

Alternative Financing Scheme for Renewable Energy Development for Electric Power Generation

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Abstract.

The importance of renewable energy development is beneficial to the society, not only to reduce the amount of pollution, but also for sustainable economic development. However, despite the efforts of the government of Indonesia in optimizing renewable energy technologies, there are some key barriers that cause insufficient access to financing and investing in renewable energy projects due to high initial costs, especially for remote areas. Therefore, the alternative financing for financing renewable energy projects through Islamic finance, namely with zakat and green sukuk. Badan Amil Zakat Nasional (BAZNAS), with the Bank of Jambi, financed the development project of micro-power plant in power plant in Jambi Province. Power plants will provide electricity for about 806 households, benefiting people and local businesses as well as public facilities. These projects demonstrate an alternative financing to finance renewable energy development projects as well as contributing to reducing development gaps in lagging regions in Indonesia.

1. Introduction

In the 21st century, the growth in energy consumption has been increasing levels of economic opportunity and wealth in most of all country. the study of the relationship between energy consumption, economic growth, and environmental pollution has grown enormously [1]. However, it is comforting overwhelming energy challenges. Fossil fuel as the natural energy resource which is regularly used for many years is one of the major contributors to climate change. The enormous credence on fossil fuels threatens to transform the Earth's climate to serious consequences for humanity and the natural system. The mining industry sector, such as oil, coal, and gas, uses 70% fossil energy from the total energy consumed [2]. Furthermore, a large fraction of the world's population has a shortage of access to basic energy services, such as electricity. At least

1.6 billion people currently live without electricity. This lack of access to modern energy technologies limits to increased revenues, affected to public's health and contributing to global deforestation and climate change.

In search of alternative energies to support their energy needs by utilizing renewable energy. Some developing countries have rapidly expanding markets for renewable energy, developed tools to be able to absorb energy from nature, such as solar energy, wind, power, biomass, and geothermal energy, to be transformed into vehicle's fuel and electricity. This report discusses double energy challenges: extending access to energy while simultaneously participating in a global transition to clean, low-carbon energy systems.

International Renewable Energy (NRE) forum made a statement that investments in renewable energy development have increased significantly. The last recorded data in the year 2015 investments in NRE amounted to US \$305 billion, increased from US \$270 billion in 2014, and US \$231 billion in 2013.

The types of NRE that are most developed by the world are solar energy and wind power. Like Denmark, its electricity needs are supplied by wind energy by 116% of the domestic needs. The next country that has made use of NRE is Germany, 95% of its electricity demand is generated by solar and wind energy. Indonesia, which is famous for its diversity of natural resources, has a potential of NRE that is very likely to be developed. Indonesia itself has six NRE resources, such as water, solar, wind, sea currents, bioenergy and geothermal energy. According to Mulyana (General Director of New Renewable Energy and Energy Conservation (NREEC) MEMR, 2016), the total potential of the six resources is estimated at 441.7 GW, with a realized capacity up to now is only 8.89 GW or 2% of the potential. With the details of the wind energy of 950-Megawatt, solar power of 11-Gigawatt, water energy of 75 Gigawatt, the biomass energy of 32 Megawatt, biofuel of 32 Megawatt, the potential marine energy of 60 Gigawatt, and Geothermal that is estimated to have 29 Gigawatts of potential. Therefore, to support the development, it is needed many adequate infrastructures and much management of NRE. In comparison to other ASEAN countries, Indonesia is still far behind the other countries. It can be seen from the table below.

Tabel 1: Indonesia Infrastructure Competitive Index

Year	Rank		Indonesia	Malaysia	Thailand	Vietnam	Philippines
2010-2011	90	Infrastructure	72	20	76	112	95
2011-2012	82	Road	72	19	50	104	87
2012-2013	92	Railway	41	12	74	52	80
2013-2014	82	Port	77	19	54	88	101
2014-2015	71	Air Transport	64	19	37	87	108
		Electricity	84	39	58	88	87
		Mobile	54	30	34	42	86
		Fixed Line	71	73	91	86	113

Sumber: The Global Competitiveness Report 2014-2015 (World Economic Forums)

Figure 1. Indonesia Infrastructure Competitive Index

Article I. The Indonesian government itself has allocated a budget in the Anggaran Pendapatan Belanja Negara (APBN) or in English is Country's Expenditure Budget of Rp. 410.7 trillion (table 2) in 2018 while the need for the development of its own infrastructure requires a fee of Rp. 4,700 trillion to the year 2019 (RPJMN 2015 – 2019).

Tabel 2: Anggaran Infrastruktur Dalam APBN

Tahun	Rp Triliun
2012	137,1
2013	176,1
2014	163,2
2015	281,7
2016	316,6
2017	386,9
2018	410,7

Sumber: Kemenkeu

Figure 2. Anggaran Infrastruktur Dalam APBN

In this case, the proposed instrument is Islamic finance which can be a valuable tool to finance the renewable energy sector, such as Zakat, Murabahah, Mudharabah, Ijarah, and Sukuk.

Some recent projects financed by the issuance of green sukuk, Islamic financial securities of the same denomination, representing the interests of individual ownership in the portfolio of existing or future assets that are qualified, for examples

are the project of One Surya Watt per Person in Indonesia and the project of Orasis in France [3].

In similar research, it has been dedicated to the feasibility of investing in renewable energy sectors. For example, Naseem Abu Jamie. Financing Green Economy Impact on Sustainable Development. Amin, et al. The Study of Renewable Energy Potential in Eastern Of Indonesia Based On Retscreen International Analysis. Anggaraini. The Role of Green Sukuk In Strengthening Indonesia's Position In The Global Sharia Financial Market. OtoritasJasaKeuangan (OJK) or in English is Financial Services Authority. Solar Power Plant Financing. Uddin and Ahmmed. Islamic Banking and Green Banking for Sustainable Development: Evidence from Bangladesh. Siswantoro. Performance of Indonesian green sukuk (islamic bond): a sovereign bond comparison analysis, climate change concerns? Mat Rahim and Zuriyati. Green Sukuk for Financing Renewable Energy Projects.

In literature, studies have not found that discuss energy performance and dependence on incentives from power stations using renewable energy in Indonesia using Sharia financial instruments and conventional finance, by comparing the results obtained. Our research aims to fill this gap.

2. Study of Literature

Sukuk

In general, sukuk can be described as a certificate of ownership of an asset or a business venture where a sukuk holder can receive a revenue share. Since the heyday of Islam in the 13th century, sukuk was mentioned as a growing source of cheque in

Europe, representing a contract or a right to a debt [4].

Green Sukuk

The green sukuk is the breakthrough of financial instruments proposed in accordance with Islamic Sharia in response to the development of green economy [3]. The concept of green sukuk is used to raise funds from investors who want to invest in financing instruments that are related to climate change in the world. Projects that are funded by the sales of sukuk must comply with the general guidelines that have been compiled by the World Bank in Green Bond Principles, including: energy efficiency and renewable energy, green building, green tourism, disaster risk reduction, sustainable transportation, waste to energy and waste management, sustainable management natural resources and sustainable agriculture.

Zakat

Zakat, according to Sharia, is the mandatory rights of certain assets at a certain time [5]. While according to the terminology, zakat is the gift of some treasures that have reached to the poor and so on and do not have a preventable nature of Syara' [6].

Renewable Energy

Renewable energy is an energy derived from nature, that can sustainably be produced continuously without having to wait for millions of years like fossil energy. These natural resources can be derived from the sun, geothermal, wind, hydropower and the form of biomass. The energy can not be depleted and can be continuously renewed.

Research Methodology

Opportunities for innovative financing to improve electricity development with renewable energy for rural areas

Globally, there is an annual investment gap of around US \$2.5 trillion to cover all sectors under the SDGs including access to energy, health, education, sanitation, etc. (UNDP 2018a). In the case of Indonesia, a significant proportion of the investment gap in financing SDG number 7, is expected in rural areas where more than 2,500 villages are without electricity. However, it should be noted that the approaches discussed in this section can be replicated in other SDGs realization financing.

There are two (2) innovative approaches to financing SDG No. 7 for affordable and clean energy that are relevant to rural electricity in Indonesia, which will be discussed in this paper, they are:

- Sharia financing
- Private sector financing

As a highest muslim population country, Indonesia only matches that consideration made about innovative ways of utilizing the Islamic financing mechanisms that are available to finance the SDGs, including improving access to energy through rural electricity. This confirms that the basic principles of SDGs are to allocate financial resources to the poor; promotes human dignity & social inclusion; and, leaving no behind, all completely in tune with the principles and objectives of the development listed in the Maqashid Al-Syariah-Islamic perspective. Consequently, it forms the basis that Islamic financing could play a role in SDGs financing through the following three key mechanisms:

Most of more than 2,500 villages without power supplies are in remote areas and outlying islands with limited economic development and high levels of poverty. Consequently, residents in these villages can

be considered less fortunate and, therefore, Zakat through investments in rural electricity, can be allocated to vulnerable communities as a way to ensure the raise of their social and economic welfare.

The second innovative Islamic financing mechanism that can finance the SDGs is an Islamic State bond if not referred to as Sukuk. Sukuk accounts are already for almost a third of government public debt implying that it is a very important source of government finance especially for national development.

In Indonesia, UNDP has supported the Finance Department in the development for the issuance of "Green Sukuk" worth of US \$1.25 billion. It is the first time in the world that any state bonds have been issued exclusively for SDG initiatives on climate funding related to changes in accordance with Islamic law. Some of the results from the green sukuk will be allocated to financing government renewable energy projects – including for rural electricity – as a means of meeting Indonesia's greenhouse gas emission reduction targets in the energy sector. The Development Fund through Islamic Development Bank (ISDB) is an innovative third financing mechanism of Islam that can support the SDGs, including number 7 in "affordable and clean energy". Although initially unrelated to the SDGs, since its inception, ISDB has financed renewable energy projects and other initiatives that contribute to climate change mitigation. Until today, globally, the bank has funded renewable energy projects worth of US \$2.75 billion and has allocated approximately 6% of the resources for climate change mitigation initiatives.

Based on the past experience and the alignment of the SDGs and Maqashid Al-Syariah, the Islamic Development Bank has recently committed to financing the realization of the SDGs (UNESCAP 2018). Therefore, as a member of the ISDB state, Indonesia could utilize the financing window that ISDB has established that is dedicated to meet SDGs.

As such, investments in the necessary infrastructure and other facilities required to meet SDGs, can be a capital-intensive effort, the private sector can play an important role in supporting the government of Indonesia in the financing initiative that contribute to meet the SDGs target. It can go through two (2) main options:

- Allocate Corporate Social Responsibility (CSR) funds that are related to SDGs.
- Direct investment as a part of normal core operation.

The first option for SDGs financing by the private sector is through Corporate Social Responsibility (CSR)

The use of CSR to support the poor in the community is an ancient practice by the private sector that is designed to give back to the society, but it is also partly motivated by tax deductible opportunities. Nevertheless, despite the motives, the SDGs offer a good opportunity for the private sector to invest their CSR funds in high-impact socio-economic initiatives.

In the second option, the government of Indonesia can develop a special incentive package that can attract private businesses in currently served areas to offer affordable services as part of their normal operation. Therefore, the government could provide incentives to encourage agro-industry to install larger than required power plant

facilities with excess electricity supplied to the nearby rural non-electrical communities or to sell to Perusahaan Listrik Negara (PLN) or in English is State Electricity Company as an overpower.

Case Studies in Indonesia: Development and Revitalization of Micro Hydro Power Generation in Jambi Province

An initiative under the auspices of the UNDP/GEF Renewable Energy and Energy Efficiency Market (MTRE3) project and is a collaborative effort with the Ministry of Energy and Mineral Resources and the provincial government of Jambi with financial support from Bank of Jambi and the Badan Amil Zakat Nasional (BAZNAS). PLN also consults in order to ensure that there are no plans to supply electricity in the project area. In this project, UNDP facilitates the implementation of innovative approaches in the form of mixed financing for rural electricity from Jambi Development Bank and BAZNAS, which has a common purpose for regional development and poverty reduction. Under the facilitation of UNDP coordinating with the Ministry of Energy and the provincial government of Jambi, Bank of Jambi as a private sector entity supports this project through the provision of Corporate Social Responsibility funds. From BAZNAS, Zakat fund is utilized for procurement of micro-hydro power plant equipment.

This project serves as an example of how Zakat can be utilized to support less fortunate communities in improving access to modern energy services as a means of alleviating poverty, thereby improving livelihoods and the quality of life of rural communities. The project consists of installations of 60 kW small-water electric power new mini-networks system and revitalizing three (3)

small water power plants, 40 kW each. Revitalizing each small hydroelectric power plant will involve improving civilian work and power generation and replacing electro-mechanical components. The existing power cord will be utilized except in one area where the grid lines will be increased. Local communities will be trained on the operation and the maintenance of small hydropower plants including the collection of revenues from end users to ensure sustainability of the project.

The project will serve some rural communities away from urbanization – one of the project locations is about 100 km from the nearest city. Therefore, the initiative is expected to change the life of more than 800 households (approximately more than 4,000 people) who will get benefit from the project. In addition, the following institutions will enjoy the electrical services: 8 schools, 23 mosques or musholla, and others.

Apart from just lighting the house and the above facilities and institutions, the project is expected to stimulate economic growth in rural community targets. Nowadays, for their income, most households in this community depend heavily on small rubber plantations. It is equipped with income from cocoa, coffee, patchouli and cinnamon farming. However, the emergence of electricity could stimulate additional opportunities of income from welding, hair salons, cold drinks, frozen food, etc., arising from the ability to use electrical appliances.

Households will also get benefit from lower energy costs for lighting. The electricity provided by the project will result in a savings of about 60% for households using kerosene lamps and a massive savings

of 91% for some households using diesel generators. In addition, the cost of electricity end users is expected to be lower than the average domestic tariff of PLN around 75%.

The project will serve as an innovative demonstration of emulated financing and how it can change the lives of the disadvantaged people. It also has an important role in helping Bank of Jambi to better understand renewable energy investments. It is hoped that after completion and operation of four (4) hydropower plants, the Bank of Jambi and other financial institutions of interest will have a better understanding of the project risks during construction and operation of hydropower plants in particular, to allow financing of other similar projects.

Islamic Financial Instruments and Conventional Financial Instruments

According to research by [7] when compared with conventional bonds, the sukuk stands better in risk measures and has the highest maximum value. Using a sample of actively traded Sukuk and bond and listed on the Indonesia Stock Exchange (IDX) and Indonesia Bond Pricing Agent (IBPA). The results revealed that sukuk yields have higher spread compared to conventional bond. Investment sukuk yielding higher would be encouraged to issue sukuk issuers where the issue of those, many investors are interested.

However, sukuk are exposed to different types of risks. The most important are the market risk, operations risk and Shari'ah compliance risk. The challenge for Sukuk issuing entities becomes to devise an effective risk management strategy congruent to Shari'ah principles [8]. Sukuk may also promote default risk as Sukuk also needs to undergo a credit rating assessment of its

future payment prospects and may also increase the risk of failing to pay [9]. Sukuk carry a fixed rate of return and affected by interest rate risk, consumer price rate risk, dollar rate risk, maturity risk, high quality risk, liquidity risk credit risk, and consumer confidence risk and return [10]. [11], The issue of sukuk default is very crucial since it affects the welfare of its stakeholders. [12], Throughout the paper, findings show that credit risk management application used for debt-based sukuk is about the same as in the conventional bonds. [13]. Adequate built-in risk control with management risk technique will increase investment. [14], This study shows that Sukuk can be a good alternative to conventional bonds, but it needs to be re-reviewed on some criteria that are not allowed by sharia.

Therefore, Zakat also can be used as an alternative financing for SDGs. Zakat receiver consisted of eight group which is called 8 asnaf (group) including poor and needy in it. There is also more focus on zakat not just as an act of giving but also its development impact. Recent data shows that zakat contributions have impacted more than 6 million people and increased average incomes by 27 percent. Also there is a shift to disbursing funds for immediate consumption to supporting longer-term productive activities. Zakat is also being used to support people's capabilities through training and equipment to help them get their entrepreneurial activities off the ground. Zakat as it has been applied to one village in Jambi, Sumatera for the construction of power plants Micro Hydro.

3. Conclusion

Alternative financing such as zakat and green sukuk can be applied to support the development agenda in Indonesia as well as global sustainable development. The harmony of zakat with the Sustainable Development Goals (SDGs) can eliminate poverty, hunger, and reduce inequality as well as partnerships to achieve goals.

Similarly, the green sukuk is a good indicator that the SDGs is a great investment opportunity. Some of the outcomes from the green sukuk will be allocated to financing government renewable energy projects – including for rural electricity – as a means of meeting Indonesia's greenhouse gas emission reduction targets in the energy sector. In Indonesia, UNDP has supported the Finance Department in the development for the issuance of "Green Sukuk" worth of US \$1.25 billion.

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