# Green Sukuk as a Funding Tool for Climate Change Projects - Indonesia as a Case Study-

# الصكوك الخضراء كآلية لتمويل مشاريع تغير المناخ – اندونيسيا نموذجا–

**Azaizia Sarra**

Laboratory of sustainable Business Management, Larbi Tebessi University, Tebessa (Algeria), sarra.azaizia@univ-tebessa.dz

*Received: 01/09/2020* *Accepted: 22/03/2021* *Published:27/04/2021*

**Abstract:**

The following study aims to investigate the value of Green Sukuk as a financing tool for climate change projects. These Sukuk provide the mobilization of appropriate funds to establish these projects. Green Sukuk help bridging the funding gap needed for these projects. Therefore, the Indonesian experiment was taken into consideration in this analysis, as it was the world's first sovereign Green Sukuk. It aimed to provide the necessary funding to achieve its climate change agenda and thus achieve the sustainable development goals.

**Keywords:** Green Sukuk; Islamic sukuk; Islamic finance; Climate change; Sustainable development.

**JEL Classification Codes**: Q54, Q01, G19.

**ملخص:**

استهدفت الدراسة البحث في أهمية الصكوك الخضراء كأداة لتمويل مشاريع تغير المناخ، ذلك لما توفره هاته الصكوك من تعبئة لتمويلات مناسبة لتوجيهها لإقامة هاته المشاريع حيث تساعد الصكوك الخضراء على سد فجوة التمويل لهاته المشاريع، وقد عرضت الدراسة تجربة اندونيسيا حيث قامت هاته الأخيرة بإصدار أول صك أخضر سيادي في العالم بغرض مساعدتها على توفير التمويل اللازم لتحقيق أجندتها في مجال تغير المناخ وبالتالي تحقيق أهداف التنمية المستدامة.

**كلمات مفتاحية:** صكوك خضراء، صكوك إسلامية، تمويل إسلامي، تغير المناخ، تنمية مستدامة.

**تصنيفات JEL** : Q54, Q01, G19.

## 1. INTRODUCTION

Countries around the world are seeking to achieve sustainable

***Corresponding author**: Azaizia Sarra, **e-mail:** azaizia-univ@hotmail.com*

development in the light of the environmental degradation that has been noticed at several levels. They call for rationalizing the use of energy and the transition to cleaner energy resources. This is through setting out climate change projects that take into consideration climate and environment's positive impacts, along with building a new infrastructure for power generation or transformation of existing projects into projects with less negative climate impact.

Sukuk appears as one of the Islamic finance tools that witnessed remarkable development in the last period because it meets the needs of a large category of people who care about Sharia rules in their financial dealings. Green Sukuk is one of those tools whose proceeds is aimed at implementing projects that take into consideration environmental impact, representing thus a step towards global climate change concerns.

**1.1 Research problem:** The following study seeks to answer the following main question: How can Green Sukuk support financing climate change projects in Indonesia?

**1.2 Research objectives:** The study seeks to achieve the following goals :

- Providing a theoretical concept of Green Sukuk and climate change projects;
- Highlighting Indonesia's Green Issuance &Climate Change Initiative;
- Focusing on the use and impact of Green Sukuk issued in Indonesia that finance Climate Change Projects.

**1.3 Research significance:** The study provides an appropriate mechanism to meet the needed funds for climate change projects. Green Sukuk represents an appropriate mechanism especially because it attracted the attention of a huge category of investors that care about directing their savings to a more appropriate environmental projects, which correspond in the same time with Islamic Sharia.

**1.4 Research Axes:** The Research is divided into the following axes:

- Green Sukuk and Climate Change Projects concepts;
- Indonesia's Green Issuance &Climate Change Initiative;
- Use and impact of Green Sukuk on financing climate change projects in Indonesia.

## 2. Green Sukuk and Climate Change Projects concepts:

### 2.1 Climate Change projects:

Climate change refers to a statistically defined change in the average and /or variability of the climate system, this includes the atmosphere, the

water cycle, the land surface, ice and the organisms of earth (nature.com, 2020). Climate change is one of the most complex issues facing us today. It involves many dimensions- science, economics, society, politics and moral and ethical questions. Moreover, it is a global issue observed on local scales, which will remain for decades and centuries to come. Carbon dioxide, the predominant heat-trapping gas and the greenhouse gases that has driven recent global warming lingers in the atmosphere for hundreds of years, and it takes time for the planet to respond to such a global warming. (nasa, 2020)

Taking actions on climate change means adopting and implementing ambitious programs to limite emissions of greenhouse gases to levels compatible with the well-being of the ecosphere, while supporting communities around the world to adopt to the unavoidable impacts of the climatic changes that are already been observed (Global environment fasility, 2020), Addressing Climate change requires many solutions, yet nearly most of these solutions exist today, and many of them hinge on humans changing the way they behave and shifting the way they use and consume energy (Nunez, 2019).

The required changes span technologies, behaviors, and policies that encourage less waste and smarter use of our resources, for example : improvements to energy efficiency and vehicule fuel economy, increase in wind and solar power, biofuels from organic waste, setting a price on carbon, and protecting forests are all ways to reduce the amount of carbon dioxide and other gases trapping heat on planet (Nunez, 2019), responding to climate change involves a two-pronged approach (nasa, 2020) :

- Reducing emissions of and stabilizing the levels of heat-trapping green house geses in the atmosphere « mitigation ».
- Adapting to the climate change already in the pipeline « adaptation ».

Recent estimates of the cost of adapting to climate change in low- and middle-income countries range in the tens of billions of dollars annually, Adaptation costs in cities will account for a fairly large proportion of this average, This is due to the cost of adapting infrastructures and services to densely populated areas (Ayers, 2009, p. 226).

**2.2 Green Sukuk:**

Islamic finance is one of the fastest growing sectors in the global financial industry. It was founded and developed on strong ethical and moral values. There are many similarities between the socially responsible

investing and Islamic finance as they both seek a gain greater than financial return (Ahmed, 2019), Islamic Sukuk have been developed and adapted to comply with the requirements of sustainable development especially with regard to environmental protection, They are defined as Islamic securities that comply with the provisions of Islamic Sharia and directed towards green investments and environmentally friendly projects. (لسود، بولعسل، و بن سعيد، 2018، صفحة 63)

Green Sukuk illustrates the importance of diversifying Islamic sukuk for use in various sectors to achieve sustainable development. It is an Islamic financial tool thatcounters traditional green bonds issued by governments, private sector or international financial institutions (زحل و الشريف، 2018، صفحة 56), Issuing Green Sukuk came in response to the increasing pace of green bonds at the global level. Particularly, there was a need to issue green bonds that are compatible with Islamic principles in order to finance a wide range of sustainable activities such as those dealing with infrastructure and small business projects, among others... (حفاي و شخوم، 2018، صفحة 344)

Green Sukuk bridge the gap between conventional and Islamic finance because it appeals to both investors looking to invest their money into more environmentally beneficial investments as well as customers who are looking for Sharia compliant investments (Sustainabilist, 2020), Green Sukuk is among the innovative financial instruments that combine two objectives. The first is the standardization or application of Islamic finance products using Sukuk as one of the effective tools in the global financial sector, and the second is in financing nature development projects. These tools are responsible for achieving the signs of social trend responsibility of Islamic financial and banking institutions towards our societies (سياخن و رباحي، 2019، صفحة 66).

Green sukuk is witnessing a wide spread, thanks to the increased awareness of the importance of Islamic financing tools on the one hand, and the importance of the environment on the other hand. Its revenues are often allocated to environmentally friendly projects to provide infrastructure or clean energy(علاب، جليط، و طيبي، 2018، صفحة 55) , and these are the motivations for relying on green Sukuk**:** (رزيق و التهامي، 2019، صفحة 111)

- an increasing number of investors interested in environmentally sustainable investments;
- the significant growth in the Islamic Sukuk market;
- Banks' reluctance to finance infrastructure projects because of the strict capital requirements.

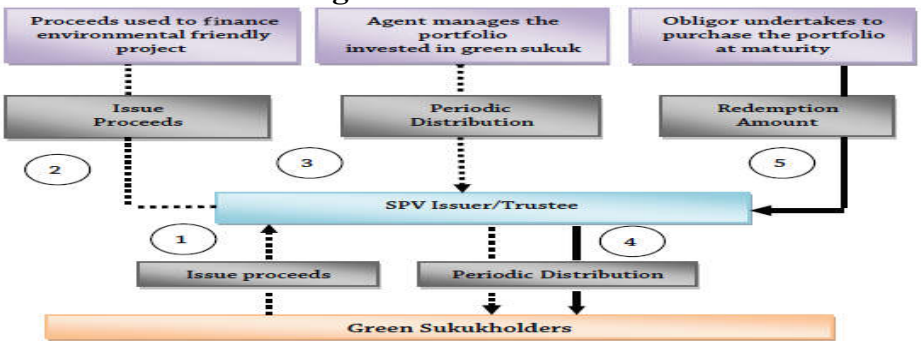
The scale of funding and technical support required to achieve the ambitious 2030 agenda for sustainable development are far beyond the scope of individual government and multilateral funding agencies. Islamic finance can be a strong and non-traditional source of financing for the SDG's beside conventional finance. Its major principles of financial stability, financial inclusion and shared prosperity are aligned with the SDG's (Global Islamic Finance and Impact investing platform, 2019), green Sukuk that are directly related to the climate change, global warming and other environment issues (rohaya & zam, 2018, p. 131).

The climate change challenge and the growth of the Islamic finance industry, together with the increase in socially responsible investing, could position Green Sukuk as a key instrument for financing clean energy and resilient infrastructure projects as well as shorter-term energy efficiency projects (Aasouli, Asutay, Mohieldin, & Nwokike, 2018, p. 01), It has recently emerged as a unique example of a Sharia compliant impact-investing instrument with strong growth prospects to fund environment-friendly projects. Green Sukuk are asset-based financial instruments structured to provide funding for Renewable Energy and environmental projects among others (Global Islamic Finance and Impact investing platform, 2019).

For developing countries, Sukuk serve as promising means to finance the infrastructure development, due to its nature that is necessarily backed by long term assets (Anugrahaeni, 2017, p. 07), Indonesia is one of the developing countries that is in dire need of financing for its sustainable development. Therefore, Green bonds and Green Sukuk, which are prominent experiences in other economics, have attracted the government to launch them to meet its urgent needs. The following figure shows the flow of revenues from Green Sukuk to finance climate change projects. (Anugrahaeni, 2017, p. 20).

The following figure describes the process flow of green sukuk proceeds financing climate changing projects :

**Fig 1**. Green Sukuk Structure



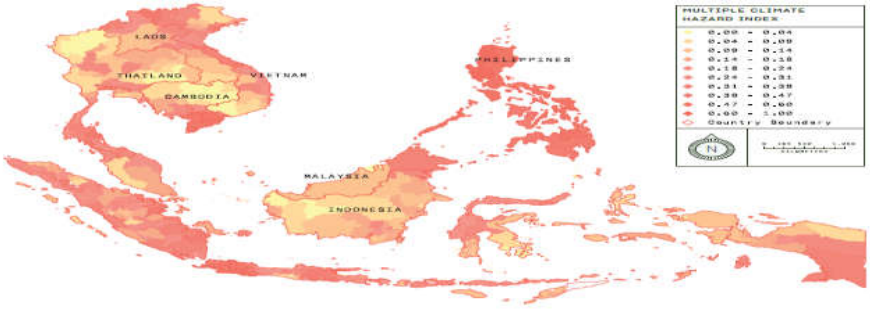

**Source:** (rohaya & zam, 2018, p. 131)

## 3. Indonesia's Green Issuance & Climate Change Initiative:

### 3.1 Indonesia's Climate Change Initiative:

Indonesia is the fourth most populated country and one of the fastest growing emerging markets. This rapid growth has improved the living standards, but has also experienced environmental degradation and vulnerability to climate change impacts.

**Fig 2**. Indonesa's climate change vulnerability map




**Source**: (Ministry of finance -Republic of Indonesia-, 2018, p. 08)

As Figure 02 shows, Indonesia is highly vulnerable to adverse climate change impacts. Rising sea levels and surface temperature are likely to intensify natural disasters, especially in low-lying areas.

Global Climate Reports predict that Indonesia could suffer from prolonged droughts, floods and increased frequency of extreme weather events, Therefore, adapting to these threats together with measures to mitigate the country's contribution to global greenhouse gasses (GHGs) emission is both a national priority and a global responsibility for Indonesia (ministry of finance-republic of Indonesia-, 2019, p. 02).

Indonesia ratified the Paris Agreement in 2019, with the goal of an unconditional 29% reduction in business as usual by 2030 and a further

12% reduction in technology transfer, capacity development, payment outcomes and access to financing.

**Table 1:** Indonesa's GHG emission for business as usual scenario and projected emission reduction for each sector

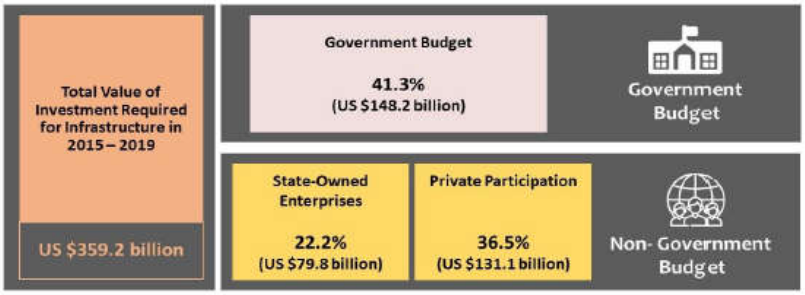
| Sector | GHGs Emission level 2030 (MTon Co2e) | GHGs Emission Reduction (MTon Co2e) | |
|---|---|---|---|
| | BaU | CM1 | CM2 |
| Energy (including fugitive)** | 1669 | 314 | 398 |
| Waste | 269 | 11 | 26 |
| IPPU | 69.6 | 2.75 | 3.25 |
| Agriculture | 119.66 | 9 | 4 |
| Forestry (including peat fire) | 714 | 497 | 650 |
| TOTAL | 2869 | 834 | 1081 |

**Source:** (Ministry of finance -republic of Indonesia-, 2019, p. 03)

- CM1 : counter measure (unconditional mitigation scenario).
- CM2 : counter measure (conditional mitigation scenario).
- IPPU : Industrial processing and process use.
- BaU : Business as usual.

Indonesia signed the Paris agreement to make funding flows compatible with the road to low-carbon and climate resilient development. In the 2019 budget, infrastructure investment increased by 2,4% to 28,8 billion USD, approximately a quarter of the expenditure needed for infrastructure in 2015-2019, which represents 17,2% of total government spending that comes from state-owned enterprises, as shown in figure 3.

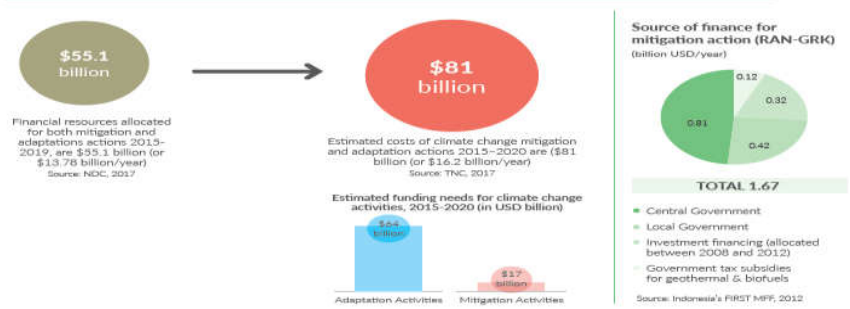
**Fig3**. Indonesia Financing Infrastructure commitment for (2015-2019)




**Source:** (Climate Bonds Initiative, 2019, p. 04)

The government is now anticipating that between 2020 and 2024 the investment value needed for all infrastructures (Green and non-green) will be about 460 billion USD. Given these sustainable policy commitments, private investors and capital markets would need to finance around a third of infrastructure growth. The policy has aggressively pursued 130-150 billion USD in investment to fund its ambitious agenda.

**Fig 4.** Indonesia Green Infrastructure financing Requirements for (2015-2019)




**Source:** (Ministry of finance -Republic of Indonesia-, 2018, p. 11)

To sustain this effort, the Government of Indonesia requires tremendous funding sustain in both climate mitigation and adaptation activities. As it is clear that there are financial gaps between funding needs (81 billion USD or 16.2 USD/year) -where 64 billion USD is for adaptation projects and 17 billion USD is for mitigation projects- and the currently accessible financial resources (55.1 billion USD or 13.78 Billion USD/year).

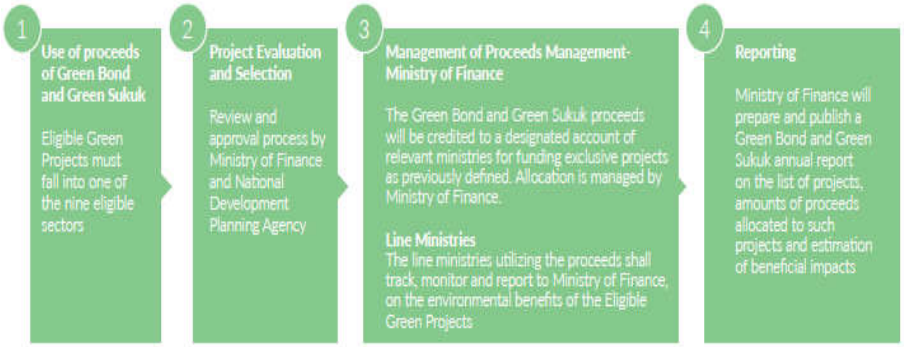
The low carbon development initiative estimates that Indonesia's low-carbon pathway requires a total amount of low-carbon development investments that would average 21,9 billion USD per year for the Period 2020-2024, which is about 1,7% of GDP and 2,3% of GDP through 2045. (Climate Bonds Initiative, 2019, p. 04).

### 3.2 Indonesia's Green Sukuk Issuance:

The republic of Indonesia has established a green bond and Green Sukuk system through which it aims to fund and refinance eligible Green projects through the issuance of Green bonds and Green Sukuk that can be used to close the green infrastructure-financing gap.

The following figure represents the use of Green sukuk and Green Islamic sukuk proceeds, followed by the project evaluation and selection process, then the stage of allocating Sukuk proceeds to projects, ending with the reporting stage on the proceeds allocated to each project and the expected impact on each one of them.

**Fig 5.** Indonesia's Green Bond and Green Sukuk framework




**Source :** (Ministry of finance -Republic of Indonesia-, 2018, p. 21)**.**

Indonesia provides a competitive market for foreign fixed income investors with few barriers for international investor participation with:(Climate Bonds Initiative, 2019, p. 04):

- No requirement for foreign investor registration;
- No restrictions for foreign investors to purchase bonds issued locally;
- No quotas on foreign involvement in the local debt markets;
- No significant limits on foreign investors holdings of individual issues.

In March 2018 Indonesia has issued 1,25 billion USD five-year global Green Sukuk as the world's first sovereign Green Sukuk to fund selected eligible projects, 51% of issuance for refinance 2016 projects and 49% for new funding 2018 projects.

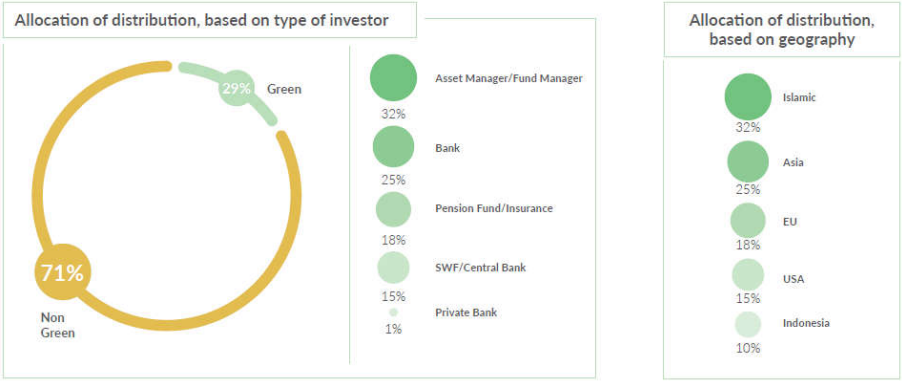
**Table 2**. Indonesia's Green Sukuk 2018 Issuance

| | |
|---|---|
| Obligor | The Government of the Republic of Indonesia, represented by the Ministry of Finance |
| Issuer | Perusahaan Penerbit SBSN Indonesia III |
| Issuer Rating | Baa3 Moody's (Positive) / BBB- S&P (Stable) / BBB Fitch (Stable) |
| Exp. Issue Rating | Baa3 Moody's / BBB- S&P / BBB- Fitch |
| Instrument | USD Wakala Trust Certificates ("Sukuk"), issued under a USD25 bn Trust Certificate Programme |
| Format. Status | 144A / RegS registered, senior unsecured |
| Maturity | Mar 1, 2023 |
| Tranche | USD1,250 mm |
| Profit Rate | 3.750% p.a. (30/360) |
| Reoffer Price / Yield | 100.000 / 3.750% |
| UST Benchmark (Price / Yield) | 2.375% 01/31/23 (98-22¾ / 2.655%) |
| Reoffer Spread | +109.5 bp |
| Use of Proceeds | General financing requirements in line with the Green Bond and Green Sukuk Framework |
| External Reviewer | CICERO second party opinion |
| Other Terms | USD200k/1k denominations, English and Indonesia law, Singapore and NASDAQ Dubai listing |
| Joint Lead Managers | ADIB, Citi (B&D), CIMB, DIB, HSBC |

**Source:** (Ministry of finance -Republic of Indonesia-, 2018, p. 27)

The following figure shows the distribution of 2018 green sukuk issuance from Indonesia distributed by investors around the globe (32% from the Islamic market, 25% Asia, 15% EU, 18% USA, and 10% Indonesia), where 71% among investors were Non green and 29% were Green investors.

**Fig 6.** Demand and allocation of Indonesia's Green Sukuk 2018 Issuance

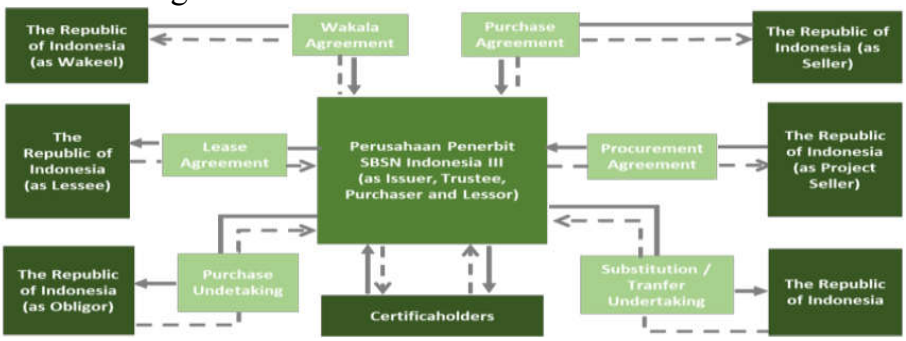



**Source:** (Ministry of finance -Republic of Indonesia-, 2018, p. 28)

The Green Sukuk applies Wakala (agency) structure –a Sharia-compliant framework, where Perusahaan Penerbit Indonesia operated as

Wakil. The Green Sukuk framework and process used by Indonesian government are showed in figure (07):

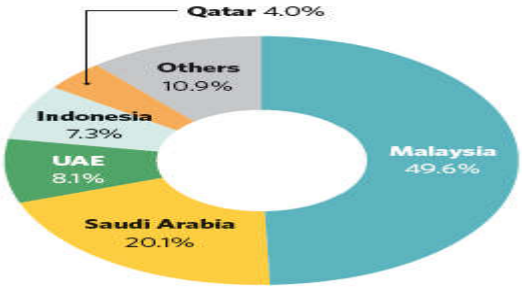
Fig 7. Wakala Sukuk Structure in Indonesia




**Source:** (Ministry of finance -republic of Indonesia-, 2019, p. 09)

Globally, Indonesia ranks as the fourth largest Sukuk market, after Malaysia, Saudi Arabia, and United Arab Emirates. The largest Market for Green Islamic issuance in Asia Malaysia is (49.6%). Indonesia, however, represents a small share of the market (7.3%), but it was a global leader with the first sovereign Green Sukuk. The following figure reflects the global Sukuk outstanding:

**Fig 8: Global Sukuk outstanding by domicile as at end March 2019**




**Source:** (Climate Bonds Initiative, 2019, p. 05)

The 1.25 billion USD green sukuk from Indonesia issued in March 2018 made the country the fifth nation in the world to have put a green sovereign issue, and the first sovereign to use the sukuk format, as shown in the following table making it the largest source in Asian countries by 39% of total Asian issuance.

**Table 3.** Indonesian Green Bonds Issuance at the end of April 2019

| List of Indonesian green bonds[5] | | | | | |
|---|---|---|---|---|---|
| **Issuer** | **Amount issued** | **Issue date** | **Maturity (year)** | **External reviewer** | **Use of proceeds** |
| **Republic of Indonesia** | USD 750m | 2019 | 5.5 | CICERO | Energy, Buildings, Transport, Waste, Land Use, Adaptation and Resilience |
| | USD 1.25bn | 2018 | 5.0 | | |
| **PT Sarana Multi Infrastruktur** | IDR 500bn (USD 50m) | 2018 | 5.0 | CICERO | Energy, Transport, Water, Waste, Land Use |
| **Star Energy** | USD 580m | 2018 | 15.0 | Carbon Trust | Energy |
| **TLFF I Pte Ltd** | USD 95m | 2018 | 15.0 | Vigeo Eiris | Land Use |

**Source:** (Climate Bonds Initiative, 2019, p. 04).

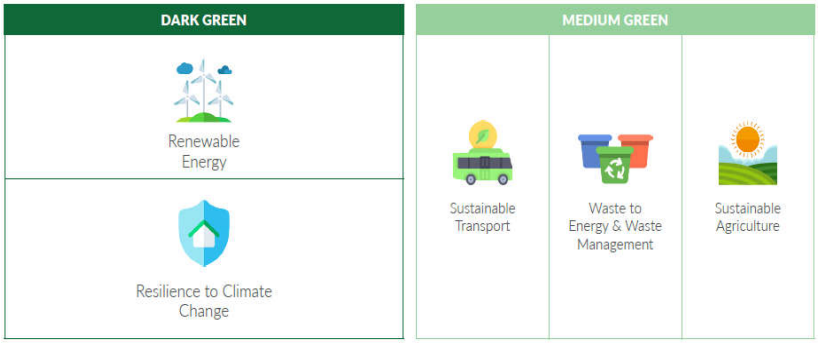
## 4. Use and Impact of Green Sukuk on financing climate change projects In Indonesia:

### 4.1 Use of Indonesia's Green Sukuk in financing climate change projects:

Indonesia's Green Sukuk issued in 2018 will be used to finance and refinance climate change Mitigation and adaptation Projects. Projects that will be financed and/or refinanced by these proceeds belong to the following sectors:

- **Dark Green:** which includes renewable energy and resilience to climate change;
- **Medium Green:** which includes sustainable transport, waste to energy and waste management and energy efficiency.

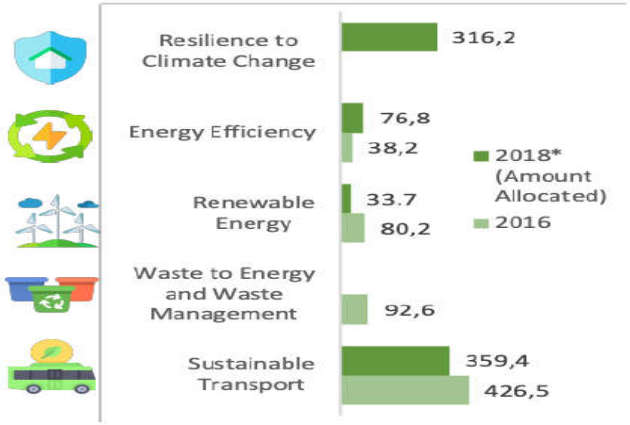
**Fig 9. Use of Indonesia's Green Sukuk 2018 Issuance**




**Source:** (Ministry of finance -Republic of Indonesia-, 2018, p. 29)

Projects funded by 2018 Green Sukuk issuance are divided into five eligible green sectors. Proceeds are been used to refinance the completed project from 2016 budget (51%) and to finance new projects from 2018 budget (49%). The following figure describes the distribution of proceeds by sector:

**Fig 10.** Use of Green Sukuk Proceeds by sector (in USD million)




**Source:** (Ministry of finance -republic of Indonesia-, 2019, p. 11)

The amount of 637.6 million USD was spent on refinancing 2016 projects. Precisely, a total of 15 projects were funded, 67% of the proceeds were spent on refinancing projects from sustainable transport sector, 46% was spent on the allocation of 2018 projects by sector through sustainable transport, 40% by resilience to Climate Change for highly vulnerable areas and sectors/disaster risk reduction, 4% by renewable energy and 10% by energy efficiency.

**Table 4**. Use of Green Sukuk Proceeds by Sector 2016-2018

| Breakdown by sector | 2016 Proceeds | | 2018 Proceeds | |
|---|---|---|---|---|
| | USD Committed | % of 2016 Proceeds | USD Committed | % of 2018 Proceeds |
| Sustainable Transport | 426,535,842 | 67 | 359,430,586 | 46 |
| Waste to energy and Waste Management | 92,598,527 | 14 | 33,704,894 | 4 |
| Renewable Energy | 80,176,104 | 13 | 76,784,136 | 10 |
| Energy Efficiency | 38,244,718 | 6 | 316,205,074 | 40 |
| **TOTAL** | **637,555,191** | **100** | **786,124,690** | **100** |

**Source**: Done by the author based on : (Ministry of finance -republic of Indonesia-, 2019, pp. 11-12)**.**

The projects chosen for 2016 are eligible Green projects that are only for mitigation projects funded from the 2018 budget include projects for mitigation and adaptation.

**Table 5. Use of Green Sukuk Proceeds by Objective 2016-2018**

| Breakdown by Objective | 2016 Proceeds | | 2018 Proceeds | |
|---|---|---|---|---|
| | USD Committed | % of 2016 Proceeds | USD Committed | % of 2018 Proceeds |
| Adaptation | - | - | 316,205,074 | 40 |
| Mitigation | 637,555,191 | 100 | 469,919,616 | 60 |
| **TOTAL** | **637,555,191** | **100** | **786,124,690** | **100** |

**Source:** Done by the author based on: (Ministry of finance -republic of Indonesia-, 2019, pp. 11-12)

The following table outlines distribution of proceeds by Ministry :

**Table 6.** Use of Green Sukuk Proceeds by Ministry 2016-2018

| Breakdown by Ministry | 2016 Proceeds | | 2018 Proceeds | |
|---|---|---|---|---|
| | USD Committed | % of 2016 Proceeds | USD Committed | % of 2018 Proceeds |
| Ministry of transportation | 453,211,835 | 71 | 359,430,586 | 46 |
| Ministry of Public Work and Housing | 92,598,527 | 15 | 316,205,074 | 40 |
| Ministry of Energy and Miniral Resources | 91,744,829 | 14 | 110,489,030 | 14 |
| **TOTAL** | **637,555,191** | **100** | **786,124,690** | **100** |

**Source:** Done by the author based on: (Ministry of finance -republic of Indonesia-, 2019, p. 12)

### 4.2 The Impact of Climate Change projects financed by Green Sukuk on climate and environment:

The government of Indonesia is committed to accurate monitoring of its climate financing, which includes the use of Green Sukuk funds in selected environmental projects and their projected impacts. The key indicator for the mitigation projects is the quantified reduction of Green House Gas emissions according to globally agreed methodologies adopted from Intergovernmental panel on climate change (IPCC) guidance in addition to the use of national emission factors provided by the ministry of energy and mineral resources. Yet, the impact data for 2018 projects are still not published. The Green Sukuk proceeds may also have impacts beyond climate and environment, such as: (ministry of finance-republic of Indonesia-, 2019, p. 13)

- Affordable and clean energy(07);
- Decent work and economic growth (08);
- Industry innovation and infrastructure (09) ;
- Sustainable cities and communities (11) ;
- Climate action (13).

The next table demonstrates a sample of detailed impact for selected projects.

**Table 7. Impact of climate Change projects financed by Green Sukuk Proceeds**

| Sector | Project Example | Amount commited in USD as at 31 dec 2016 | Shares of proceeds | Target results (environmental benefit) Tonnes of Co2 | Other impacts/SDG/s |
|---|---|---|---|---|---|
| **Renewable Energy** | Solar PV power plants | 58,617,539 | 4,7% | 13.044.474 | (07), (09), (13) |
| | Bio Energy | 16,160,799 | 1,3% | 57.666 | (07), (11), (13) |
| **Energy efficiency** | Clean and efficient energy technology | 11,568,725 | 1% | 9.988 | (07), (11), (13) |
| | Replacement of aid for sea navigation | 22,705,261 | 1,8% | 18,984,67 | (07), (09), (13) |
| **Sustainable Transport** | Double track railways developmentt | 114,066,801 | 9,1% | 0,566 MT CO2 | (07), (09), (11), (13) |
| | Procurement of medium size bus | 92,598,527 | 1,5% | 165,704 | (07), (09), (11), (13) |
| **Waste to energy and waste** management | Improvement of solid waste management | 92,392,957 | 7,4% | Impact measurement is yet to be calculated | (11), (13) |

**Source:** Done by the author based on: (Ministry of finance -republic of Indonesia-, 2019, pp. 13-18)

## 5. CONCLUSION:

Climate change is one of the most important issues facing the world today. Taking action involves finding greener ways to generate energy and new ways of energy consumption, which means a greener infrastructure. However, the cost of shifting and adjusting to climate change would account for significant amounts of countries' income, especially low and medium income .

Green Sukuk could be the most appropriate mechanism for achieving climate change agendas in countries, particularly Islamic ones, because it fulfills the provisions of Islamic sharia and environmental projects financing. Thus, climate challenges and the growth of Islamic finance have made Green Sukuk a major financing tool for providing funds for green projects.

Indonesia, like all countries in the world, faces environmental degradation and is committed to working on climate change by setting an ambitious agenda to pursue a low carbon pathway. In order to face this commitment that requires a huge financement gap between financing needs and funding resources, Indonesia used Green Sukuk as an financial resource by issuing the world's first sovereign Green Sukuk through the Wakala structure. The proceeds of Indonesia Green Sukuk has been used to finance and refinance dark and medium dark projects. Climate change projects financed by Green Sukuk proceeds tend to have a positive impact on reducing co2 emissions, as they can also have many other impacts beyond climate and environment. Therefore, Green Sukuk contribute to achieving sustainable development, and especially building robust infrastructure and cities to improve access to clean energy with an affordable cost.

## 6. Bibliography List :


1. Aasouli, D., Asutay, M., Mohieldin, M., & Nwokike, T. c. (2018). Green Sukuk, energy poverty and climate change -a roadmap for sub-saharian Africa-. world bank group .
2. Ahmed, M. (2019, 10 07). CNBCAFRICA. Retrieved 03 01, 2020, from how green sukuk couls help Africa fight & fund climate change: https://www.cnbcafrica.com/insights/energy-environment/2019/10/07/op-ed-how-green-sukuk-could-help-africa-fight-fund-climate-change/
3. Anugrahaeni, P. (2017). Analysis of Indonisian Sovereign Green bond of green Sukuk initiatives. kajan ekonomi & Keuangan , 01 (01), pp. 01-24.
4. Ayers, J. (2009). International funding to support urban adaptation to climate change. environment & urbanization , 21 (01), pp. 225-240.
5. Climate Bonds Initiative. (2019). Green Infrastructure investment Opportunities -Indonesia update report-.
6. Climate Bonds Initiative. (2019). Unlocking Green Bonds in Indonesia: a guide for issuers regulators and investors.
7. Global environment fasility. (2020). Climate Change. Retrieved 03 01, 2020, from http://www.thegef.org
8. Global Islamic Finance and Impact investing platform. (2019). Retrieved 03 02, 2020, from Green Sukuk inititive: http://www.gifiip.org/green-sukuk-initiative/
9. Ministry of finance -republic of Indonesia-. (2019). Green Sukuk issuance -Allocation and Impact report-.
10. Ministry of finance -Republic of Indonesia-. (2018). Indonesia's Green bond and green sukuk initiative.
11. nasa. (2020). Responding to climate change. Retrieved 02 28, 2020, from https://climate.nasa.gov
12. nature.com. (2020). Retrieved 03 02, 2020, from https://www.nature.com/subjects/climate-change
13. Nunez, C. (2019, 01 24). Global warming solutions. Retrieved 02 18, 2020, from http://www.nationalgeographic.com
14. rohaya, s., & zam, z. (2018). Green sukuk for financing renewable energy projects. Turkish journal of islamic economics , 05 (02), pp. 129-144.
15. Sustainabilist. (2020). developing the green sukuk market. Retrieved 02 27, 2020, from https://thesustainabilist.ae/developing-the-green-sukuk-market/
16. حفاط زحل، وعمر الشريف. (2018). أهمية التوجه نحو التمويل الاسلامي الأخضر –الصكوك الاسلامية الخضراء– لتعزيز التنمية المستدامة بالإشارة إلى حالة ماليزيا. مجلة إقتصاد المال والاعمال ، 03 (02)، الصفحات 49-68.

17. راضية لسود، مسعودة بولعسل، و مسعودة آمال بن سعيد. (2018). تجارب عالمية ناجحة في إصدار الصكوك الاسلامية لتمويل التنمية المستدامة وآفاقها في الجزائر. مجلة نماء للاقتصاد والتجارة ، 01 (خاص)، الصفحات 58-74.

18. رشيد علاب، الطاهر جليط، و حمزة طيبي. (2018). دور الصكوك الاسلامية الخضراء في تمويل مشاريع مستدامة. مجلة نماء للاقتصاد والتجارة ، 01 (خاص)، الصفحات 50-57.

19. عبد القادر حفاي، و رحيمة شخوم. (2018). التمويل الاسلامي الأخضر ودوره في خدمة التنمية المستدامة –السندات الاسلامية الخضراء في ماليزيا–. مجلة دفاتر اقتصادية ، 10 (02)، الصفحات 336-348.

20. كمال رزيق، و ابراهيم شيخ التهامي. (2019). أهمية الصكوك الإسلامية في تمويل المشروعات المستدامة –الصكوك الاسلامية الخضراء نموذجا–. مجلة الاقتصاد الجديد ، 10 (01)، الصفحات 98-116.

21. مريم سياخن، و صبرينة رباحي. (2019). آليات تعزيز المسؤولية الاجتماعية في البنوك الاسلامية ودورها في تحقيق التنمية المستدامة –الصكوك الاسلامية الخضراء نموذجا–. مجلة المنتدى للدراسات والأبحاث الاقتصادية ، 03 (خاص)، الصفحات 53-74.