

Chapter 7

Cash Waqf Linked Sukuk and Renewable Energy: Potential, Model, Strategy

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A. Introduction

As a country with the fourth largest population in the world, Indonesia participates in contributing to global carbon emissions quite a large amount. Indonesia contributes carbon emissions number five in the world, with a contribution of carbon emissions reaching 102,562 GtCO₂ (Evans, 2021). According to the Ministry of National Development Planning (Bappenas), more than 90% of total carbon emissions in Indonesia come from the energy sector and land degradation (Setiawan, 2021). In addressing this issue, the government is targeting a reduction in carbon emissions by 31.89% in 2030 and net zero emission in 2060 (Putri, 2022).

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The Ministry of Environment and Forestry (KLHK) stated that the energy sector will be the focus of reducing emissions in the next few years compared to the forestry sector. So far, the energy sector has directly and indirectly contributed to other sectors, especially the transportation and industrial sectors, which have used non-environmentally friendly energy. In addition, the Ministry of Environment and Forestry claimed that the largest amount of carbon emissions in Indonesia was generated from fossil-based power plants. At the same time, from the forestry sector, it actually decreased during 2015–2018. On the other hand, domestic energy demand has actually increased. Indonesia also needs 2.9 billion barrels of oil equivalent (SBM) in 2050 or an increase of more than 236% in 2020 (Jayani, 2021). Therefore, the Indonesian government is committed to making an energy transition to renewable energy to overcome this problem. The energy transition program will encourage domestic energy needs to be met, while still paying attention to environmental aspects.

Although the environmental friendly energy transition scenario can have positive impacts on the economy, social and environment, its implementation faces funding constraints, especially in developing countries including Indonesia (Brunnschweiler, 2010; Geddes et al., 2018). Energy development with low carbon emissions requires large funds. Based on data from the Ministry of Finance, Indonesia requires an investment of around IDR 3,500 trillion to develop a renewable energy transition program (Fitriani, 2022).

The Ministry of Finance explained that the State Revenue and Expenditure Budget (APBN) scheme is unable to fund the low-emission energy transition program because the current annual APBN is only around IDR 3,000 trillion. Some policymakers in the energy transition program are pessimistic that investment in developing renewable energy technologies will run quickly, given that there is a significant financing gap (Geddes et al., 2018). Therefore, to fill this significant financing gap, financial cooperation from various sectors is needed, including conventional and nonconventional finance (Shahbaz et al., 2021).

According to Fateh and Elsayed (2019), the transition to environmentally friendly renewable energy requires a more advanced financial system that encourages and develops promising renewable energy technologies. In the absence of a well-developed financial sector, the state will find it difficult to finance projects. Given the result, financing is one of the most important obstacles in promoting renewable energy projects in developing countries (Becker & Fischer, 2013). Several conventional financial sources that have the potential to finance renewable energy include state treasury financing, international funding, sovereign wealth funds, banking financing, green bonds and mutual funds, corporate social responsibility (CSR), and crowdfunding.

In a country with a majority Muslim population, such as Indonesia, the developing financial sector is not only focused on the conventional financial sector, but nonconventional finance, such as Islamic finance, has also progressed rapidly. Indonesia is one of the countries with great potential for Islamic finance. One of the sharia financial schemes that can be developed to fund renewable energy projects is the Cash Waqf Linked Sukuk (CWLS) scheme. CWLS is a mechanism for depositing waqf funds (cash waqf) in State *Sukuk* (SBSN) to assist the Government's social facility development program (Hafandi & Handayati, 2021). The CWLS scheme is considered suitable for funding environmental and social-based projects, including renewable energy projects in Indonesia because of Indonesia's huge cash waqf potential. According to the Indonesian Waqf Agency (Badan Wakaf Indonesia), Indonesia's cash waqf potential can reach IDR 180 trillion per year, but the actual revenue is only IDR 860 billion or 0.478% (Badan Wakaf Indonesia, 2021).

The potential of CWLS as a financing alternative in funding social-environmental projects has been studied in previous studies. Faiza (2019) simulated the CWLS scheme for managing the impact of natural disasters such as the Yogyakarta and Central Java, earthquake. The simulation results found that investment funds sourced from CWLS could reach IDR 2.673 trillion so that they could cover the

funding needs due to damage to public facilities caused by natural disasters. In other research, the CWLS scheme can also be used for social infrastructure development projects that benefit the community (Ubaidillah et al., 2021). In addition, Siregar et al. (2021) explained that the CWLS scheme with *salam* contracts is the best solution in funding food security projects during the COVID-19 pandemic. Saiti et al. (2019) stated that the CWLS scheme had a direct impact on reducing economic inequality, thereby increasing the welfare of people in Somalia because infrastructure development projects funded by CWLS can directly create jobs thereby reducing unemployment and poverty levels. According to Thaker et al. (2016) and Lahsasna (2010), CWLS is an alternative solution for funding Micro, Small and Medium Enterprises (MSMEs) in Malaysia.

Sukuk integration with waqf can also be used as financing for environmental and sustainable development goals. Musari (2022) proposes a climate change countermeasures model by utilizing CWLS through a sharia green financing scheme in Indonesia. The proposed model confirms that CWLS, as one of the Islamic social finance instruments in Indonesia, is an innovative instrument with the potential to finance social and environmental based projects. According to Fauziah et al. (2021), CWLS is not only a useful financial instrument for social development programs but can also facilitate sustainable development programs that have a positive impact on the environment. CWLS has greater benefits and opportunities than the risks and costs, so it has great potential in financing social-environmental projects in Indonesia.

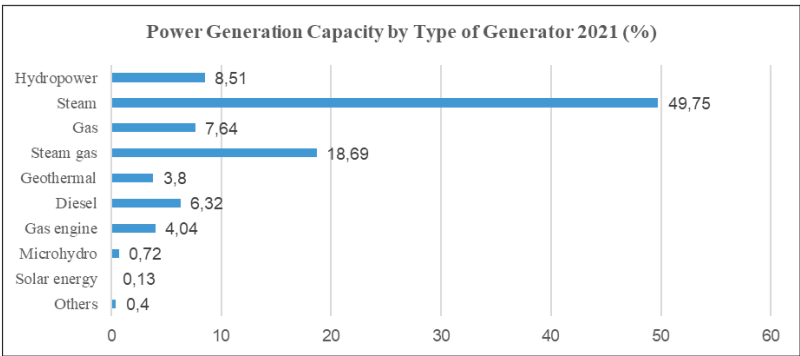
In another study, Mutmainah et al. (2022) developed a cash waqf integration model with blue *sukuk*, which is abbreviated as Cash Waqf Linked Blue *Sukuk* (CWLBS) for the purpose of sustainable maritime development. The proposed CWLBS model can be used to develop and increase access to fisheries business capital in order to encourage sustainable exclusive economic zone management. In addition, this model also serves to increase access for Muslims to become *waqifs* and participate in cash waqf programs through the use of digital platforms.

Although there have been many studies that have found that CWLS can be used for social investment projects, not many have highlighted CWLS financing schemes for green infrastructure projects such as renewable energy projects.

B. Development of Renewable Electrical Energy in Indonesia

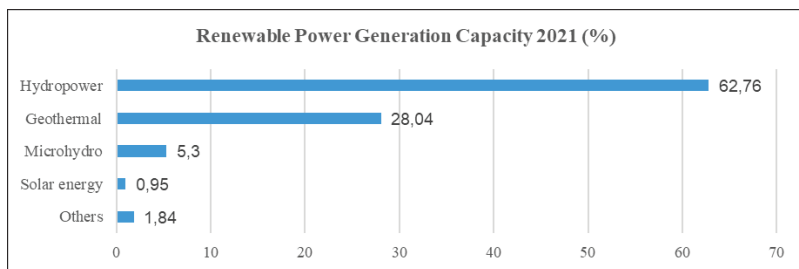
Based on data from the Ministry of Energy and Mineral Resources (ESDM), the need for electricity consumption increases by 6.9% every year, but most of the power generation in Indonesia still comes from power plants with high carbon emissions such as steam power plant (PLTU) (Wiratmini, 2019). Energy sources produced from PLTU are obtained from coal or petroleum fuels, which can pollute the environment (see Figure 7.1).

Based on the Central Bureau of Statistics (Badan Pusat Statistik) (n.d.), the total installed electricity capacity in Indonesia reaches 66,514 MW, but almost half of it comes from steam power. Renewable energy power plants (e.g., solar, hydro, micro-hydro, geothermal, and other EBT power) contribute only 13.56% or 9,020 MW (see Figure 7.1). Most power plants powered by renewable energy are still dominated by hydropower, followed by geothermal power plants. Solar energy only contributed 0.95%, micro-hydro power contributed 5.3%, and other low-emission power plants contributed 1.84% (see Figure 7.2).



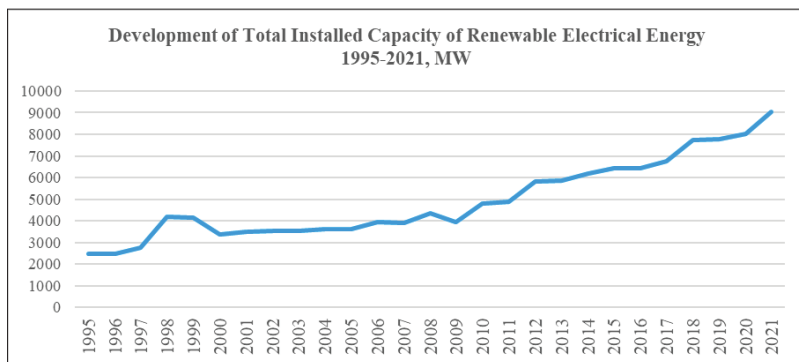
Source: Badan Pusat Statistik (2021)

Figure 7.1 Power Generation Capacity by Type of Generator 2021 (%)



Source: Badan Pusat Statistik (2021)

Figure 7.2 Renewable Power Generation Capacity 2021 (%)



Source: Badan Pusat Statistik (2021)

Figure 7.3 Development of Total Installed Capacity of Renewable Electrical Energy 1995–2021 (in MW)

Figure 7.3 reveals that the development of total renewable electric energy in Indonesia from 1995–2021 as a whole shows an increase for all low-emission power plants. The total electricity from low-emission power plants in 1995 was only 2,486 MW and increased to 9,020 MW in 2021. Solar, micro hydro and other low emission power plants were only developed in 2011. Hydro and geothermal power plants have been under development for a long time because these two plants are basically non-renewable but are considered to have low emissions when compared to coal or petroleum.

The installed capacity of electricity according to solar power in Indonesia is only 1 MW in 2019, then increases to 86 MW in 2021. Even so, according to the Ministry of Energy and Mineral Resources,

the total installed capacity of electricity from solar power is still far from the potential of 207.8 GW. The installed capacity of electricity from micro-hydro power was only 15 MW in 2011, then increased to 478 MW in 2021, and the installed capacity of other renewable power plants increased from 38 MW in 2011 to 266 MW in 2021. The installed capacity of hydro and geothermal electricity also increased compared to 1995. The installed capacity of hydroelectric power was only 2,178 MW in 1995 but increased to 5,661 MW in 2021, while the installed capacity of geothermal electricity was only 308 MW in 1995, then increased to 2,529 MW in 2021.

C. Financial Sector and Renewable Energy

There are many potential financial sectors that can be utilized to finance renewable energy projects. In Indonesia, the development of the financial sector, particularly the banking, stock market and bond market, has been progressing quite rapidly. This is evidenced by the increasing value of conventional banking assets, stock market capitalization, and total outstanding bonds. Based on data from the Financial Services Authority (Otoritas Jasa Keuangan—OJK), the value of conventional banking assets as of December 2021 has reached IDR 10,112 quadrillion, or an increase of more than 8 times compared to 2001. Meanwhile, the capitalization value of the Indonesian stock market reached IDR 8,252 quadrillion (an increase of 33.4 times that of 2001) and total outstanding bonds of IDR 4,957 quadrillion in 2021 (58 times increase compared to 2001). The increase in Indonesia's financial sector provides potential funding for developing low-carbon energy.

According to Daszyńska-Żygadło et al. (2021), the financial instruments used by banks are the most effective in financing. This is based on ranking various instruments used by banks in the process of financing renewable energy that are environmentally friendly by assessing the structure and value of financing needs based on renewable energy in future scenarios. On the other hand, Kim and Park (2016) concluded that countries with well-developed financial markets (par-

ticularly bank credit and capital markets) tend to experience growth in the renewable energy sector, which is environmentally friendly due to easier and greater access to external funding. In addition, according to the findings Ji and Zhang (2019), the development of the financial sector (bank credit, capital markets, foreign investment) is very important and contributes an overall of 42.42% to variations in the growth of environmentally friendly renewable energy in China. In this study, in particular, the capital market is the dominant sector in influencing the development of low-emission renewable energy.

Apart from conventional finance, Indonesia also has quite large potential for nonconventional finance, such as Islamic finance. This is supported by the very large number of Muslim population in Indonesia. Based on OJK data, as of December 2022, Indonesia has total Islamic financial assets reaching IDR 2,375.84 trillion (not including Islamic stocks) or an increase of around 2 times compared to 5 years ago, which was only IDR 1,129.76 trillion. In addition, the Indonesian government has also issued State Sharia Securities (SBSN) financing instruments or state *sukuk*. The issuance of SBSN is not only intended as a source of financing for the State Budget but also represents the government's presence in supporting the development of the Islamic economy in Indonesia and the global market. As of April 1, 2021, the total issuance of SBSN has reached IDR 1,697.96 trillion, with the current outstanding reaching IDR 1,048.18 trillion, either through the issuance method by auction, book building, or private placement.

D. The Potential of Cash Waqf in Indonesia

Indonesia is a Muslim-majority country with enormous potential for cash waqf. Based on data from the Indonesian Waqf Agency (2021), Indonesia's cash waqf potential reaches IDR 180 trillion per year. The potential for cash waqf in Indonesia is also influenced by the number of benefactors in Indonesia, in addition to the large number of Muslim residents in Indonesia. According to data from the World Giving Index, 8 out of 10 Indonesians are classified as philanthropists

because they are willing to donate money or wealth for social, environmental or religious activities (Charities Aid Foundation, 2021). The large number of philanthropic people in Indonesia should be able to encourage the exploration of the potential of cash waqf for social and environmental activities.

According to the World Bank (2020), there are five types of social classes which are classified based on their income (see Table 7.1), namely the upper class (expenditures above IDR 6 million per month), the middle class (expenditures IDR 1 million–IDR 6 million per month), the lower-middle class (expenditures IDR 0.5 million–IDR 1 million per month), vulnerable groups (spending IDR 354 thousand–IDR 532 thousand per month), and the poor (spending below IDR 354 thousand per month). The lower-middle class is the group that dominates the social class in Indonesia with a total of 44.5%, followed by the vulnerable group at 24%, the middle class at 20%, the poor at 11%, and the upper class at 0.5% (Lidwina, 2020).

Table 7.1 The potential of cash waqf in Indonesia

Expenditure per month	Classification	Number of Muslim	Cash Waqf Rate (2.5%) per month*	Potency per month (trillion)	Potency per year (trillion)
< IDR 354 thousand	Poor	16.81 million	IDR 8,850	IDR 0.148	IDR 1.785
IDR 354–532 thousand	Vulnerable	36.67 million	IDR 11,075	IDR 0.406	IDR 1.53
IDR 0.5–1 million	Lower-middle	67.99 million	IDR 18,750	IDR 1.27	IDR 15.3
IDR 1–6 million	Middle	30.56 million	IDR 87,500	IDR 2.67	IDR 32.1
> IDR 6 million	Upper	0.77 million	IDR 150,000	IDR 0.115	IDR 1.386
Total		152.8 million		IDR 4.38	+/- IDR 52

Note: The cash waqf rate per month is obtained from the middle value of the expenditure if it is a range of expenditure figures and the upper or lower limit if it is a single digit.

The total Muslim population in Indonesia is estimated at 237.55 million people or 86.7% of the total population and the number of productive age aged 15–64 years is 70.72% of the population or more than 191 million people (Badan Pusat Statistik, 2022) so that there are approximately 165 million Muslims are of productive-age. Data from the Charities Aid Foundation (2021) states that 8 out of 10 (80%) Indonesians are philanthropists, so it can be projected that there are around 152.8 million philanthropic Muslims of productive-age in Indonesia. If it is assumed that every productive age Muslim population in Indonesia has cash waqf of 2.5% of their monthly expenses, then the potential for cash waqf to be obtained is as follows.

If as many as 152.8 million philanthropic Muslims of productive age consistently donate money of 2.5% of their monthly expenses, then the potential for cash waqf that can be explored reaches IDR 4.38 trillion per month or around IDR 52 trillion per year. If the government targets only the lower-middle, middle, and upper groups, then the potential for cash waqf that can be obtained is up to IDR 48.78 trillion per year. The potential for cash waqf in Indonesia is relatively large, so if it is able to be explored and managed properly, it can be used for social-environmental-based projects that are beneficial to the community, including renewable energy development projects that require large investment costs.

The potential of cash waqf in Indonesia is relatively large, but in its realization, it encounters a number of obstacles. According to the Indonesian Waqf Agency (2021), Indonesia's cash waqf potential can even reach IDR 188 trillion per year, but the actual revenue is only IDR 400 billion or 0.213% of the potential. Several factors have contributed to the untapped potential of cash waqf in Indonesia, such as the strong understanding of the Muslim community that endowments must be in the form of land, lack of understanding of cash waqf, the low level of public trust in *nazhirs* as waqf managers (Faudji & Paul, 2020).

E. Cash Waqf Linked Sukuk Model for Renewable Energy Financing

Indonesia needs large funds to develop renewable energy, but the state budget is unable to finance the existing funding needs. Cash Waqf Linked Sukuk (CWLS) has great potential in financing renewable energy projects in Indonesia. *Sukuk* is a sharia investment instrument that is capable of channeling sharia financial funds to productive sectors and reaching all levels of society (Amanatillah, 2020). Furthermore, *sukuk* can finance social, environmental, or religious-based projects so that it has an impact on people's welfare (Oubdi & Raghibi, 2018). On the other hand, the utilization of cash waqf in Indonesia is not significant. This is evidenced by the low realization of cash waqf receipts in Indonesia, which is only 0.213% of the potential. Therefore, to make it easier for the community to channel cash waqf funds in a safe and productive way, as well as to develop social investment in Indonesia, the CWLS innovation was developed.

In order to explore the potential of cash waqf, the government has issued the Retail CWLS series SWR001 in October 2020 and the Retail CWLS series SWR002 in April 2021. The issuance of this CWLS is one of the government's efforts to support the national cash waqf movement, encourage the development of social investment, and the development of productive waqf in Indonesia. Sales proceeds of SWR002 amounted to IDR 24.141 billion, which came from individual endowments of IDR 15.661 billion and institutional endowments of IDR 848 billion. The sales value of SWR002 is higher when compared to the sales value of SWR001, which is only IDR 14.902 billion. Apart from that, the issuance of Retail CWLS series SWR002 also attracted 91.03% of new *waqifs*. This indicates that more and more *waqifs* are interested in social investment through the CWLS scheme. Even so, the government has not issued many *sukuk* for environmentally based projects such as renewable energy development. Therefore, this study proposes a CWLS model for financing renewable energy in Indonesia. The following Figure 7.4 is an explanation of the Cash Waqf Linked Sukuk Model for renewable energy financing in Indonesia.

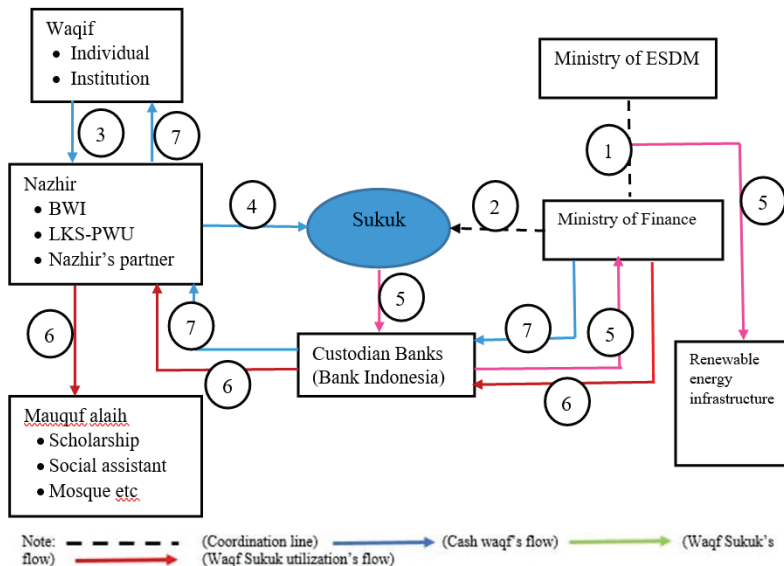


Figure 7.4 The CWLS Model for Renewable Energy Financing in Indonesia

The CWLS model scheme for renewable energy infrastructure development in Indonesia is explained as follows.

1. The Ministry of Energy and Mineral Resources (ESDM) proposed a renewable energy project to be funded by *sukuk* to the Ministry of Finance. The project proposal includes how much it costs to build a renewable energy project.
2. The Ministry of Finance issues *sukuk* waqf to finance renewable energy projects requested by the Ministry of Energy and Mineral Resources. Waqf *sukuk* schemes may not be traded on the secondary market. In addition, the issuance of *sukuk* also requires underlying assets, namely tangible assets such as land, buildings or other types of buildings, as well as assets that are intangible but have economic value, are not against sharia principles, and are not prohibited. In this case, the Ministry of Finance can include State Property (BMN) as the underlying asset for the issuance of waqf *sukuk*.

3. Individual or institutional *waqifs* hand over cash waqf of 2.5% of their income to the *nazhir* as the party that collects and manages the waqf funds. The *nazhir* appointed must be competent and trustworthy. The government can appoint *nazhir* partners such as Islamic banking or Islamic Financial Institutions Receiving Money Waqf (LKS-PWU) to collect, manage, and develop waqf funds. The cash waqf funds that have been collected are submitted to the Indonesian Waqf Agency (Badan Wakaf Indonesia—BWI) to be placed in state *sukuk*.
4. BWI purchases *sukuk* for renewable energy projects issued by the Ministry of Finance through Bank Indonesia as a custodian bank using cash waqf funds that have been collected by partner *nazhir* and LKS-PWU. Bank Indonesia then manages the sharia investment fund in the form of *sukuk* during the agreed tenor.
5. The *sukuk* waqf fund managed by Bank Indonesia is then distributed to the Ministry of Finance and the Ministry of Energy and Mineral Resources. The Ministry of Finance and the Ministry of Energy and Mineral Resources use the *sukuk* waqf funds to build and develop renewable energy projects in accordance with mutually agreed agreements.
6. The Ministry of Finance distributes returning *sukuk* in the form of coupons to *nazhir* through Bank Indonesia in accordance with the *ijarah* contract that has been mutually agreed upon. *Nazhir* as the party that manages the waqf funds uses the *sukuk* return funds for social purposes such as scholarships, social assistance and natural disasters, building mosques, and so on.
7. The Ministry of Finance fully returns the initial *sukuk* investment to BWI as *nazhir* after the tenor ends through Bank Indonesia. The Ministry of Finance fully returned the initial *sukuk* investment to BWI as the lowest point after the tenor ended through Bank Indonesia. The waqf *sukuk* are not returned to the *waqif* and can become BWI assets which can be reused to buy other waqf *sukuk* if the *waqif* deposits cash waqf permanently. On the other hand, BWI is obliged to return the cash waqf to the *waqif* if the

waqif deposits cash waqf temporarily. The return of waqf funds to the *waqif* is carried out after the maturity date in accordance with the nominal cash waqf deposited at the beginning of the agreement.

The contract proposed in the issuance of CWLS is an *Ijarah* contract. An *Ijarah* contract is an agreement in which one party leases the rights to its assets to another party based on the agreed fee and lease period (UU No. 19, 2008). In general, *sukuk* can be issued by three parties, namely the state, state companies and the private sector. In this scheme, *sukuk* is issued by the state through the Ministry of Finance. In this case, the *sukuk* issuer (Ministry of Finance) is obliged to pay income to the *sukuk* holder (*waqif*) in the form of profit sharing/margin/fee and repay the *sukuk* funds at maturity in accordance with the mutually agreed contract scheme (in this case, the *Ijarah* Agreement).

The Ministry of Finance provides coupons for *sukuk* with a fixed market value with the symbol “c” every year. The government sets a relative percentage of coupon rates, around 5 to 6 percent per year, with a relatively short tenor, generally under 2 to 3 years. In addition, in receiving waqf benefits from the management of *sukuk*, BWI as the recipient of the mandate (*nazhir*) can use a maximum of 10% of the returns for operational needs, while the remainder is channeled to *mauquf alaih*. *Ujrah* (u) *nazhir* for cash waqf management is a maximum of 10% of the coupon. After the end of the tenor period, the value of waqf utilization proceeds becomes “Mn” assuming n terms of the tenor of the *sukuk* so that the accumulation of waqf utilization income for *sukuk* is as follows:

$$M_n = (c - u)_1 + (c - u)_2 + \dots + (c - u)_n$$

or

$$M_n = \sum_{1}^n (c - u)_n$$

Assuming fixed coupons and *ujrah*, the value of waqf utilization can be calculated as follows:

$$M_n = (c - u)_n.$$

Note:

- M_n : The value of utilization of the *sukuk* waqf that can be received by *mauquf alaihi* during the tenor period;
- c : *Sukuk* coupon, calculated from the value of the *sukuk* multiplied by the specified coupon percentage;
- u : *Ujrah* for *nazhir*, calculated at a maximum of 10% of the coupon value;
- n : Year of tenor period.

The results of using CWLS funds can be used for many useful things such as building places of worship or tombs. In addition, the proceeds from using CWLS funds can also be distributed to *mauquf alaihi* in the form of business capital financing for new business actors. For this scheme, *nazhir*, in this case BWI, can cooperate with the Financial Services Authority and Micro Waqf Banks (Bank Wakaf Mikro—BWM) as distributors of financing assistance funds. With the characteristics of waqf funds that are eternal and can only be used without transferring property rights, this scheme can minimize the margin or yield that must be paid by beneficiaries. Thus, the capital assistance from BWM is financed with a minimum margin.

Waqf funds can support productive activities and distribute welfare to the community. Even in the long term, waqf can play a role in reducing poverty, overcoming hunger, improving the quality of health and education, and reducing social inequality. With this development of CWLS, waqf is expected to become an economic instrument and a means of strengthening the social sphere.

F. Cash Waqf Linked Sukuk Financing Simulation for Solar Photovoltaics Infrastructure Development in Indonesia

There are many types of renewable energy power plants that have been developed in the world including bioenergy, geothermal, solar energy, hydropower, onshore wind, offshore wind, and others. However, solar photovoltaics (solar PV) is the cheapest type of renewable energy power plant at this time (see Table 7.2).

Table 7.2 Global weighted average total installed cost, capacity factor and levelized cost of electricity trends by technology, 2010 and 2021

	Total installed costs			Capacity factor			Levelized cost of electricity		
	(2021 IDR Million/kW)			(%)			(2021 IDR/kW)		
	2010	2021	Percent change	2010	2021	Percent change	2010	2021	Percent change
Bioenergy	24.52	33.74	38%	72	68	-6%	705	961	36%
Geothermal	24.52	57.23	133%	87	77	-11%	452	975	116%
Hydro-power	11.88	30.61	158%	44	45	2%	352	688	95%
Solar PV	43.44	12.29	-72%	14	17	25%	3,768	688	-82%
CSP	85.14	130.36	53%	30	80	167%	3,235	1,635	-49%
Onshore wind	18.45	19.00	3%	27	39	44%	922	473	-49%
Offshore wind	44.06	40.98	-7%	38	39	3%	1,699	1,076	-37%

Note: 1 USD = IDR 9,036 (per 31 Dec 2010) and IDR 14,340 (per 31 Dec 2021)

Source: International Renewable Energy Agency (2021), processed

According to the International Renewable Energy Agency (2021), the total cost of installing solar PV is only IDR 12.29 million per kW in 2021, down by 72% compared to 11 years ago, which reached IDR 43.44 million per kW. Compared to other renewable energy power plants, the cost of installing solar PV is the cheapest at present, although the capacity factor is still the lowest, namely only 17% in 2021. In line with this, the Ministry of Energy and Mineral Resources stated that the cost of installing a power plant PV solar power is not as expensive as before. Currently, the average cost of installing a solar PV power plant is IDR 15 million per kW (Widyastuti, 2022).

The Indonesian government is targeting the installed capacity of Solar PV Power Plants in 2025 to reach 3,600 megawatt (MW) or around 3.6 gigawatt (GW). However, achieving this target is not easy because the installed capacity of solar PV until December 2021 was recorded at only 48.79 MW, with a total of 4,794 customers spread throughout Indonesia (Pradipta & Ardhi, 2022). If it is assumed that the installation cost of solar PV is IDR 15 million per kW, while the target installed capacity of solar PV power plants is 3600 MW in 2025, then an investment fund of IDR 54 trillion is required until 2025 to achieve this target. The cost is relatively large and quite burdensome for the government. Therefore, CWLS is a financing alternative that should be considered to cover solar PV investment costs.

The potential for cash waqf that can be explored in Indonesia reaches IDR 52 trillion per year. If the government targets only the middle and upper groups, then the potential for cash waqf that can be obtained reaches IDR 33.48 trillion per year or IDR 66.96 trillion by 2025. This amount has fulfilled 124% of the estimated solar PV financing target, amounting to IDR 54 trillion by 2025. In addition, if it is assumed that coupons resulting from the utilization of *sukuk* are 5.5% per year, with a tenor of 2 years (2024 and 2025), *ujrah* is 10%, and cash waqf obtained from the middle and upper groups is IDR 33.48 trillion per year, the value of using the *sukuk* funds is as follows:

$$c = \text{IDR } 33,480,000,000,000 \times 5.5\% = \text{IDR } 1,841,400,000,000;$$

$$u = \text{IDR } 1,841,400,000,000 \times 10\% = \text{IDR } 184,140,000,000;$$

$$\begin{aligned} M_n &= \sum_{1}^n (c - u)_n \\ &= (c - u)_n \\ &= (\text{IDR } 1,841,400,000,000 - 184,140,000,000)_2 \\ &= \text{IDR } 3,314,520,000,000. \end{aligned}$$

The calculation results above show that if the government is able to collect CWLS funds from the middle and upper groups of IDR

33.48 trillion per year, then this value is able to cover the financing needs of solar PV investment until 2025. Not only that, the results of the management of the waqf placed in a *sukuk* with a tenor of only 2 years is able to generate benefits of IDR 3.314 trillion. This value is large enough to be utilized by *mauquf alaiih*. The results of using CWLS funds can be used to improve the welfare of the people such as building mosques, scholarships, social assistance, and others.

G. Challenges and Strategies for Development of Cash Waqf Linked Sukuk as Alternative Financing for Renewable Energy Projects in Indonesia

The potential for cash waqf in Indonesia is quite large, but its implementation is still not maximized. There are several challenges that cause the CWLS scheme to be underdeveloped in Indonesia. First of all, knowledge of sharia social investment in the form of CWLS and public awareness for cash waqf is still low. According to data from the Financial Services Authority (Otoritas Jasa Keuangan, 2022), public literacy about Islamic finance is only 9.14%, while Islamic financial inclusion is only 12.12%. In addition, public knowledge about waqf is still low, as evidenced by the waqf literacy index in 2020, which is low with a score of 50.48 (Badan Wakaf Indonesia, 2020). This could be due to the lack of socialization carried out by the government to the Muslim community, causing literacy in Islamic finance, especially CWLS, to be low and hindering the collection of cash waqf (Hakim, 2021).

The government needs to cooperate with community Islamic organizations such as Nahdatul Ulama or Muhammadiyah to participate in socializing CWLS to the wider community to overcome this problem. Socialization can be done directly to the public through seminars or with social media. The socialization theme must include the clarity of the CWLS scheme, the ease of investment and the low risk offered in CWLS (Yasin, 2021). The socialization should target the upper middle class with an expenditure of more than IDR 1 million per month. In addition, the government through the Indonesian Waqf

Agency can also initiate a money waqf movement program in which the community, especially the upper and middle class, can set aside 2.5% of their income every month to invest in the CWLS scheme.

Another problem is *nazhir's* low ability to manage waqf funds. Financial management is one of the competencies that a *nazhir* must have so that the waqf funds that have been collected can be managed optimally. However, there are still many *nazhirs* who do not have good waqf fund management competencies (Farhand, 2020). This can have an impact on the lack of public trust in *nazhir*. Some people still trust community leaders as those who manage waqf assets compared to *nazhirs*. Therefore, the government needs to provide intensive assistance and coaching to *nazhirs* as waqf fund managers. The competence of waqf managers is an indicator that determines public trust in giving cash waqf to *nazhirs*. In addition, it is necessary to carry out strict, structured, and comprehensive supervision of the management of cash waqf in Indonesia. Supervision of waqf *sukuk* funds and their utilization in energy transition development programs is important to do so that waqf *sukuk* funds can be used in accordance with sharia principles and regulations that apply in Indonesia. BWI, the Sharia Supervisory Board, and the Financial Supervisory Board (Badan Pemeriksa Keuangan—BPK) are actors who play an important role in this oversight function (Disha et al., 2012).

On the other hand, the use of technology to access or invest in CWLS is still not optimal. Compared to the conventional financial technology, the use of Islamic financial technology, especially CWLS, is still not optimal. Therefore, a good cash waqf fund management database is needed to overcome this problem (Ginanjar, 2015). Transparency also needs to be improved. Waqf, as an Islamic financial instrument, has the principle that the object of waqf and *mauquf alaih* must be clear. Therefore, transparency in the management of CWLS is the main priority. In this case, if CWLS is used to build renewable energy infrastructure, the allocation of funds and beneficiaries must be clear (Putro et al., 2020).

H. Closing

According to the discussion that has been presented, it can be concluded that the CWLS scheme can be an alternative financing for low-cost renewable energy development programs (e.g., solar PV energy) in the future. Waqf funds collected through CWLS can be used in two ways. First, cash waqf is used to finance the development of renewable energy infrastructure through waqf *sukuk*. Funds from the utilization of waqf placed in *sukuk* can be distributed to *mauquf alaih* for programs for the benefit and welfare of the people such as providing scholarships, building mosques, social assistance, financing business capital and others.

The simulation results of implementing CWLS in the financing program for solar PV energy infrastructure development show that, if CWLS is collected in the amount of IDR 33.48 trillion per year, then this value is able to cover the entire financing for solar PV energy infrastructure development until 2025. Not only that, the management results waqf placed on *sukuk*, in a 2-year tenor can generate benefits of up to IDR 3.3 trillion. This value is large enough to be used by *mauquf alaih*. The results of using CWLS can be used for the construction of mosques, schools, as well as capital for the productive sector. Even though the CWLS scheme has great potential to finance the development of renewable energy in Indonesia, there are many obstacles that must be overcome immediately, such as low literacy of community waqf in Indonesia, lack of competence of *nazhir* as waqf managers, lack of maximum digitalization of CWLS, and obstacles related to transparency. The government is expected to be able to intensify socialization regarding CWLS to the public, develop *nazhir* competence, build databases and CWLS applications that make it easier for the public to donate cash, and must be more transparent about the collection, management, and distribution of cash waqf.

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