of impact as a mandatory task for them (Interviewee Yuniarti). Regarding this, Interviewee Septianto conveyed that they need to coordinate one-by-one with the ministries that own the projects to obtain the impact information since some ministries has not submitted the impact of their projects in the National Registry System (SRN).

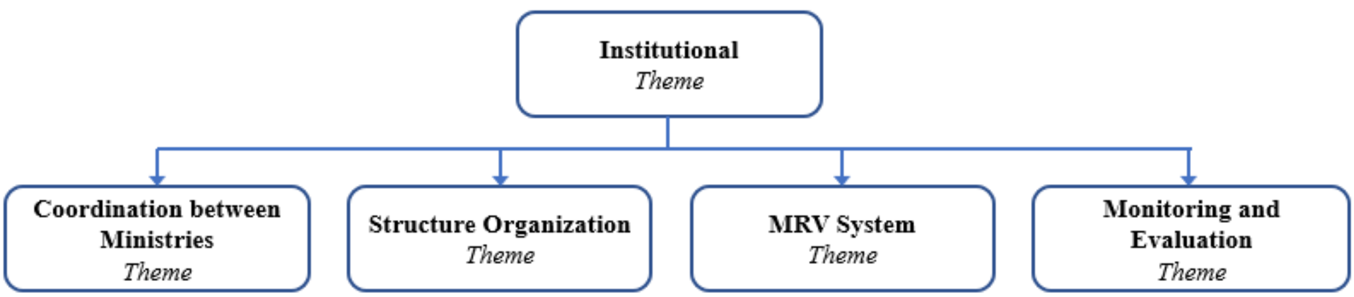
The second sub-theme is measurement, reporting and verification (MRV) system. According to Interviewee Tumiwa, there is simplifications in reporting emission reduction. For example, the baseline of the calculation is, if a renewable energy power plant replaces the steam power plant. Furthermore, the problem also occurred on the lack of capacity of the project owners in calculating the impact as Interviewee Sadono said: *"There are many problems in calculating (the impact of the project), such as the project owners lack of understanding of how to calculate."*

The third sub-theme focuses on monitoring and evaluation. According to Interviewee Haryanto, in selecting the underlying assets, the monitoring and evaluation also become an aspect that determines the selection. Because, without good monitoring and evaluation, it can bother the formulation of the impact assessment.

The last sub-theme is structure of organization. Interviewee Julia indicated that: *"In the past, in 2016 and 2017, there were hundreds of power plant each year. Meanwhile, only the employees at the directorate of various new energy and renewable energy are limited. So we rarely verify it in the field."* Consequently, it will influence the availability and the accuracy of data for the impact report.

The summary of these sub-themes can be seen in the following figure:

Figure 8. Summary of Themes in the Reporting Phase



5.3 Thematic Analysis of the Barriers that Influence the Flow of Money

5.3.1 Institutional Barriers

According to my analysis, most of the barriers in ensuring the money flows to renewable energy plants are institutional barriers. In the issuance phase, the main problem occurred in identifying the green project. This problem happens in the directorate of Islamic financing, as mentioned by Interviewee Septianto *"We are only an instrument provider. Even though this is a green sukuk or green bond in the future, let us say that there is a green bond in the future. Then, we will facilitate the issuance of this green with the issuance of this bond. So, however, in the green format, if there are things beyond our capacity, for example, in terms of measuring the impact, (and) from the side of what is called the selection of the underlying green, we definitely need an expert. It requires expert judgment from UNDP in this regard."* As I suggested in section 5.1.3, the Ministry of Finance should consider establishing a new directorate dedicated to formulating and implementing green and sustainable finance policies to anticipate this barrier.

Regarding the framework, CICERO has graded the Republic of Indonesia Green Bond and Green Sukuk Framework with medium green grade in which it is the second-highest grade according to their grade level (CICERO, 2018). Despite this achievement, the Government of Indonesia needs to be not complacent. In this regard, the statements from Interviewee Hindarto (Chairman of Board of Supervisors of Green Partnership Foundation): "*there is no analysis and evaluation model for eligibility criteria for the proposed green project*" and from Interviewee Maftuchah*:* "*In Indonesia, there are no clear taxonomic boundaries related to green (project) or not"* must be considered to improve the eligible project criteria in the framework. It becomes the case since the current criteria of the eligible projects in the existing framework only set basic requirements, as shown in Table 9. Consequently, there is a probability that the selected green project is not as "green" as supposed to be. In the previous issuance, there was precedence when the money was allocated to the railway construction in Sumatra Island (Interviewee Sadono). After the construction has completed, this railway is mainly utilized to transport the coal instead of the passengers (*ibid.*). As a result, the impact of this project on the environment is not as expected.

In the allocation phase, I identify three sub-barriers: coordination between ministries, the capacity of the regional government, and the sustainability of the project. Regarding the coordination between ministries, World Bank has stated that it can be an issue for the public issuer in their study (World Bank, 2020). It also occurred in Indonesia, according to the findings from the interviews. For instance, Interviewee Heviati–Coordinator of Investment and Cooperation of Bioenergy of the Directorate of Bioenergy of the Ministry of Energy and Mineral Resources revealed that she only found out that some bioenergy power plants were financed by green sukuk when she attended a meeting held by UNDP and the Ministry of Finance. Her statement was like this: "*I once attended a meeting that held by UNDP and the Ministry of Finance. At that time, they discussed this matter and then they asked how far the progress had been. At that time, I just found out that this (renewable energy power plant project) was financed by green sukuk. Because frankly, we do not know much about this.*" Regarding this, the Ministry of Energy and Mineral Resources only knows that the money is originated from the state budget (Interviewee Adipurwoko–Analyst of the Directorate of Energy Conservation of the Ministry of Energy and Mineral Resources). Meanwhile, the spending system of the state budget does not distinguish the source of money, whether it comes from green sukuk, grant, or tax (*ibid.*). Therefore, the Ministry of Finance should inform the other ministries before the execution of the project to ensure they are well-informed about their task to submit the impact report of the project.

The sub-barrier of the lack capacity of the regional government was conveyed by both Interviewee Julia as the central government official and Interviewee Tumiwa as an executive director from a civil society organization. For example, Tumiwa said: *"The problem is some of the local governments do not have the technical capacity to manage when they receive the assets that have been built. Or they do not have the financial capacity to continue the operation. As a result, the projects that have been transferred to the regional government or other parties are rarely able to continue or survive after several years."* As a result of this insufficient capacity, some renewable energy power plants that have been transferred to the regional government cannot survive for a long time.

Furthermore, the sub-barrier of the sustainability of the project also has linkage with the lack capacity of the regional government (Interviewee Julia). Because all of the renewable energy power plants that built by the central government will be transferred to the regional government. However, Interviewee Julia added that the regional government rarely monitors the power plant operation after receiving the asset. Therefore, the operation process is usually continued by the community who lives around and utilizes the power plant. Concerning this, Julia proposed community assistance to the society to manage the operation of the power plants that build in their village. She also added that the villages that utilize the renewable energy power plants for business activities have a higher chance of sustaining their power plants longer than the villages that only use the electricity from these power plants for consumptive activities. In this regard, Julia's proposal is only feasible to be implemented in small-scale power plants. However, for the larger ones, the villagers will not be able to manage it. Therefore, the capacity of the regional government in managing the renewable energy power plants should be improved and the central government should create a better mechanism to ensure the sustainability of these projects.

5.3.2 Market Barriers

Based on the interview's findings, there were two kinds of sub-barriers in the market barrier, such as the cost issuance and the green investor preference. In the former sub-barrier, Interviewee Haryanto said that: *"there is a high cost to issue the green bond and green sukuk*." He also added that this high cost hinders the state (Indonesia) from issuing the green bond and the green sukuk.

Regarding green investor preference, their concern on the standard of the green project is an excellent aspect to encourage the issuers to ensure the standard. According to my interview with Interviewee Sadono, I concluded that they pay attention to the investor's concern on the green standard. For example, they avoid flowing the money from the Indonesian sovereign green sukuk to a railway project in Sumatra island due to the investor concern about the utilization of this railway project for transporting coal. Furthermore, Interviewee Sadono also added that the market could "punish" the issuer if they fund the non-green projects. Regarding this punishment, Interviewee Sukmajaya explained that the form of this "punishment" is that the investor will avoid investing their money again if they do not satisfy with the implementation of the green principles by the issuer. Therefore, to anticipate this and to maintain the credibility, the Government of Indonesia always select the projects from the sector with grade dark green and medium green (both of them are the highest grades) from CICERO to maintain the green standard of the projects (Interviewee Sadono; Interviewee Sukmajaya).

5.3.3 Legal Barriers

Two sub-barriers in the legal barrier are identified in the allocation phase. It consists of the protection of investor rights and regulatory impediments. In terms of the protection of investor rights, there are no rules that give the investors protection if the Government of Indonesia does not implement the green principles in the Indonesian sovereign green sukuk. It is not an issue from the government side since they still commit and pay attention to implementing the green principles to maintain their credibility, as mentioned in sub-section 5.3.2. However, I still argue that the regulation to protect investor is needed because it gives a legal guarantee for the investors if the Government of Indonesia does not comply with the implementation of the green principles. Without this regulation, the green investors may reconsider their plan to invest if they think there is a possibility the money is allocated to other than the green projects.

In terms of regulatory impediments, two rules obstruct the implementation of the allocation process, such as the obligation to include the domestic component in a certain percentage for solar power plant projects and the restriction to spend the sovereign green sukuk to spend in the following fiscal year (Interviewee Tumiwa; Interviewee Sadono). In terms of the domestic component level, it leads to the high cost in constructing the solar power plant as indicated by Interviewee Julia: *"So there is a* *regulation that stipulates that there is a minimum of around 40% of the domestic level component (in solar power plant component). The problem is, if the domestic level component is that high, then the investment costs will high as well."* Originally this rule is aimed at developing the domestic industry in the renewable energy sector. On the other hand, some domestic components have a higher price than the import components. Therefore, both the ministry industry and the Ministry of Energy and Mineral Resources should find common ground to develop a solution that can boost domestic industry and the development of the solar power plant.

Regarding the restriction to spend the money raised by the sovereign green sukuk in the next fiscal year, it can be solved by regulating this in the law. For example, according to the article no. 26 of the Law of the Republic of Indonesia No. 9 of 2020 Regarding the State Budget Fiscal Year 2021, it stipulates that the remaining fund from the issuance of the sovereign sukuk in the fiscal year of 2020 which have not been used in that fiscal year due to the impact of covid-19 to finance the same projects which the completion time have been extended in fiscal year of 2021. However, it must be noted that it requires regulation in the "law" level to allow the spending of the remaining fund from sovereign green sukuk in the next fiscal year. According to the Indonesian Constitution, a law can only be passed by the government and legislative approval. As a result, the government must also obtain approval from the legislative body to allow the spending of this remaining fund in the following fiscal year.

5.3.4 Other Barriers

In the other barriers, I include the technology and *force majeure* themes. In terms of the technology barrier, Interviewee Julia stated that: *"The obstacle why renewable energy hard to be developed is because it is unstable or intermittent. And our (electricity) network is not already the smart grid. Our network is not that smart in responding to the renewable energy network."* Due to the absence of a smart grid, it struggles to support the intermittent renewable energy sources.

In terms of *force majeure,* it came up because the covid-19 pandemic has disrupted the completion of the green projects in 2020. Interviewee Sadono indicated that: *"Due to covid-19, many projects have stopped because they must follow health protocols and so on, in which it influenced the completion of the green project. Fortunately, we can finish these projects."* If the project cannot be completed or the money cannot be allocated in the same fiscal year due to the similar cause or another *force majeure*, then the Government of Indonesia should propose to the legislative body to pass the law that can allow the use of remaining funds in the next fiscal year as explained in the sub-section 5.3.3.

6. Discussion

This chapter aims to contextualize the research questions and to discuss further based on theory, findings, and its relation to the result.

6.1 Discussion on the Flow of Finance

As the first sovereign green sukuk is issued in 2018 or three years ago before this study is conducted, no previous academic paper has researched the flow of finance. However, there was a report from Suroso et al. (2020) that compared two green financial instruments such as the Indonesian sovereign green sukuk and Reducing Emissions from Deforestation and Forest Degradation (REDD+). As their study aimed to compare those financial instruments, as a result, they only gave a general overview on the flow of finance in the Indonesian Sovereign Green Sukuk. Therefore, my study is the first to attempt to offer a detailed insight into the process not only for the flow of finance from the Indonesian sovereign green sukuk to renewable energy power plant projects but also for the general issuance that can apply in other eligible project sectors.

My study highlights some points in the flow of finance. Firstly, as I explained before in sub-section 5.1.3, it involves two directorate in the Ministry of Finance namely: the directorate of Islamic financing and the center for climate finance and multilateral policy. On the other hand, the issuance of the conventional sovereign sukuk does not involve the center for climate finance and multilateral policy (Cahyani, 2017). A possible explanation of the involvement of the center for climate finance and multilateral policy might be caused the fact that they are responsible for the climate budget tagging mechanism and in providing the recommendation for the climate finance policies (Fiscal Policy Agency, n.d.). In the future, I propose the establishment of a new directorate that is dedicated to formulating and implementing the policies for green and sustainable finance. Through this proposed directorate, they can take over the roles currently handled by both the center for climate finance and multilateral policy and the directorate of Islamic financing. Consequently, it can simplify the process.

The second highlight is the current spending system of the state budget does not distinguish the source of the state money, whether it comes from green sukuk, grant, or tax (Interviewee Adipurwoko). As a result, the Ministry of Energy and Mineral Resources was not aware if there were some projects funded by the green sukuk since the spending system does not display the origin of the money. Furthermore, the Ministry of Energy and Mineral Resources found out that the money they used to fund their projects came from the green sukuk after the Ministry of Finance informed them (Interviewee Heviati). Therefore, they became less prepared to submit the progress and the impact report of the projects to the Ministry of Finance since they just found out in the mid or the end part of the project. Regarding this, Banga (2019) indicated that the monitoring and assessing of the funded project should be conducted throughout the project's lifespan to ensure the implementation of the project follows the green bond principles (Banga, 2019). Therefore, the Ministry of Finance should inform the Ministry of Energy and Mineral Resources about their projects that funded by the sovereign green sukuk since the earlier stage. Because it is necessary to ensure the projects are implemented in accordance with the green sukuk principles throughout the project's lifecycle.

6.2 Discussion on Barriers in Relation to Literature

6.2.1. Key Barriers

This section attempts to relate several key barriers identified from the findings with the literature. Although this research focus on the barriers on the renewable energy sector, there were some barriers that also occurred in every sector according to the respondents. For instance, the first three barriers mentioned in this section have also occurred in every sector. Meanwhile, the fourth barrier only happens in the renewable energy sector.

The first key barrier is the coordination between ministries, especially in the reporting phase. It must be remembered that reporting is one of the main pillars of the green bond principles (ICMA, 2018). Therefore, it requires a strong coordination between at least two kind of ministries especially the ministry that issues the green sukuk and the ministry that owns the project (World Bank, 2020).

However, the difficulty in coordinating with other ministries in preparing the report becomes the primary consideration for the Ministry of Finance before deciding to reissue the sovereign green sukuk in the future, according to Interviewee Yuniarti, who is currently researching the sovereign green sukuk. The lack of awareness from the ministries that own the projects had complicated the impact reporting process due to they did not have a sense of urgency to submit the impact report (Interviewee Yuniarti). As a result, it was time-consuming to complete the reporting process since the Ministry of Finance must be coordinated one by one with the ministries that had utilized the funds from the green sukuk instead of receiving all of the reporting impacts time (Interviewee Septianto). It is matched with the study from Banga (2019) that a lack of coordination between ministries and/or state agencies with different responsibilities and priorities may obstruct the emergence of the green bond.

In terms of reporting, it also became the main reason why the sustainable transportation sector dominated the use of proceeds in 2019 and 2020 with 62% and 48%, respectively (Ministry of Finance, 2020). On the other hand, the renewable energy sector only accounted with 8% and 5% in the same period (*ibid.*). Furthermore, the figure of renewable energy sector in 2019 also place them in the bottom from five sectors that received the sovereign green sukuk allocation (*ibid.*). Regarding this, Interviewee Haryanto argued that the sustainable transportation sector (which governed by the Ministry of Transportation) was the most prepared sector in monitoring and evaluation the projects so that it eased the formulation of the impact report.

On the contrary, when I interviewed Heviati from the Directorate of Bioenergy of the Ministry of Energy and Mineral Resources, she just found out if there were some projects in her directorate that funded by the sovereign green sukuk when she was invited to the meeting with UNDP and the Ministry of Finance to discuss the sovereign green sukuk and the progress of the project. It seems that the Ministry of Finance did not inform the Ministry of Energy and Mineral Resources in the beginning of the project. On the other hand, it also was possibly occurred if the person-in-charge in the Ministry of Energy and Mineral Resources did not get the transfer of knowledge about the sovereign green sukuk from the former person-in-charge. According to the Interviewee Haryanto, the change of the person-in-charge who responsible for the submitting report in the other ministries has complicated the formulation of the green sukuk impact report. In this regard, he stated that *"Actually, the problem is employee turnover (the employees that submit the report of the project impact from the ministries which own the projects). That is the most frequent."* Due to this turnover, every year the Ministry of Finance with UNDP should conduct a capacity building for the new person-in-charge from these ministries to formulate the impact reporting (Interviewee Sukmajaya; Interviewee Yuniarti).

Regardless, whether this reporting problem occurred due to the lack of the sense of ownership from the ministry which owns the project or because there is lack of information from the Ministry of finance, this reporting issue must be solved. Because the post-issuance report is essential to prevent the information gaps that can undermine investor confidence in their green investment (Tolliver, Keeley, and Managi, 2019). Moreover, an improved impact reporting may lead to more significant opportunities to obtain more green investors since it helps them decide to invest in the green projects (*ibid.*). Based on this study, it is recommended that both the Ministry of Finance as the issuer and the Ministry of Energy and Mineral Resources and other ministries as the project owners to improve their coordination, especially in reporting the impact to maintain and to improve the reputation of the Indonesian sovereign green sukuk.

The second key barrier lies in the green project identification. According to the World Bank (2020), many financial institutions in developing countries still have difficulty identifying green projects as an underlying asset. In Indonesia, the directorate of Islamic financing from the Ministry of Finance needs the UNDP's assistance to help them identify the green project from the climate budget tagging list since they lack capacity to identify it (Interviewee Sadono; Interviewee Septianto).

Moreover, the existing criteria of eligible green projects, including the renewable energy sector in the Indonesian green sukuk framework, are still simple. Meanwhile, there is also no green taxonomy as expressed by the Maftuchah: *"In Indonesia, there are no clear taxonomic boundaries related to green or not. In a renewable energy project (for example), many people say it is green. In fact, it* *could not be green. For example, (if) the infrastructure uses aluminium from illegal mines."* So, it opens up the possibility to have projects that actually not "green." According to Interviewee Sadono, it ever happened when they proceed of green sukuk was used to construct a railway in Sumatra Island. Interviewee Sadono also conveyed that they did not know that the railway in Sumatra is mostly utilized to transport the coal instead of the passengers. Therefore, after knowing this fact, they stopped funding this project in the next issuance.

It must keep in mind that we need to avoid greenwashing to fund and to promote the green projects that actually do not have environmental impacts (Banga, 2019). Hence, I suggest the following solutions. First of all, it is crucial for the directorate Islamic financing to anticipate if the assistance from UNDP has ended. As a solution, they can recruit some experts with capacity in environmental issues, especially in identifying the green projects. The second is the establishment of the green taxonomy. Currently, the Indonesian Financial Service Authority (OJK) has invited twelve ministries to develop the green taxonomy (Interviewee Maftuchah). If this proposed taxonomy can be well-developed, then the issuer can also refer to this to eliminate the green project candidates that do not have a good impact or potentially harm the environment.

The third key barrier occurred in the absence of hedging in the global issuance. According to Acharya et al. (2018), hedging can be an option to anticipate the exposure of the exchange risk. In the case of the Indonesian sovereign green sukuk, as the Interviewee Yuniarti explained in sub-section 5.2.1, the absence of hedging in the international issuance that used the foreign currency has exposed the fluctuation risk. Regarding this, I suggest the Ministry of Finance to consider to hedge the exchange rate of the Indonesian sovereign green bond during their global issuance. Because, it can minimize the risk when the rupiah's rate having a significant drop during the maturity time of the sukuk.

The fourth key barrier is related to the sustainability of the project and the capacity of the regional government. According to the Audit Board of the Republic of Indonesia (BPK), there were 142 renewable energy power plant projects built by the Ministry of Energy and Mineral Resources from 2011 to 2017 that have not been transferred to the regional government from the central government (BPK, 2017). According to the Ministry of Energy and Mineral Resources, from these 142 projects, 68 projects had broken (Iskana, 2017). Meanwhile, the remaining projects have not been transferred due to the regional government still waiting for the grant to operate the power plant before they could receive the project asset or there was an administrative barrier in transferring the asset (Wijiatmoko, 2017).

There is no available information on whether some of these 142 projects were funded by the green sukuk or not. However, there was a possibility that at least a few of these 142 projects were funded by the sovereign green sukuk, since according to the Indonesian sovereign green sukuk impact report 2019 and 2020, there were hundreds of renewable energy power plant projects in 2016 and 2017 that refinanced by the green sukuk.

Regardless of whether some projects funded by the green sukuk or not in these 142 projects, it will be beneficial to discuss how to prevent this situation. Because when the performance of proceeds cannot fulfil the environmental benefit expectation, it can diminish the investor confidence (Jones et al., 2020). However, due to the transfer asset and the sustainability problem as can be seen in these 142 projects, the Ministry of Energy and Mineral Resources has started to switch their priority to install the energy saving solar energy lights in the rural area (LTSHE) through the money from the state budget instead of constructing the renewable energy power plants in areas where electricity is not yet available since 2017 (Ministry of Energy and Mineral Resources, 2017). Moreover, some of the budget that initially allocated to build the solar power plants and the micro-hydro power plants in 2017 was reallocated to support the energy saving solar energy lights in the rural area program (*ibid.*). It became the case since the energy saving solar energy lights which are installed in the household in the rural areas are easy to operate and to maintain (Ministry of Energy and Mineral Resources, n.d.; Pratiwi, 2019). Some of this solar energy lights were funded by the sovereign green sukuk. According to the Green Sukuk Allocation and Impact Report 2020, the money from the Indonesian sovereign green sukuk has contributed in providing lighting in 79,556 households, reducing 1,184,748 tons of carbon emission, and helping the effort to achieve the SDGs target no 7, 11, and 13 (Ministry of Finance, 2020). Due to this light utilize the solar energy, then this project was included in the renewable energy sector in the 2020 report (*ibid.*)

Despite its advantages, it must be noted that the program of energy saving solar energy lights in the rural areas only can be used for lighting and charging the phone (Pratiwi, 2019). In addition, the lifetime of these lights only 3 years (IESR, 2019). On the other hand, the community in the remote areas also need more electricity to support their activities and livelihood (*ibid.*). Therefore, the presence of the renewable energy power plants in the small scale still needed especially in the remote areas where electricity is not yet available.

Taking into account that the presence of renewable energy power plants still needed in the rural areas where the main grid has not reached and considering that it will be unlikely for the private sector to invest in solar power plant in these areas since it less economic viable (Suryani and Dolle, 2020), the sovereign green sukuk can plays a significant role in financing the construction of the renewable energy power plants in the rural areas. Then, in preventing the renewable energy projects built by the green sukuk proceed become short-lived, there are some proposed solutions. Firstly, since most initiatives to build these projects come from the regional government proposals, then the Ministry of Energy and Mineral Resources should check all aspects from the documents until inspecting the proposed location. In the past, the directorate of various new energy and renewable energy were rarely visited the proposed location due to the lack of employees as Interviewee Julia stated: *"In the past, in 2016 and 2017, there were hundreds of power plant each year. Meanwhile, only the employees at* *the directorate of various new energy and renewable energy are limited. So we rarely verify it in the field."* The inspection of the proposed location is essential. According to a study from GIZ (2014), some solar power plants were built on erosion-exposed slopes and in flood zones. GIZ (2014) also mentioned the limited of technical personnel from the ministry of energy and resources as the reason they could not inspect all proposed site. However, as long as the directorate of various new energy and renewable energy still had the budget and the proposal from the regional government were successfully passed the document checking process, then the projects were going to be built even though there were some proposed sites that had not been inspected (Interviewee Julia). Hence, particularly in terms of the money that originated from the green sukuk, I suggest the Ministry of Energy and Mineral Resources check the document and inspect the proposed sites before deciding to fund the proposed projects.

Secondly, the regional government should provide the financial plan for operating and maintaining the proposed power plant. According to the Minister Energy and Mineral Resources Regulation No. 12/2018 concerning the Amendment of the Minister Energy and Mineral Resources Regulation No. 39/2017 about the Physical Activities of the Utilization of New Energy and Renewable Energy as well as Energy Conservation, the regional government only need to submit the letter of commitment to managing the power plant in their proposal. In this regard, I argue that this commitment letter is not enough to prove the financial capability of the regional government. As a result of the lack of financial capability, some power plants have not transferred due to the regional government need to wait for the grant to operate the power plant (Wijiatmoko, 2017). Even according to Interviewee Tumiwa, the lack of financial capacity also led some of the power plants that had been transferred to not last after several years. Therefore, I suggest the provision of the financial plan as a mandatory requirement for the regional government. After that, the Ministry of Energy and Mineral Resources need to analyse the financial capability of the regional government through their financial plan.

Thirdly, both the central and regional government should work together in a legal manner to eliminate administrative barriers during the process of asset transfer. Because the longer the administrative case slows down the project handover after the completion, the more likely the project will be damaged due to the delay in the transfer asset process.

Fourthly, it must be noted that some of the regional governments also lack the technical capacity to operate the power plants that they have received (Interviewee Tumiwa). Concerning this, the central government should provide the technical assistant not only in operating but also in estimating the impact in emission reduction and in achieving the SDGs target. The estimation of this impact is essential, especially for the project funded by the green sukuk since it will be displayed in the report. As mentioned before, the information gaps in the impact of the use of proceeds can undermine the investor confidence in their green investment (Tolliver, Keeley, and Managi, 2019).

Lastly and most importantly, the regional government that wants to propose renewable energy power plants (through the proposal to the Ministry of Energy and Mineral Resources) funded by the sovereign green sukuk should improve their technical and financial capability because these two things are important to ensure the sustainability of the renewable energy power plants.

From these four key barriers, I concluded that the main obstacles are the lack of coordination between ministries in the reporting phase and the lack of capacity of some regional governments to manage the renewable energy power plants they received. It is because the Ministry of Finance can solely anticipate the other two barriers as an issuer. Meanwhile, in formulating the report, the coordination between the Ministry of Finance and the Ministry of Energy and Mineral Resources as the owner of the renewable energy projects must be strengthened. Furthermore, in terms of the lack capacity of some of the regional governments, it requires strong coordination between the Ministry of Energy and Mineral Resources and the Regional Governments.

6.2.2. Barriers Outlined in the Analytical Framework that Irrelevant in the Indonesian Sovereign Green Sukuk

The lack of financial incentives in issuing the green sukuk was mentioned by Karina (2019) and World Bank (2020). In this regard, both of them indicated that the government should provide any types of financial incentives that can support the development of the green sukuk. Therefore, it only applies to commercial green sukuk since it is issued by private entities or financial service institutions. Meanwhile, in the sovereign green sukuk, the issuer of this green sukuk is the government. Consequently, this barrier cannot be applied in the case of the Indonesian Sovereign Sukuk, according to this literature.

However, it must be considered that a high cost in issuing the Indonesian sovereign green sukuk was one of the identified barriers mentioned by Interviewee Haryanto. This issue also brought up by Banga (2019) in his study. He noticed that the expensive cost of issuing the green bond has hindered the development of the green bond in developing countries. Therefore, in terms of sovereign green sukuk issued by the government institution, especially in the developing countries, the role of developed countries are needed to ease the issuance cost. It is aligned with Interviewee Haryanto, who asserted that the developed countries should play a more prominent role in promoting the attractiveness of the green bond and the green sukuk market. Furthermore, as mandated by the Copenhagen Accord (UNFCCC, 2019), the commitment of the developed countries in mobilizing 100 billion USD per year by 2020 to help developing countries address climate change must be underlined. In this case, the developed countries can give some financial incentives for the developing countries in issuing the sovereign green sukuk as part of this 100 billion USD commitment.

7. Conclusions

The aim of the present research was to examine how the money raised by the Indonesian sovereign green sukuk flows to the renewable energy power plant projects and to identify the barriers in the issuance, allocation and reporting phases that influencing the raising and funnelling of money from the Indonesian sovereign green sukuk to the renewable energy power plant projects. This study has identified that here are two key actors in implementing the flow of money: the Ministry of Finance and the Ministry of Energy and Mineral Resources. The involvement of these actors indicates that the implementation of Indonesian sovereign green sukuk requires at least two ministries that consist of ministry that issue the green sukuk (The Ministry of Finance) and the ministry that owns the projects (the Ministry of Energy and Mineral Resources in the case of renewable energy projects). Therefore, it requires good coordination since each ministry has different responsibilities and priorities.

Meanwhile, there are three frameworks that determine the mechanism of the flow of finance. Firstly, the state budget. Secondly, the Law No. 19/2008 concerning Sovereign Sukuk and its subordinate legislation which is the Government Regulation No. 56/2011 concerning Project Financing through Sovereign Sukuk Issuance. Lastly, the Republic of Indonesia Green Bond and Green Sukuk Framework. The involvement of these frameworks shows that the implementation of the sovereign green sukuk is arranged to conform with these frameworks. Firstly, as part of the state budget, the sovereign green sukuk must be aligned with the management of state finances. Secondly, as part of sovereign sukuk, the sovereign green sukuk must comply with the sovereign sukuk law and its subordinate legislation. Thirdly, as part of the green sukuk, the sovereign green sukuk should follow the green principles in accordance with the Republic of Indonesia Green Bond and Green Sukuk Framework.

In terms of the barriers, this study has found that in the issuance phase the barriers occurred in the institutional and market aspect. Next, in the allocation phase, the barriers consist of institutional, legal, *force majeure,* and technology aspect. Lastly, in the reporting phase, the barrier lies in the institutional factor. When it comes to the barrier details, I found that the main obstacles have occurred in the lack coordination between ministries and the lack of capacity of the regional government. The lack of coordination between ministries has complicated the formulation of the report impact. The main implication of this problem is that it can influence the quality of the impact report, which is vital to maintain the investor’s confidence. Meanwhile, the lack capacity of some of the regional governments has affected the quality of the flow process in the renewable energy sector especially in ensuring that the renewable energy power plants that funded by the green sukuk can be sustained to give impact for the emission reduction and the SDGs achievement in the rural areas. Due to this problem, the Ministry of Energy and Mineral Resources has prioritized the installation of the energy saving solar energy lights in the rural area program (LTSHE). Some of these lights also funded by the sovereign green sukuk in which this project was categorized as the renewable energy sector due to these lights powered by solar energy.

This thesis has provided new insight into the study of the Indonesian sovereign green sukuk, especially when it comes to the process of money flow and the identified barriers in channelling the money to the renewable energy power plant projects. Furthermore, this study also contributes to the further study on the green sukuk considering this field is still relatively new and lacks previous studies.

The major limitation of this study lies in the time constraint, lack of previous studies, and lack of information in terms of the specific data regarding the further details of the renewable energy power plants funded by the Indonesian sovereign green sukuk. In terms of lack of information in the green sukuk impact report, it only informs the total power plant project without displaying the list of these power plants. The absence of the list of power plants had affected the findings since I could not explore any further when I interviewed the Ministry of Energy and Mineral Resources officials.

This study suggests some recommendations for future implementation. Firstly, the Ministry of Finance should consider establishing a directorate dedicated to exclusively handling green finance, including the green sukuk. Secondly, the ministries that own the project should raise their awareness in reporting the impact of the green projects. Thirdly, the coordination between the ministries should be improved in ensuring solid implementation in the issuance, allocation, and reporting phase. Fourthly, the Ministry of Energy and Mineral Resources should ensure that they ensure the plan to build renewable energy power plants from the green sukuk are well-planned and well-executed. Lastly, the regional government should increase their technical and financial capacity to ensure the sustainability of the renewable energy power plants they manage. If these recommendations would be implemented, then it can contribute to the simplification of the issuance process, the improvement in the impact report formulation, raising the investor's confidence while giving environmental and SDGs benefit through the solid implementation in every phase, and the improvement of the sustainability of renewable energy power plants that are built by the sovereign green sukuk.

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Law of the Republic of Indonesia No. 9 of 2020 Regarding the State Budget Fiscal Year 2021

Government Regulation No. 56/2011 concerning Project Financing through Sovereign Sukuk Issuance

Government Regulation No. 17/2017 concerning the Synchronization of the Process of Planning and Budgeting the National Development

Presidential Regulation No. 113/2020 concerning the Details of the State Budget Fiscal Year 2021

Minister Energy and Mineral Resources Regulation No. 39/2017 about the Physical Activities of the Utilization of New Energy and Renewable Energy as well as Energy Conservation

Minister Energy and Mineral Resources Regulation No. 12/2018 concerning the Amendment of Minister Energy and Mineral Resources Regulation No. 39/2017 about the Physical Activities of the Utilization of New Energy and Renewable Energy as well as Energy Conservation

Minister of Energy and Mineral Resources Regulation No. 22/2019 concerning Guidelines for Implementation of Inventory and Mitigation of Greenhouse Gases in the Energy Sector

Minister of Finance Regulation No. 143/PMK.02/2015 concerning Guidelines for Formulation and Review of Work and Budget Plan and Validation of the Budget Implementation List

Minister of Finance Regulation No. 12/PMK.08/2018 concerning Hedging Transactions in Government Debt Management

Minister of Industry Regulation No. 54/M-IND/PER/3/2012 concerning Guidelines for Utilization of the Domestic Products for the Development of Electricity Infrastructure

Minister of Industry Regulation No. 05/M-IND/PER/2/2017 concerning the Amendment of Minister of Industry Regulation No. 54/M-IND/PER/3/2012 concerning Guidelines for Utilization of the Domestic Products for the Development of Electricity Infrastructure

10. Appendices

Interview Quotes and Related Themes

THEMES IDENTIFIED IN THE ISSUANCE PHASE			
INTERVIEWEES	**QUOTES**	**SUB-THEMES**	**THEMES**
Hindarto	So far, there is no analysis and evaluation model for eligibility criteria for the proposed green project.	Green Project Identification	Institutional
Sadono	And there are so many lists of projects in which it is very challenging to even identify them. Therefore, we only look at the budget document. So if we want to see whether that is a power plant project or not, maybe we need to look deeper to the sub-component level of budget in which there is a possibility that we cannot identify what kind of project in the budget document. Consequently, we must confirm it with other ministries or state agencies because it is impossible for us to check every project that may be spread throughout all provinces.	Green Project Identification	Institutional
Maftuchah	In Indonesia, there are no clear taxonomic boundaries related to green or not. In a renewable energy project (for example), many people say it is green. In fact, it could not be green. For example, (if) the infrastructure uses aluminium from illegal mines.	Green Taxonomy	Institutional
Haryanto	It is required high cost to issue the green bond and green sukuk. In this case, the developed countries such as a massive green donor like Norway and the annex I countries should make the international bond and sukuk market more attractive. It is difficult for a country to issue (the green bond and the green sukuk) due to expensive cost. On the other hand, the (developing) countries do not get benefit other than from the commitment and reputation (from reviewing process by an independent reviewer that required high cost).	Cost of Issuance	Market
Yuniarti	Since the first global green sukuk issuance in USD (currency), they should had utilized hedging. In the last few years, the rupiah (Indonesian currency) has weakened. Not much, but it is fluctuating. So definitely, there	Currency of Issuance	

	is a risk of the exchange rate when the payment is due. If the loss happens, then it will burden the state budget.		
Sukmajaya	Despite some existing standard for green projects, the market continues to grow and even in Europe, the EU green taxonomy just emerged. Meanwhile, many investors come from this region. Therefore, this market development must be keep captured.	Green Investor Preference	

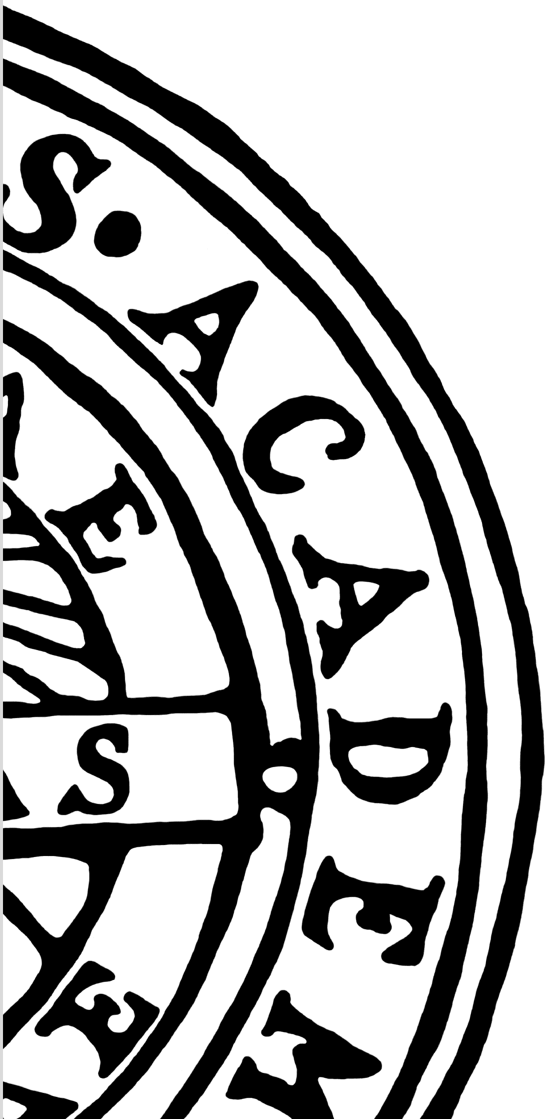
THEMES IDENTIFIED IN THE ALLOCATION PHASE

INTERVIEWEES	QUOTES	SUB-THEMES	THEMES
Sadono	Due to covid-19, many projects have stopped because they must follow health protocols and so on, in which it influenced the completion of the green project. Fortunately, we can finish these projects,	Covid-19	*Force Majeure*
Sukmajaya	Because of covid-19, many projects that had to be carried out was hampered despite it had been budgeted for several billion. Due to covid-19, the realization (of the projects) had not been fulfilled as it was budgeted before.	Covid-19	*Force Majeure*
Julia	The ministry of industry saw this (the domestic level component rule) as important to encourage the domestic industry, while the Ministry of Energy and Mineral Resources argues that it hindered the development of solar power plant. Then the Ministry of Energy and Mineral Resources had proposed to (review the rule) the ministry of industry. But the ministry of industry responded that this rule still applies. So (the negotiation between both ministries) it's not finished yet	Coordination between Ministries	Institutional
Heviati	I once attended a meeting that held by UNDP and the Ministry of Finance. At that time, they discussed this matter and then they asked how far the progress had been. At that time, I just found out that this (renewable energy power plant project) was financed by green sukuk. Because frankly, we don't know much about this. Maybe this is part of the familiarize process that has to be conveyed to the public.	Coordination between Ministries	Institutional
Julia	So actually, the maintenance and the operating budget should be borne by the regional government budget. But practically, it is rarely supervised by the regional government. Thus, in the end, it is independently maintained by the community.	The Capacity of Regional Government	Institutional
Tumiwa	When the Ministry of Energy and Mineral Resources has finished the construction (of renewable energy power plant	The Capacity of Regional Government	Institutional

	projects), it should be handed over. In this regard, the regional or local government usually will be received it as the fastest option. The problem is some of the local governments do not have the technical capacity to manage when they receive the assets that have been built. Or they do not have the financial capacity to continue the operation. As a result, the projects that have been transferred to the regional government or other parties are rarely able to continue or survive after several years.		
Julia	The bottleneck of the power plants in Indonesia that handed over to the community is its sustainability. Therefore, it requires community assistance since this power plant will be passed to them.	The Sustainability of the Project	Institutional
Tumiwa	For the solar project, there are many constraints due to the implementation of the regulation of the minister of industry about domestic component level.	Regulatory Impediments	Legal
Sadono	The funds (from green sukuk) can only be used during the fiscal year of the Indonesian State Budget, in which that all of them must be disbursed with no leftovers. So, then the challenge is that the figures that we have in the beginning are the budget ceiling figures, not the budget realization figures. Unless it becomes a challenge for us to report them to investors since the remaining money (from green sukuk) cannot be invested (other than in the fiscal year when the green sukuk is issued).	Regulatory Impediments	Legal
Sadono	For corporations, it will be easier to match issuance and allocations. Meanwhile, if the state only flows money to a specific project, it can complicate the financing flexibility. For example, if we have decided to allocate the money to project A, however, this project A cannot be materialized due to several obstacles. Consequently, the money cannot be transferred despite there is other projects that need it. Therefore, we flow the money into the state general treasury account in which the money can be withdrawn through the state budget implementation list to fund the other projects.	Regulatory Impediments	Legal
Julia	So there is a regulation that stipulates that there is a minimum of around 40% of the domestic level component (in solar power plant component). The problem is, if the domestic level component is that high, then the investment costs will high as well.	Regulatory Impediments	Legal
Sadono	In terms of regulation, as if the green bond principles, there is no legal effect if we do not comply with it. For example, if our green projects turn out to be not green as	Protection of Investor Rights	Legal

	we have disseminated before, then there will be no lawsuits against Indonesia. However, of course, we will be punished by the investors (if the projects are not green) and losing their trust. So the punishment will come from the market not legal.		
Julia	The obstacle why renewable energy hard to be developed is because it is unstable or intermittent. And our (electricity) network is not already the smart grid. Our network is not that smart in responding to the renewable energy network. PLN tends to resistant to increase renewable energy because they are not technically ready.	Electrical Grid	Technology
THEMES IDENTIFIED IN THE REPORTING PHASE			
INTERVIEWEES	**QUOTES**	**SUB-THEMES**	**THEMES**
Septianto	If the line ministries have a good governance discipline in submitting their projects in the National Registry System, we only need to download this data from the National Registry System. However, from what we did before and our experience, we cannot rely on this system. Consequently, we have to coordinate one by one, even we also have face to face zoom meetings to obtain the official answers from them, either in direct form or in the form of letters from each of them.	Coordination between ministries	Institutional
Yuniarti	The coordination to ensure all ministries reporting the impact from the projects funded by the green sukuk is very difficult. It is because the related ministries feel that they are not obliged to inform the impact.	Coordination between ministries	Institutional
Sadono	There are many problems in calculating (the impact of the project), such as the project owners lack of understanding on how to calculate. Therefore, until now we are still coordinating with UNDP, since as Rama said before, they help us in providing experts in the environmental field who understand the adaptation and mitigation activities in Indonesia and how to calculate its impact so that we can get the exact number.	Measurement, Reporting, and Verification System	Institutional
Tumiwa	The MRV framework is monitored, reported, then verified. And there are some standards and conditions if we refer to the UNFCCC. So, it seems like we have never done that MRV. So far, we just take a note, for example from the line ministries. For instance, the Ministry of Energy and Mineral Resources publishes data about several power plants and their emission reduction each year. But in terms of methodology, we question it. Because, for instance, what they measure is the addition of renewable energy, only the capacity. But	Measurement, Reporting, and Verification System	Institutional

	what is the baseline? The baseline is usually calculated based, for example, if it replaces the steam power plant. However, the question is whether the method is correct or not. So we usually see simplifications by line ministries in reporting emission reduction from what they build.		
Adipurwoko	The problem of these solar power plants in remote areas and off-grid is because we do not have a monitoring system and there are no reports from the operators and the residents. In the end, we just use an assumption. So (for example) in a day, it operates for 12 hours. From this, we can get the kwh (kilowatt-hour) data, then this operational time will be multiplied to 30 days and 365 days if it is a year.	Monitoring and Evaluation	Institutional
Haryanto	This includes a strategy to select underlying assets with good monitoring and evaluation unless we will be bothered in (formulating) the impact assessment. So if you look at the impact report, it is still dominated by transportation such as trains because the monitoring and evaluation are good and the most prepared.	Monitoring and Evaluation	Institutional
Haryanto	Actually, the problem is employee turnover (the employees that report the progress of the projects). That is the most frequent.	Structure of Organization	Institutional
Julia	In the past, in 2016 and 2017, there were hundreds of power plant each year. Meanwhile, only the employees at the directorate of various new energy and renewable energy are limited. So we rarely verify it in the field. Once the procurement process starts, then the contractor goes to the field to verify it again.	Structure of Organization	Institutional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