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#### Provided in Cooperation with:

International Journal of Energy Economics and Policy (IJEPP)

*Reference:* Handayani, Dian/Surachman, Eko Nur (2017). Sukuk negara as financing strategy for renewable energy infrastructure : case study of Muara Laboh Geothermal Power project. In: International Journal of Energy Economics and Policy 7 (4), S. 115 - 125.

This Version is available at:

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# Sukuk Negara as Financing Strategy for Renewable Energy Infrastructure: Case Study of Muara Laboh Geothermal Power Project

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## ABSTRACT

The importance of renewable energy development is so imminent. It will benefit the society not only by fulfilling the electricity shortage but also by reducing the amount of pollution. However, the funding of the project is still challenging for the Government. One financing alternative is Sovereign Sukuk (Sukuk Negara). This study investigates the possibilities of Sukuk Negara to finance renewable energy project with the case study of Muara Laboh Geothermal Power Plant. The analysis uses two perspectives including legal aspect and financial aspect. Study literature and interview are used in the legal analysis by exploring specific regulations regarding the Sukuk Negara and interviewing Sukuk administrator and issuer. Secondly, financial analysis using discounted cash flow, net present value and internal rate of return. The result is Sukuk Negara is feasible as the source of financing Muara Laboh Geothermal Power Project.

**Keywords:** Renewable Energy, Sovereign Sukuk, Infrastructure Financing

**JEL Classifications:** E62, R42, H74, H76, G12

## 1. INTRODUCTION

The availability of infrastructure is one of the main drivers of economic growth, poverty reduction, and welfare distribution. This conception is widely accepted as explored in studies of Démurger (2001), Wang (2002), Ali and Pernia (2003), Esfahani and Ramírez (2003), Fedderke and Bogetić (2009), and Srinivasu and Islamia (2013). Infrastructure creates the backbone of an economy since they provide social and economic benefits to society both in social as well as in commercial context. With such an infrastructure ready in place, the goods and services, as well as information can be provided to the public more efficient and effective so that it will contribute to the inclusive economic and social growth of a nation.

One of the most critical infrastructures is electricity. The electricity consumption, in the long run, gives rise to more economic growth for all income class country, from high income, middle, to low-income countries by 21.45%-28.71% for every 100% increasing in

electricity consumption (Hossain and Saeki, 2012). Moreover, in the Indonesian context, according to Bangun and Firdaus (2009), the most critical sector that influences the economic growth is electricity, in which the elasticity Figure is 0.33. It means by increasing of 1% in electricity provision, the economic growth will be accelerated by 0.33%. These figures draw a conclusion the importance of electricity to support the economic growth.

Nevertheless, the provision of energy infrastructure to supply electricity to fulfill the demand is still far from enough. Based on The Power Supply Business Plan - State Electricity Company 2015-2024 (PT Perusahaan Listrik Negara (Persero)) [PLN], 2015), energy demand in Indonesia is forecasted to attain 464.2 Terra Watthour (TWh) in 2024, increase significantly from 219.1 TWh in 2015. On the supply side, per 2014, PT PLN power installed capacity reached 43,457 Mega Watt (MW). By using the standard assumption which only 75% of capacity will generate power, the existing installed power plants are able to produce

286 TWh. It indicates that, if there are no new power plants built to supply the demand, Indonesia will face electricity shortage by 2018.

In order to tackle this issue, the Government has been taking various actions to increase the electricity supply by planning the development of 35 Giga Watt (GW). The amount of the project cost is so massive, while the Government budget has limitation to support PLN to finance the project. Hence, there is only 18,027 GW (42%) of the 35 GW will be built by PLN's power plant and the remaining 24,914 GW (58%) should look for another source of financing (PLN, 2015). In addition, the other fact also reveals that the planning development of new power plants, as well as the upgrading of existing power plants, are still concentrated on the non-renewable energy as a source of plant fuel. Reference to the Handbook of energy and statistic reveals that the fuel mixed of power generation in Indonesia per 2013 is dominated by coal (51.1%), gas (27.3%) and oil (9.3%), while the portion of renewable energy contributes only 12.2%, namely hydro power (7.8%) and geothermal (4.4%) (Center for Data and Information Energy Mineral Resources, 2014). This condition causes Indonesia as the main emitter CO<sub>2</sub> in the region and became the front runner in carbon intensity growth, far outpacing neighboring countries like Thailand and Malaysia and also Australia since 2010.

In terms of the effectiveness of renewable energy investment policies in 16 East Asia Summit countries, Indonesia is among the countries that are lagging behind, along with Singapore, Malaysia, Vietnam, and New Zealand. The country has a huge geothermal potential due to its volcanic geology, however, that potential is not explored to the optimum capacity. Even though the Government has been developing a number of energy policy and regulations which targeting 17% renewable energy in the energy mix in 2025, but the full effect is not seen yet (Chang et al., 2016). On the other hand, one problem arises from the urgent need to build renewable energy infrastructure is the financing gap. The funding source in Asian countries is highly dominated by banking loan. More diversified instruments such as from capital market will be favorable to promote financial intermediation and create efficiencies. One of the instrument proposed to narrow the financing gap is project bond (Ng and Tao, 2016).

Infrastructure financing has been a great concern of many nations. As elaborated in Deutsche Bank Research (2013) for the European Union (EU), public expenditure is one of the most important sources of infrastructure funding. Large amount of public debts mean that the public sector was facing a major challenge to reconcile public spending on infrastructure with the rising demand. Hence, the funding sources are limited, and with the global financial crisis, there is a more stringent banking regulation to increase the safety funding. To solve the problem of limited source of funding, the EU set off Project Bond Initiative (PBI) as innovative financial instrument. However, only commercially feasible projects that are reflected by predictable income flow that can be considered for the PBI.

The Indonesian Government, as elaborated in the Medium Term Development Plan 2015-2019, will require about USD

345.1 billion for infrastructure financing. However, there is only 41% of the total needs that can be financed by the State Budget. In order to overcome the budget limitation as a source of financing particularly, in the last few years, the Government has been conducting expansionary fiscal policy to promote infrastructure development. The goal is not only to accelerate economic growth but also to achieve inclusive economic welfare. A recent focus in fiscal financing strategy are using debt for productive spending; enhancing the role of private, State-Owned-Enterprise, and local Government for infrastructure development; and innovation in creative financing. However, to some extent, an expansionary fiscal policy has caused issues in fiscal sustainability. Concerned arise regarding debt trap since accumulated Government liability can lead to vulnerability in fiscal sustainability (Kuncoro, 2011). Therefore, it is necessary to be more selective in new debt commitment. In this context, productive spending that brings multiplier effect to the national economy should be prioritized as it can benefit, not burden the next generation.

Sukuk Negara (Sovereign Sukuk) is one of the financing innovation to create productive spending. Referring to the purpose of issuance according to the Law No. 19 year 2008, it is where the Government apply sharia-complied market instrument for infrastructure development. Since its issuance debut in August 2008, Sukuk Negara progress is getting significant. In 2008, Sukuk Negara issuance is IDR 4.7 trillion or 3.7% of total Government Securities issuance. In 2016, total Sukuk Negara issuance is IDR 179.89 trillion which is 27.6% of total Government Securities issuance (Directorate General of Budget Financing and Risk Management, Ministry of Finance, 2017). Its outstanding has reached to IDR 436 trillion as of 23 February 2017. However, the application of Sukuk Negara for project financing is still far from the ideal. The current practice is the usage of Sukuk proceeds to finance the infrastructure development, but the coupon and principal payments are not linked to the project revenue. In the long term, this mechanism will burden the State Budget.

On the other side, the opportunity of Sukuk Negara development is quite promising. The Government has consistently issued retail Sukuk in the form of Sukuk Ritel and Sukuk Tabungan. It aims to diversify domestic investor base by providing sound and profitable investment for retail investor. The issuance volume is increasing over the year with the number of investors is growing as well. Since 2009, the Government has been issuing Sukuk Ritel each year and it always attracts a huge demand (Figure 1). Most likely because Sukuk Ritel is a Government guarantee investment and bids a favorable yield.

Sukuk Tabungan debut was in 2016 and successfully attracted total purchase of IDR 2.585 trillion in which 47% of total investors have a purchase range from IDR 2-50 million (Figure 2). It concludes that the instrument also successfully diversified the investor to make an inclusive base of investors.

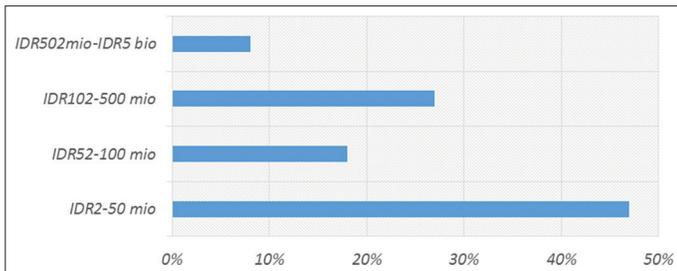
Sukuk Negara as potential source of financing for infrastructure development is truly needed because the Government face

**Figure 1:** Sukuk Ritel issuance and total investor (2009-2016)



Source: Directorate General of Budget Financing and Risk Management, Ministry of Finance.

**Figure 2:** Sukuk Tabungan investor composition based on nominal purchase



Source: Directorate General of Budget Financing and Risk Management, Ministry of Finance.

limitation in the fiscal space. Given the fact that the supply of the electricity is limited so it caused the electricity shortage problem, especially in the region outside Java and Bali, this study uses the renewable energy power plant as an example to be financed by Sukuk Negara, as Indonesia will need abundance supply of electricity to support the economic growth.

Based on the explanation above, the financing need to build renewable energy in Indonesia is so imminent, and the promising opportunity as a funding source is offered by Sukuk Negara. Moreover, this study uses Muara Laboh geothermal plant, as it has promising geothermal reserves to be developed. The project is located in the South Solok Regency, 150 km Southeast of Padang, West Sumatra. The project will develop geothermal steam resources through production and injection facilities and construct, operate, and maintain a single power generation unit with a total capacity of approximately 80 MW. It is one among potential geothermal power project offered by the Government through PLN and has Government support from the Ministry of Finance, as stipulated under a business viability guarantee letter.

Given the discussion above, this study will explore the using of Sukuk Negara as proper financing innovation to make debt instrument used for productive spending to finance the development of renewable energy power infrastructure. In addition, this study also looking for the further structure of Sukuk Negara that involve and accessible not only for a large major investor but also for individual investor to make robust and inclusive infrastructure financing in Indonesia.

## 2. LITERATURE REVIEW

### 2.1. Sukuk Definition and its Recent Development

Sukuk can be generally described as transferable certificates representing a share in the ownership of assets or business ventures that enable the Sukuk holders to receive periodic returns and full redemption on Sukuk maturity. As explored by (Haneef, 2009), the model of modern Sukuk was first introduced in 2000 at the 11<sup>th</sup> Islamic Development Bank Annual Symposium, but the concept is actually has been known since the early days of Islamic civilization. In the 1<sup>st</sup> century AH, the Umayyad Government would pay soldiers and public servants both in cash and in kind. The payment in kind was in the form of Sukuk Al-Badaâ'i which has been translated as commodity coupons or grain permits. The Sukuk holders were entitled to present the Sukuk on its maturity date and receive a fixed amount of commodity, usually grains. However, it was also common that some of the holders used to sell their Sukuk for cash before the maturity date.

In 2001 State of Bahrain launched its inaugural Sukuk Al-Ijarah in domestic market. The issuance amount was USD 250 million and had a tenor of 5 years. The Sukuk was backed by USD 250 million worth of sovereign assets. It was a major milestone in Islamic finance as it marked the emergence of the Sukuk in a capital market. Later in 2002, the Federation of Malaysia issued the first global Sukuk that complied with the U.S. Regulation S and rule 144A formats that usually used for conventional global bonds. The Malaysian Sukuk Al-Ijarah was the first Sukuk to be listed on the Luxembourg Stock exchange and rated by Standard and Poor's and Moody's. The USD 600 million Sukuk was offered globally and backed by USD 600 million worth of sovereign assets such as Government administrative buildings, hospitals and academic institutions (Haneef, 2009).

Sukuk has gained increasing popularity as an alternative class of investment asset. Haneef (2009) discuss the transition from asset-backed, asset-light, and asset-based sukuk. Early Sukuk issuances are issued in a form of asset-backed. However, asset-backed Sukuk is considered as secured instrument, thus the issuance is potentially breaching negative pledge standard form of international transaction, especially for any sovereign who previously issued a global bond. The issuance of asset-light Sukuk which use only a certain portion of real asset as Sukuk underlying yet still allowed the Sukuk to trade in the secondary market, is banned by accounting and auditing Organization for Islamic Financial Institutions. Most Sukuk issuances nowadays are issued on asset-based, with the issuance value is based on minimum 100% of real underlying asset. The asset-based Sukuk is considered unsecured obligation to the originator, make it an acceptable instrument both from international best practices and Islamic-compliance perspectives.

Recent development nowadays placed Sukuk as financial tools that are compatible with socially responsible investing (SRI). Both have been the most rapidly growing areas of finance in the last few decades (Bennet and Iqbal, 2013; Marwan and Adawiah, 2015). Sukuk, a financial instrument that is issued based on Islamic principle, together with SRI, shared aims where they mainly focus on individuals using their money in a manner that follows their

morals and beliefs. Economic return is not the primary motive for the investment, instead, the investors also take into account ethical behavior and social-welfare activities (Bennet and Iqbal, 2013).

Some variety of SRI financial tools on Sukuk are vaccine Sukuk which is issued by International Finance Facility for Immunization (IFFIm) in 2014 and 2015 (Marwan and Adawiah, 2015). The Sukuk share some characteristics with asset-backed securities but the investor credit risk was wholly borne by IFFIm. It means that IFFIm would repay investors on its own intrinsic financial strength regardless the value of the underlying assets. Marwan and Adawiah (2015) quoted Bennet that from the over-subscriptions of the Sukuk, the transaction is a success which demonstrates a promising instrument of the convergence of conventional SRI and Islamic finance.

SRI Sukuk have been promoted by Government of Malaysia under the Capital Market Masterplan 2 which was launched to promote socially responsible financing and investment. The guidelines on Sukuk declares that SRI Sukuk issuance proceeds will be applied for the purpose of funding eligible projects that aim to preserve and protect the environment and natural resources, conserve the use of energy, promote the use of renewable energy, reduce greenhouse gas emission, or improve the quality of life for the society (Marwan and Adawiah, 2015).

## 2.2. Sukuk Negara Issuance by Government of Indonesia and its Recent Development

The Government of Indonesia entered the Sukuk market in 2008 after the Parliament passed the Law No. 19 year 2008 on Surat Berharga Syariah Negara (later called Sukuk Negara or Sovereign Sukuk). Its debut was the issuance of sukuk Sarah sale and lease back in domestic market with the volume of IDR 4.7 trillion. The Government used state-owned-assets as the underlying asset. There is no legal title transfer in the issuance and the Sukuk is considered as asset-based securities. The Law has introduced the concept of beneficial title to be applied in Sukuk Negara issuance. In 2009 the Government issued Sukuk Ritel which is offered specifically for individual investor in the primary market. Later in the same year, the Government issued the first Global Sukuk in USD to be offered in the U.S. Regulation S and Rule 144A formats for international investors. Table 1 shows Sukuk Negara milestone from its inception until 2016.

The Government has been committed to being a frequent issuer of Sukuk, domestically and internationally. In the domestic market, the Government has conducted a scheduled Sukuk auction every 2 weeks. In order to get domestic Sukuk market deepening, the

Government also regularly issued retail Sukuk for Indonesian citizen. Currently, there are two instruments of retail Sukuk have been launched, Sukuk Ritel and Sukuk Tabungan. Sukuk Ritel is a tradable instrument aimed specifically for Indonesian citizen in the primary market. Its minimum purchase is IDR 5 million and maximum is IDR 5 billion. Sukuk Ritel is offered with a 3-years tenor area and monthly coupon payment. It is sold through selling agents which consist of banks and securities companies. Sukuk Tabungan is a non-tradable instrument aimed specifically for Indonesian citizen. Its minimum purchase is IDR 2 million and maximum of IDR 5 billion. Sukuk Tabungan is offered with 2-years tenor and monthly coupon payment. Even though Sukuk Tabungan is a non-tradable instrument but it has early redemption facility after 1-year holding. In the international market, according to data from Directorate General of Budget Financing and Risk Management, Ministry of Finance, as of 24 February 2017 the Government of Indonesia has become the largest sovereign issuer of USD Sukuk with total issuance is USD 10.15 billion, contribute to 22.5% of total issuance by a sovereign. Historical issuance of Sukuk Negara in Figure 3.

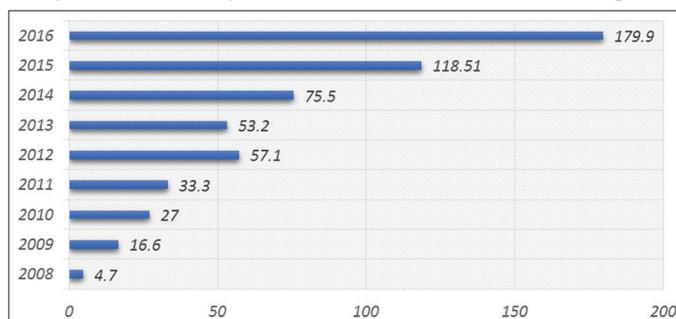
## 2.3. The Role of Sukuk to Finance the Infrastructure

In the last few years, there have been several studies and working papers on Sukuk as a potential funding instrument for infrastructure projects. From (Kammer et al., 2015) which is an IMF staff discussion note:

Sukuk can readily be structured for infrastructure financing. They resemble Public-Private Partnership financing whereby investors finance the assets, own them - leading to true securitization - and then transfer them back to the Government at maturity.

Usmani, as quoted in Najeeb and Vejzagic, 2013, has acknowledged this potential. Usmani emphasizes on the securitization to open a

Figure 3: Sukuk Negara issuance 2008 – 2016 (in trillion Rupiah)



Source: Directorate General of Budget Financing and Risk Management, Ministry of Finance.

Table 1: Sukuk Negara milestone

2008	2009	2010	2011	2012	2013	2014	2015	2016
Law No. 19/2008 Debut Sukuk Negara issuance	Issuance debut: Sukuk Ritel, Global Sukuk (in USD), Hajj Fund Sukuk (SDHI)	Sukuk Negara regular auction	Issuance debut Islamic T-Bills (SPN-S) Auction debut of Project-Based Sukuk	Green-shoe option auction for Sukuk Negara market development	Issuance debut of Sukuk Negara using project financing mechanism	Issuance debut of global Sukuk using Wakalah structure	Largest ever single tranche Global Sukuk globally	First dual tranches Global Sukuk (5 and 10 years) Debut Sukuk Tabungan issuance

Source: Directorate General of Budget Financing and Risk Management, Ministry of Finance

wider access to small investors to participate in large infrastructure project funding through the capital market:

To date, ICM instruments such as equity investments and Sukuk have been used to fund projects in both public and private sectors, including those of infrastructure. Without securitization and resulting capital market instruments, these projects would only be reserved for the wealthy segments of the society while excluding the masses - A case where the rich get richer and poor get poorer as envisioned by Karl Marx.

In addition to those, there are numerous researches and working papers discuss this issue. Ray (2015) highlighted the drainage of global liquidity and economic crisis leads to the promotion of project bond to finance infrastructure in the Asian countries. Historically it relies on development financial institutions, multilateral institutions, Government institutions, or export credit agencies from western countries for infrastructure financing. It outweighs the traditional financial instrument when the yield of a corporate bond and Treasury Bills is diminishing, though project bond is likely to bear the higher risk. It attracts financial institutions with long-term assets oriented such as insurance and pension funds. In the same way, Yoshino and Hirano (2010) suggests bond issuance in a form of Government bond and infrastructure revenue bond is the prospective funding source for infrastructure financing as it has potential demand from large national savings of developing countries. The study offers structure in which Government bond is issued to finance the construction period since it is not feasible to expect any revenue stream from the project during the period. Afterward, during the operational phase when the project able to deliver income stream, the Government bond will be converted to infrastructure revenue bond where the investor will receive a return based on the project performance.

The using of Government project bond to finance infrastructure also explored by Mirabile et al. (2014) in Development Co-operation Report 2014. They discuss the opportunity of using the bond as pooling resources fund to attract private investment fund. According to the authors, one way to pool financing resources is through securitization schemes through Sukuk. The researchers believe that Sukuk complies with sharia requirements of risk-taking and sharing of profit and losses. Sukuk value and income stream depend on the performance of the underlying assets/projects. The instrument has potential ability to attract Islamic investors who are a growing source of financing for many developing countries.

Furthermore, in order to successfully attract the investors, Sukuk as a bond must be able to provide good yields so that it can be sold on the market (Damodaran, 2011). Simulation to run a scenario of instrument issuance to finance the project is done by comparing project internal rate of return (IRR) with bonds yield, as those have the same meaning (Sigman, 2005). It means that IRR should be at least the same with the risk-free Government bond yield incomparable tenor, to the make the investor interesting enough to buy the instrument.

In the Indonesia context, the using of a Government bond to finance the infrastructure has been studied by Surachman and Setiawan (2016) which concluded that the using of a municipal

bond as a funding source for a project finance infrastructure is possible to be applied. In real practice, mixed source of funding between project loan and project bond has been used including for renewable energy project with long term payback period. After global financing crisis, getting project funding from the bank is more difficult and expensive. The banking loan is suitable for pre-construction phase, whilst the project bond's investor is more likely to fond of mature assets with stable cash flow. The yield Co-model which is established by NRG energy in 2012 shows the potential use of the securitization model to improve liquidity and diversify renewable energy project bond risk. The Yield Co investment structure is trying to lower cost of capital for renewable projects by bundling several operational assets together, resulted in reduced pre-construction and construction risk and assets diversification (Ng and Tao, 2016).

The using of Sukuk as pooling resources fund to finance the infrastructure was applied in the Equate Petrochemical Company Project in Kuwait (Sadikot, 2012). The study informs that the project had financed by Sukuk financing as well as the conventional instrument. For debt instrument, the project sponsor generated maximal of USD 500 million from Islamic funding. By entering into the Islamic tranches, the company try to diversify its funding source and expect to make the project more socially acceptable to Kuwaiti citizens and investors. Furthermore, the study concluded that Co-financed scheme between Islamic and conventional tranches is more complex to structure. However, Sadikot (2012) believes that investors will be more familiar with the structure as the market develops. There are other several other research on Sukuk issuance to get fresh funding from the market. By its nature, Sukuk is the appropriate instrument to finance a project (Kamil et al., 2010; Halim, 2016; Lebbe and Rauf, 2016). However, it also needs careful assessment to set up the structure by identifying and profiling risks associated with funding infrastructure projects from the issuance of Sukuk (Abdullah et al., 2014).

According to Abdullah et al. (2014), the risks associated with Sukuk issuance for project financing are liquidity risk, market risk, credit and counterparty risk, operational risk, institutional risk, capital risk and legal risk including shariah compliant risk. Since project management is a complex process which involves different kinds of risk, it required an understanding and analysis in each aspect to ensure a successful project outcome. It is also highlighted that since Sukuk represents a share of ownership in an underlying asset for a specified period, rate and return of Sukuk is associated with cash flows generated by pool of that underlying assets, which is then passed to Sukuk holders. This is regarded as the validity of shariah principle to accept returns derived from financial asset, which reflect the performance of the underlying asset.

The discussion of the risks in Sukuk issuance to finance the infrastructure project was held by Ismail (2013). As a case study, the author uses the development of Kuala Lumpur International Airport 2 (KLIA-2). In order to finance the development, Malaysia Airport Holdings Bhd issues Sukuk under two programs, firstly, Islamic Commercial Paper program in a form of discounted paper and Islamic Medium-Term notes program which is issued with coupon. By investing in this instrument, the biggest risk faced by

investors is project risk in which there is no guarantee that there will be sufficient cash flows generated from the project to meet both coupon and principal payments of the Sukuk. Nonetheless, Ismail (2013) believes that in spite of potential risks, Sukuk issuance for financing infrastructure provides many benefits to originators, investors and capital market. For the originator, Sukuk has given the access to the capital market for desired funding. KLIA-2 project securitization has given an alternative source of financing that makes the originator less dependent on one source of financier. Investors took advantage from instrument diversification and high-quality investment that Sukuk is usually offered. On the capital market side, Sukuk for project financing has created secondary market for benchmark purposes, facilitates and promotes the efficient allocation of capital. Related to the risks, Ismail (2013) gives an opinion that the instrument has evidently bear some risks and Islamic principle believes that the risks could not be transferred, instead, they should be mitigated. Therefore, in order to make it more attractive for investors, the originator could structure a Government credit enhancement to mitigate this risk.

The credit enhancement is discussed by Haneef (2016). The author mentions that low credit risk or Government guarantee is a critical factor of investor expectation for retail Sukuk framework launched by the Government of Malaysia. This opinion is pretty much the same with Sarah (2014) who research factors affecting investor interest in Sukuk Ritel in Indonesia. Using respondents from Sukuk Ritel investors seri SR-001 until SR-006, Sarah (2014) discovers that the strongest variable is the appraisalment that Sukuk Ritel is a product that has zero default risk.

Retail Sukuk framework in Malaysia is launched to facilitate retail investors to have direct access to a wider range of investment instrument (Securities Commission Malaysia, 2012). As discussed by Haneef (2016), the program is gradually implemented to provide retail investors time to gain understanding and familiarity with investing and trading in Sukuk. Retail Sukuk program is launched in 2013 by DanaInfra Nasional Berhad which is a company wholly owned by the Ministry of Finance that has main objective to undertake funding for infrastructure projects mandated by the Government. The Malaysian Government guarantees the Sukuk program. There have been 3 issuances so far with each volume and tenor is RM 300 million (10-years), RM 100 million (15-years), and RM 100 million (7-years). The use of proceeds is to finance Shariah-compliant capital expenditure and operating expenses in relation to the development of the Klang Valley Mass Rapid Transit project and any other related infrastructure. The investors of DanaInfra Retail Sukuk is not limited to Malaysian citizen, but also institution incorporated in Malaysia with majority shareholding held by Malaysian citizens, superannuation, cooperative, foundation, provident or pension fund established or operating in Malaysia (Haneef, 2016).

### 3. METHODOLOGY

In order to analyze the possibility of Sukuk issuance to finance renewable energy geothermal plant, including to enhance the Sukuk instrument to be inclusive to the market through Sukuk retail, this research used mixed method approach, between

qualitative and quantitative technique. The qualitative method is applied through desktop study and interview, while quantitative method used financial modeling study. The desktop study held by reviewing the literature and related journals, especially the Sukuk application, scheme, and practice in Malaysia, Middle East, and also Indonesia. In addition, this research also held by interviewing and digging data from the debt management office, Ministry of Finance, as the office is the administrator of the Sukuk issuance in Indonesia along with other Government debt. Furthermore, the analysis of the financial aspects was calculated using discounted cash flow (DCF), net present value (NPV), and IRR based on financial model resulted from the pre-feasibility study (Damodaran, 2011). The DCF are used to reflect the cash flow resulted from the project that will be used as underlying of Sukuk issuance. It will give the information related to project liquidity ratio (cash adequacy) to pay the coupon as well as Sukuk principal. Moreover, the NPV is a parameter to give a signal for the Sukuk issuance, in which positive figure meaning the project gives positive value to the project (Sukuk holder). Furthermore, in order to benchmark the coupon of the Sukuk, the IRR is used as it reflects the minimal return that investor willing to achieve. Finally, IRR is compared to the comparable risk free-Government instrument yield to maturity (YTM) to give a signal whether the Sukuk interesting enough to attract the bond investor in the market.

## 4. DISCUSSION

### 4.1. Legal Analysis of Sukuk Negara for Project Financing

The initial intention of drafting the law of Surat Berharga Syariah Negara (later called Sukuk Negara or Sovereign Sukuk) is built on the spirit of creating a financial instrument that is based on Islamic principle for infrastructure projects funding. The legal basis to this instrument is Law No. 19 year 2008 regarding Surat Berharga Syariah Negara, which regulates that the issuance objective of Sukuk Negara is specifically to finance State Budget including infrastructure projects. It is a bit different with its ancestor, Surat Utang Negara, which has the objective to finance State Budget deficit, fulfill cash mismatch, and Government debt portfolio management as regulated in Law No. 24 year 2002 on Surat Utang Negara. The opportunity to invest in a real project makes Sukuk Negara bring enthusiasm to encourage real sector development through funding sourced from the Islamic capital market.

Furthermore, in order to fulfill the issuance objective with regard to the project financing, the Government passed the Government Regulation No. 56 year 2011 on Project Finance with Sovereign Sharia Securities Issuance. The regulation sets among others the scope and procedures for the project nomination initiated by Line Ministry/Agency to be funded directly (earmarked) by Sukuk Negara issuance.

From sharia perspective, the Government works closely with the National Sharia Board - Council of Ulama Indonesia (DSN – MUI). There are several choices of Islamic contract to create Sukuk for project finance. For Government projects to be funded by Sukuk Negara issuance, DSN-MUI has stipulated Fatwa No. 76/DSN-MUI/VI/2010 about Sovereign Sharia Securities

Ijarah Asset to be leased. It is Ijarah or leasing contract that the object specification has been determined and some objects already exist at the time of the contract. However, the object delivery will be done in the future according to the agreement. Sukuk Negara which is issued with Ijarah asset to be leased contract represents ownership of part of the Sukuk Negara object, either the object already exists, or still under construction.

Besides using Ijarah contract, DSN-MUI also stipulated Fatwa No. 95/DSN-MUI/VII/2014 about Sovereign Sharia Securities Wakalah. Sukuk Negara which is issued with Wakalah contract represents ownership of the portion of the assets used in investment activities that are managed by the SPV as representative of the Sukuk Negara holders. Wakalah assets could be in a form of goods, services, projects, or other assets that are not against Islamic principle.

Since 2013 the Government has performed “project financing Sukuk” mechanism. It is Sukuk Negara issuance mechanism, which is earmarked by partial or overall required financing of specific projects. Under this mechanism, the projects to be financed by Sukuk Negara issuance has already specified since the budgeting process between Government and Parliament. The first activities using “project financing Sukuk” mechanism is the construction of Cirebon - Kroya double track worth IDR 800 billion initiated by Ministry of Transportation. Table 2 shows projects that are financed by the issuance of Sukuk Negara.

In order to use the scheme of project financing Sukuk, project initiation should come from Line Ministry/Agency addressed to The National Development Planning Ministry (Bappenas). Bappenas will assess the projects suitability with medium term development plan, readiness criteria, and sharia principles. As a guideline of sharia principles conformity, DSN-MUI stipulates the Provision No. 1/DSN-MUI/III/2012 on project criteria in accordance with Sharia principles. Projects that conform all the criteria will be escalated to budgeting process in the Parliament. Once the proposed projects got approval from the Parliament, the

funding commitment will be enacted in the State Budget Law for the corresponding year.

The application, however, still far from the ideal concept of project financing. The proceed amount of Sukuk issuance was earmarked to finance the project, but the coupon payment, as well as the principal payment, are burdened to the state budget, not linked to the revenue stream of the project. This mechanism, in the long term, will threat the fiscal sustainability, as the amount of coupon and principal will be getting bigger, in line with the growing of infrastructure needed to finance with Sukuk Negara. In addition, this existing mechanism also completely diminish the project risks that should bear by the project financing investors. In one hand, this situation looks to protect the investors, nevertheless, on the other hand, this mechanism also limits the investor opportunity to get higher return generated from the project. It is because their return of investment in Sukuk is set to the specific figure which not linked to the projected revenue.

#### 4.2. Financial Analysis of Sukuk Negara for Project Financing

The financial analysis was conducted to examine the possibility of Sukuk Negara as an alternative funding to finance Muara Laboh Power Plant. Based on the data from the feasibility study, the basic financial assumptions were used in this study as in the following tables. Table 3 covers all the assumption used for development cost and followed by Table 4 which show the assumption for operational cost. Finally, other assumptions are presented in Table 5.

In order to calculate DCF, NPV, and IRR, authors use two basic assumptions, namely capital expenditure and revenue and operation expenditure.

##### a. Capital expenditure assumptions

Muara Laboh power project is planned to be developed in 4 years. The construction activities include conducting a study of geology and geophysics, opening access road, drilling exploration wells, injection wells, as well as exploitation

**Table 2: Projects financed by Sukuk Negara issuance**

2013	2014	2015	2016	2017
IDR 800 billion	IDR 1.5 trillion	IDR 7.1 trillion	IDR 13.67 trillion	IDR 16.76 trillion
Double track railways	Double track railways	Railways in greater	Railways in greater	Elevated and double track
Cirebon - Kroya	Cirebon - Kroya	Jakarta, Central Java,	Jakarta, Central	railways in Java, Sumatera,
under the Ministry of	under the Ministry of	Sumatra, under the	Java, Sumatera, under	Sulawesi, under the Ministry
Transportation	Transportation (continuation)	Ministry of Transportation	the Ministry of	of Transportation
	Double track railways	Roads and bridges in	Transportation	Roads, flyover, underpass,
	Manggarai - Jatinegara	provinces under the	Roads and bridges in	bridges in provinces under
	under the Ministry of	Ministry of Public Works	provinces under the	the Ministry of Public Works
	Transportation	Infrastructure for higher	Works	Infrastructure for higher
	Hajj embarkation lodge in	education and religious	Infrastructure for	education and religious
	provinces under the Ministry	affairs offices under the	higher education and	affairs offices under the
	of Religious Affairs	Ministry of Religious	religious affairs offices	Ministry of Religious Affairs
		Affairs	under the Ministry of	
			Religious Affairs	Flood control infrastructure

Source: Directorate General of Budget Financing and Risk Management, Ministry of Finance

**Table 3: Assumption of development cost**

Geology and geophysics preliminary study cost	2	Mio USD
Construction cost (road and well pad), land and licenses for exploration:	20	Mio USD
Exploration (drilling+well testing)		
Total number of wells	6	
Drilling cost per well	7	Mio USD
Total cost Exploration (drilling+well testing)	42.0	Mio USD
Feasibility study and geology and geophysics study cost:	1	Mio USD
Development well cost		
Total number of wells	22	
Drilling cost per well	6	
Total cost Feasibility study and geology and geophysics study	132.0	
Injection well cost		
Number of wells	5	
Drilling cost per well	3.5	Mio USD/well
Total cost Injection well	17.5	Mio USD
Construction cost (road and wellpad), land and licenses for development:	10	Mio USD
Construction cost:		
Geothermal power plant per MW installed	1.3	Mio USD/MW
Pipelines (SAGS) per MW installed	0.4	Mio USD/MW
Total construction cost - plant	286	Mio USD
Total construction cost - SAGS	88	
Percentage of Management Project cost: 5% from construction cost	18.7	Mio USD
Owner's overhead costs	18.0	Mio USD
Total of development cost (without escalation)	635.2	Mio USD

**Table 4: Assumption of operational cost**

Operation and maintenance cost	0.9	Cent USD/kWh
Overhead	0.1	Cent USD/kWh
Make-up wells (4 wells every 5 years) per well	5.5	Mio USD/well
Average per year	4.4	Mio USD/year
Major well work-over ( 2 wells@ 1.2 MUSD every 3 years) per well	1.2	Mio USD/well
Average per year	0.80	Mio USD/year
Plant overhaul (2 units@ 2 MUSD every 3 years) per unit	2	Mio USD/year
Average per year	1.3	Mio USD/year
Total average annual capital expenditure during operations:	6.5	Mio USD/year

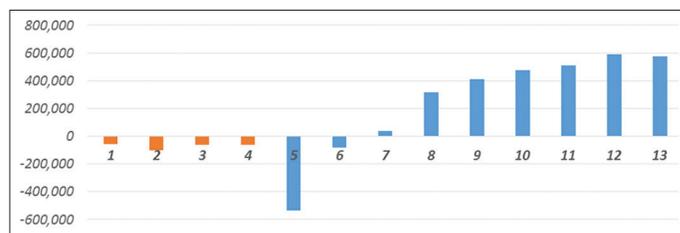
wells, planting pipeline, and developing power plant as well as distribution lines.

Based on per pre-feasibility study, total project cost is IDR 8.55 trillion, including the development of power plant; pipeline system, civil works for exploration and exploitation, exploration wells, and exploitation wells. The proportion of the project cost is 47%, 14%, 8%, 7%, and 28% respectively.

b. Revenue and operation expenditure assumptions

After the completion of construction in 4 years, then Muara Laboh project start to commercialize by producing electricity with total capacity 220 MW or equal to 1734 GW h per year. The tariff of electricity is 12.6 cent USD/Kilowatt h or equal to IDR 1.675/Kilowatt h. Based on this assumption, the gross revenue generated from the project is IDR 2.9 trillion per year.

On the cost side, the operation expenditure consists of 3 direct costs namely operation and maintenance costs, 3 yearly well

**Figure 4: Free cash flow**

repair, 3 yearly power plant repair, and general expenses, while depreciation of plant and pipe network will be treated as an indirect cost. In addition, the payment of royalty and others permit fee also included in the project expenditure. The total expenditure ranges from IDR 254.6 billion to IDR 424.7 billion

c. Financial analysis

Analysis of the financial aspects was calculated using DCF method to calculate NPV and IRR. As it can be seen in the Figure 4, the negative cash flows occur during the construction phase and the first 2 years of the operational phase. The total cost of the project is IDR 8.547 trillion in which reached the top at year 3 and 4 (IDR 3.032 trillion each year). Furthermore, starting from commercial operation date, during the first 2 years (5 and 6 year), the project still suffers for negative cash flow. It caused by the allowance of the Sukuk principal payment, which it is started from the first year of the operational phase when project also starts to gain revenue, while the depreciation expense also high in the early time of the project. The principal allowance is made for each year since the Sukuk issuance so that it will not burden the project to pay back the bullet payment of the Sukuk in the last year of the Sukuk period. Afterward, the trend of the cash flow is increasing and attain breakeven point in 6 years after the project is commercialized (year 10).

**Table 5: Other assumptions**

Geothermal power plant capacity design plan	2×110	MW
Tariff	12,6	Cent USD/Kwh as of Ministry EMR No. 17 year 2014
Inflation	2.50%	%/year
Price escalation per year	25% of tariff	US PPI
Exchange rate Rp/USD	Rp 13.300	Rp per USD as of APBN 2017 assumption
Take or pay (ToP) contract	90%	
Royalty	2.5%	
Corporate income tax	25%	

**Table 6: Coupon of 10-15 years Government bond and Sukuk**

Series	First issue date	Maturity date	Coupon (%)	Period
SDHI-2024A	11-Feb-2014	11-Feb-2024	9.04000	10.0
SDHI2025A	08-Jul-2015	08-Jul-2025	8.30000	10.0
SDHI-2029A	25-Mar-2014	25-Mar-2029	8.43000	15.1
SDHI-2029B	13-Aug-2014	13-Aug-2029	8.62000	15.1
FR0074	10-Nov-2016	15-Aug-2032	7.50000	15.8
FR0073	06-Aug-2015	15-May-2031	8.75000	15.8
PBS012	28-Jan-2016	15-Nov-2031	8.87500	15.9

Source: <http://www.djppr.kemenkeu.go.id>, accessed on February 16, 2017

**Figure 5: NPV Sensitivity Analysis**



	IRR	NPV
Project	19.86%	IDR626.4 billion (discount rate 8%)

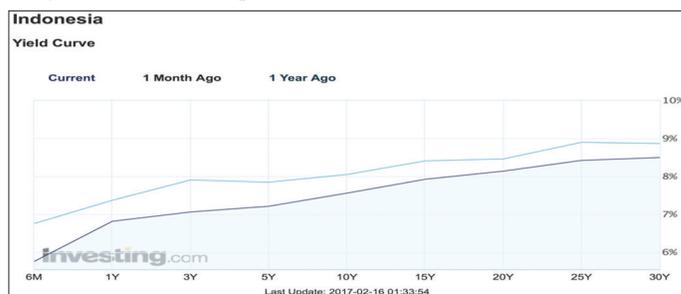
Based on the existing project cost structure (inflation adjusted) and existing financing scheme, the financial feasibility considerably strong results IRR 19.86%, while the NPV vary depend on the investor perspective about their cost of equity. Figure 5 shows the NPV sensitivity analysis.

As stated before, IRR number is the same meaning with bond yield. This means that the IRR 19.86% of the existing scheme should be at least the same with the risk-free 13 years Government bond yield to make the Sukuk interesting enough to attract investors in the market.

On the other hand, the yield of 13 years Government bond indicates that the investor required return from investing in Government bond range from 8.04% to 8.40% during the last year (Figure 6) and the coupon of 10 to 15 years government bond series itself range from 7.5% to 9.04% (Table 6).

It can be seen from the data presented above, the project IRR 19.86% is far exceeding the yield of Government bond (8%-8.4%) nor the coupon (7.5%-9.04%) within the same tenor (10-15 years). This figure will provide strong confidence to attract the market. Nevertheless, there should be highlighted in the Sukuk prospectus about the project risk. Unlike the usual Government risk-free instrument, in this specific instrument, the investors should also bear the project risk. Still, since the project is still under the

**Figure 6: Investor Required Return of Indonesia Government Bond**



Government surveillance, some guarantee is also applicable to the project, just like Government guarantee for electricity project. This arrangement surely will attract investors, as the ±10% margin return gained (19.86% min 8 to 9%) is comparable to the project risks they should bear.

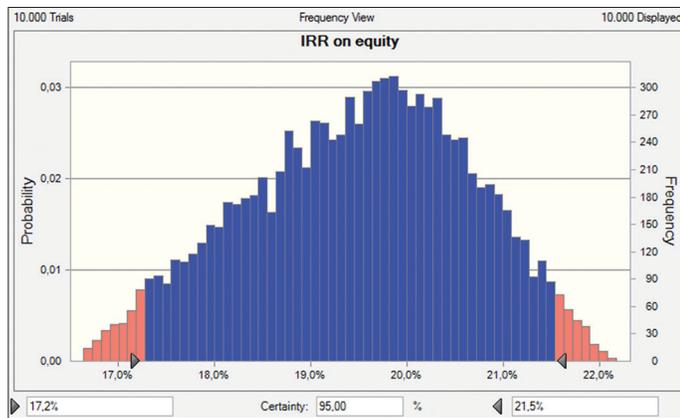
Furthermore, in order to strengthen the financial analysis, authors also calculate IRR using Monte Carlo analysis. The project cost is defining as the independent variable, as it reflects the project risk. Based on the study of Stefansson (2001), the project cost of geothermal power plant in a known field is ranging from 1.062 million USD/MW to 1.692 million USD/MW, which likely the cost is 1.267 million USD/MW. The data will be used as an input in the financial model to simulate the effect of it to the IRR figure using Monte Carlo analysis. The analysis will use Crystal Ball software to result the IRR histogram. Figure 7 shows the result.

The result of simulation analysis informs that the certainty range of IRR is from 17.2% to 21.5% with certainty level 95% (double standard deviation). The figure is interesting because the minimum IRR still far exceed the sukuk benchmark return.

### 4.3. Potential Instrument Development of Sukuk Negara for Retail Investor

Sukuk Negara issuance has shown its potential not only in domestic but also international market, not only for institutional

**Figure 7:** Simulation of internal rate of return using crystal ball analysis



investor but also for retail investor. It is not surprising, given Islamic financial practice is not new in Indonesia. Since 1991 Indonesian citizen has known Bank Muamalat, the first Islamic bank operation in this country. Bank Muamalat immunity from the national banking crisis in 1997 has added confidence to Islamic banking. Islamic financial practices emerge gradually since then. In 2000, Indonesia Stock Exchange introduces Jakarta Islamic Index which is meant to be investment guidance for capital market players. In 2002, Indonesia capital market has new instrument, Islamic bond or later known as Sukuk, which issued by PT. Indosat. The Government has followed by issuing Sukuk Negara since 2008.

Since its initiation, Islamic finance industry players such as banking, insurance, mutual fund, and capital market, have searched their own way to grow and develop. There is an effort to boost the growth by enacting Law No. 21 year 2008 on Islamic Banking. Roadmap for Islamic banking is introduced with a target to achieve 5% market share of the total banking industry. Other efforts were done sporadic for each industry players.

It requires a holistic approach to map Islamic finance potential in Indonesia. The consolidated approach is important to define policy and strategy to foster the growth of Islamic finance. The effort is materialized in 2015 when the Government introduced Indonesia Masterplan of Islamic Finance Infrastructure (Masterplan AKSI) containing the consolidated Government's commitment to carry out systematic efforts to improve infrastructure and the ability of the Islamic financial system. The Masterplan AKSI is intended to bring Islamic financial increasingly playing a significant role in the economic development of Indonesia.

Sukuk market and instrument to be one of the strategic aspects given the huge potential of this instrument. From the demand side, Sukuk Ritel issuance trend becomes an indicator that shown a large potential of a retail market share which is the Indonesian excellence and economic driving. From the supply side, especially on the local retail market share, there is a strategy and action plan to create new retail Sukuk program, which is connected to infrastructure projects, education, and agriculture that have a great impact on the economy. In addition to that, Islamic financial institution is designed to be granted permission to structure a

new savings instrument which is linked to the Sukuk instrument (Masterplan AKSI, 2015).

The Muara Laboh Project Sukuk also offers potential opportunity to be accepted in retail based customer, as it is likely to deliver significant return IRR to the Sukuk holders. However, there is an important factor that should be done by the Government before launching the project Sukuk namely the education to the investor, specifically about know-how project risk related to the Sukuk.

## 5. RESULTS

The possibility to use Sukuk Negara to finance renewable energy infrastructure such as geothermal power plant is so imminent. This study explores and reviews it based on two approaches. Firstly, from a qualitative point of view, there are sufficient legal basis and established mechanism to issue Sukuk Negara to finance the geothermal project. In addition, the Sukuk financing for real project that has viable project revenue stream will also strengthen fiscal sustainability in the long term. Secondly, from the quantitative perspective, as discussed in the financial analysis, the geothermal project is financially viable to get funding from Sukuk issuance. The project's IRR which reached to 19.86% indicates that the proposed Sukuk YTM exceeds the YTM of existing Sukuk Negara and Government bond with the corresponding tenor. It indicates that the Sukuk with the underlying Muara Laboh power project will be easily absorbed by the market, as the return offered by the project is above Government Sukuk and bond market perceived rate of return.

In addition to these, there is also an opportunity to involve retail investor to finance the geothermal project through the issuing of retail Sukuk. This opinion is drawn from the retail investor demand and potential Sukuk market share in Indonesia. Even though the proposed tenor is longer than historical evidence that is found in Indonesia but there is an opportunity to escalate the issuance of retail Sukuk to the next level like what has been stated in the Masterplan AKSI. Nevertheless, the Government should work out a preliminary step to educate the retail investors especially related to the project risk that embedded to the Sukuk.

## 6. CONCLUSION AND SUGGESTION

The development renewable energy project is very critical and should be put in high prioritization agenda, not only for fulfilling the electricity need, but also for reducing the pollution caused by fossil fuel plant. In this case, how to get project funding become an important issue. One of the alternatives is using Sukuk Negara. This instrument is prioritized by the Government as debt financing tool for productive spending. Our analysis by using desktop study, literature review, interview, as well as financial analysis, concluded that, by using Muara Laboh geothermal power plant case, it is feasible to use Sukuk Negara to finance the renewable energy project.

For policy objective analysis, the Government, namely Ministry of Energy and Mineral Resources, along with PLN, can propose the issuing of Sukuk Negara to finance green infrastructure

development, including geothermal and other renewable energy projects. In addition to that, for further analysis, this article offered a baseline for further research on legal issues on project structuring and market appetite in quantitative numbers.

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