



INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

Sustainable Financing: A study on effect and development of green bonds in Asia

Authors:

Dr. Varsha Agarwal, Assistant Professor, Center for management studies, Jain (Deemed to be university), India
Khushi Thakkar, Student - BBA, Center for management studies, Jain (Deemed to be university), India.
Riya S Jain, Student - BBA, Center for management studies, Jain (Deemed to be university), India.
D Keerthan, Student - BBA, Center for management studies, Jain (Deemed to be university), India.

ABSTRACT

Climate change is accelerating, it is necessary that our society make a transition toward a green and low-carbon economy. One way to do so is through finance instrument that are tailored to fund low-carbon and climate-friendly projects. Such climate finance instrument can prove to be a distinguishing factor in how fast and how energized our society is to make the transition. An important tool in measuring the recent impact of climate change on financial markets has been the green bond. A green bond allows various parties whether countries or organizations to mobilize traditional debt investments into projects or assets that can help society adapt or alleviate climate change impacts. This study aims to study the effect, development and the growth of green bonds in Asia. The authors have utilized secondary data for the purpose of this research paper. This paper has been authored in Bengaluru, Karnataka, India. The geographic limitation of this paper is Asia. Green finance is still at an early stage in ASIAN countries and it faces several critical challenges. These challenges exist both for issuers of green bonds and investors. Two distinct challenges that have been found in the paper for issuers include limited credit retention limit and costs of meeting green bond requirements. The green bond market is going to grow at a rapid rate due to the ambitious renewable energy goals that the asian countries have set for themselves.

Keywords: Green bonds, Climate change; Finance; Asia, Low-carbon development Investment, Green Finance, Climate Finance, Renewable energy, Sustainable Finance

INTRODUCTION

Climate change affects all of us. But it is expected to hit developing countries the toughest. Its potential effects on temperatures, precipitation patterns, sea levels, and frequency of weather-related disasters pose risks for agriculture, food, and water supplies. Climate change is accelerating, it is necessary that our society make a transition toward a green and low-carbon economy. One way to do so is through finance instrument that are tailored to fund low-carbon and climate-friendly projects. (Centre for international governance innovation, 2019) Such climate finance instrument can prove to be a distinguishing factor in how fast and how energized our society is to make the transition. An important tool in measuring the recent impact of climate change on financial markets has been the green bond. A green bond allows various parties whether countries or organizations to mobilize traditional debt investments into projects or assets that can help society adapt or alleviate climate change impacts. A study shows that green bonds also help to create a long-term value for corporate issuers and also reduce their environmental footprint, making them a robust tool for addressing climate change. While the use of corporate green bonds has become increasingly more prevalent in practice, we know very little about this new financial instrument.

The past five years have seen explosive growth in “corporate green bonds” issued to finance climate-friendly projects. While investors bought just \$3 billion of these bonds in 2013, they scooped up \$49 billion worth in 2017, bringing the total value since 2013 to \$113 billion at an average of \$308 million per offering. (Harvard Business Review, 2018)

Until recently, green bonds were only issued by municipalities and global developmental financial institutions, such as the World Bank, European Investment Bank, Asian Development Bank. The first corporate green bonds, labelled as such, were issued in November 2013 and the market has grown rapidly since then. The value of global green bond issuances in 2015 was not as high as hoped. At the start of the year, people had talked of the possibility of US\$100 billion in green bond issues in 2015, but in the end the value of the green bonds issued was US\$41.8 billion³, which is still a record and the reduced volume can be partly blamed on a quiet year for the debt capital markets generally. This is a new and fast developing market and, while Asia was definitely behind the curve, the region has seen some action in the last 18 months making it one of the most promising markets for green bonds in the future.

Despite this boom, very little is known about the future of these bonds.

Initially, it might seem puzzling that companies choose to issue green bonds in lieu of conventional bonds as the proceeds from green bonds are committed to green projects, which restricts companies’ investment policies. This paper plans on exploring the popularity of the green bond market and its impact, the growth of the market in the national as well as international context and the need for standardization and regulation.

REVIEW OF LITERATURE

In a research conducted by Dina Azhgaliyeva, Anant Kapoor, and Yang Liu (Jan, 2020) defined that majority of green bonds issued in ASEAN countries were used to finance renewable energy and energy efficiency projects. Issuance of green bonds in the top three green bond issuing countries in ASEAN, i.e., Indonesia, Malaysia, and Singapore, are spoken of in detail. The paper also mentions about green bond policies and show that green bond policies in ASEAN countries are effective in inhibiting its growth

ASEAN Green Finance State of the Market studied that The ASEAN region has witnessed a great year on year growth in its green and sustainable bond and loan markets in 2019 compared to 2018, in line with the global momentum. However, the growth remains underdeveloped as a higher number of national markets are still in early stage development. Singapore has emerged as a regional leader of green lending, but its bond market remains relatively fragmented despite its stated intention of becoming a green finance hub. Outside of the core markets, the development of green bonds remains very low in Vietnam, Cambodia, Laos and Myanmar.

In the research conducted by Yasuko kameyama, kanaka Morita, Izumi Kubota Finance has become a crucial agenda in climate change negotiations in recent years. This paper talks about how investment towards low-carbon development could be materialized in Asia. A thorough review of current financial assistance for developing countries in Asia was conducted, and the amount of funding proved to be relatively modest to achieve the aim.

Clarence Tolliver, Alexander Ryota Keeley and Shunsuke Managi (2019) conducted a research to study the impact of The Paris Agreement under the United Nations Framework Convention on Climate Change and the SDGs of the United Nations Development Programme both entail substantial global investments through cost-efficient, long-term financing. Green bonds are gaining prominence in climate change and sustainable development finance frameworks. This study is the first to thoroughly examine publicly reported green bond proceeds allocations from 53 organizations to projects and assets throughout 96 countries from 2008 to 2017.

The report green bonds in India defined that the government of India aims to dramatically increase the amount of installed renewable energy and is currently focused on arranging and facilitating the needed capital investment to achieve targets. This report provides information on the use of Green Bonds as a key financial instrument to provide Indian renewable energy project developers access to scalable, long-term, low-cost debt capital from institutional investors.

In a report by MA Jun, LIU Jialong, CHEN Zhouyang, XIE wenhong (2019) it was defines that since the inception of the green bond in 2016, china has become one of the world's largest green bond markets, gaining a 40% market share in its first year itself. In addition to issuing more than 200 green bonds, china is also a growing leader in setting frameworks and institutions for green bond issuance and verification. At present, less than one percent of the world's bonds are labelled green bonds.

Green bonds could play a key role in financing the investment needed to achieve the global climate and energy objectives and the UN Sustainable Development Goals. Using Bloomberg data of corporate green bond issuance from 2010 to 2017, we explore the factors affecting the size of borrowing. Findings suggest that, in general, issue size is positively related coupon rate, credit rating, collateral availability, and issuer's sector and financial health. The paper calls for policies and incentives to encourage impact borrowing through increased green bond supply.

Durrani, Rosmin, and Volzinvestigates study the role of central banks and other monetary authorities in promoting sustainable finance in the Asia-Pacific region. Firstly, this paper reviews why monetary and financial authorities should address climate and other sustainability risks. Secondly, this paper investigates the views of monetary authorities from the Asia-Pacific region on policies promoting sustainable finance. Finally, this paper provides in detail review of policies promoting sustainable finance implemented by monetary higher authorities in six countries from the Asia-Pacific region: Bangladesh, the PRC, India, Indonesia, Singapore and Viet Nam.

The ADB estimates Asia's infrastructure needs from 2016 to 2030 will exceed US \$26 trillion. This ballooning demand for infrastructure, coupled with rising investor awareness of the importance of sustainable development, is driving the nascent green finance sector. In emerging markets, raising capital for green projects is often the easy part; identifying and implementing suitable projects and structuring the financing is more challenging. The paper concludes by discussing Ministerial Regulation 50/2017 which has created a regulatory framework that side-steps some of these constraints.

This publication describes an innovative financing solution for enhancing both financially bankable as well as environmentally sustainable infrastructure projects. A large financing need challenges climate-adjusted infrastructure in developing Asia, estimated at \$26 trillion till 2030. This necessitates crowding-in private sources to meet financing, efficiency, and technology gaps. However, a lack of bankable projects is a major hurdle. This publication suggests one possible innovative financing approach. The Green Finance Catalyzing Facility (GFCF). The GFCF provides useful inputs for the current debate on mainstreaming green finance into country financial systems.

In this research by Abhirup Ghosh (2017), shows a statistical review of how India has come a long way ever since the first issuance of Green Bonds two years ago. Ever since the first investment, Green bonds was always looked upon as a great potential being looked upon as a key tool to help raise the financing needs to meet the targets set by India's Intended Nationally Determined Contribution (INDC), which established for COP21 - essentially India's climate change action plan.

In the study by Janette Chen (2020), predicts how green bonds can have a very smooth growth past this covid-19 situation. Asia-pacific countries are considered as one of the major drivers of the Green Bonds issuance growth. With the market being broken around and going through a recovery period, Green bonds are a very sustainable and defensive asset.

In the study by Annabelle Liang (2019), reports about how Carbon Care Asia (CCA) along with Solactive has launched region's first index for green bonds. They i.e. Solactive CarbonCare Asia Sustainability Bond Index Will feature bonds for contributing to sustainability and address social challenges. They have planned to put a two-layered screening in line with international best practices. This screening is done in order to have a clear transparency standard of issuers to know whether proceeds go to designated projects. It was approximately predicted that these bonds will have a weighted yield to maturity of 2% and duration of four years.

In an article by Gabe Kirchheimer (2019), reports suggest that Kazakhstan leads Central Asia in Green Finance. The Republic of Kazakhstan, Central Asia's leading financial hub is aiming to transform its economy which is the oil and minerals to a cleaner greener model by issuing green bonds for domestic projects. This will help in driving renewable energy, improving environment, reduction of industrial pollution, clean transport initiative, reforestation and much more towards a green nation. Kazakhstan aims to increase its share of alternative and renewable energy to 50% of all energy production by 2050.

RESEARCH METHODOLOGY

For the purpose of this study, the methodology used is secondary data. The data was collected by several articles, journals, websites, research subject from government statistics, published market research reports from different organizations, international agencies (such as IMF, World Bank, etc.), and so on. A Descriptive study was employed for this study. For the purpose of this research study, the authors have utilized qualitative information and quantitative information to examine and investigate the effect that green securities have in the security market, development of the green security market, obstructions to the green security market and the eventual fate of the green security market. The authors have used tables and charts in order to make the information more comprehensible. This research study was conducted in Bangalore, Karnataka, India during the period of July 2020 to August 2020. The demographic area covered through this study is Asia. The authors have attempted to fill in research holes through this investigation.

ANALYSIS AND INTERPRETATION

INDIA

GREEN BOND MARKET IN INDIA

India is the second most populated country and seventh largest country by land area. India is one of the fastest growing economies in the world with a diversified financial sector with an increased demand for new forms of financing. The Indian green bond market currently stands at the second place in the global green bond market with a total of \$3,195 million in the year 2019.

CHARACTERISTICS OF GREEN BOND IN INDIA

In January 2016, Securities and Exchange Board of India (SEBI; regulator) published its official green bonds requirements for Indian issuers. As per the guidelines debt security shall be considered as 'Green' or 'Green Debt Securities', if the funds raised are to be utilized for asset(s) falling under any of the following broad categories-

- Renewable and sustainable energy including wind, solar, bioenergy, other sources of energy which use clean technology, etc.
- Clean transportation including mass/public transportation, etc.
- Climate change adaptation
- Energy efficiency including efficient and green buildings, etc.
- Sustainable waste management including recycling, waste-to-energy, efficient disposal of wastage, etc.
- Sustainable land use including sustainable forestry and agriculture, afforestation, etc.
- Biodiversity conservation

BSE-owned India International Exchange has launched an exclusive platform for trading in green bonds. The platform is called GSM (Global Securities Market) Green.

ISSUANCE OF GREEN BONDS

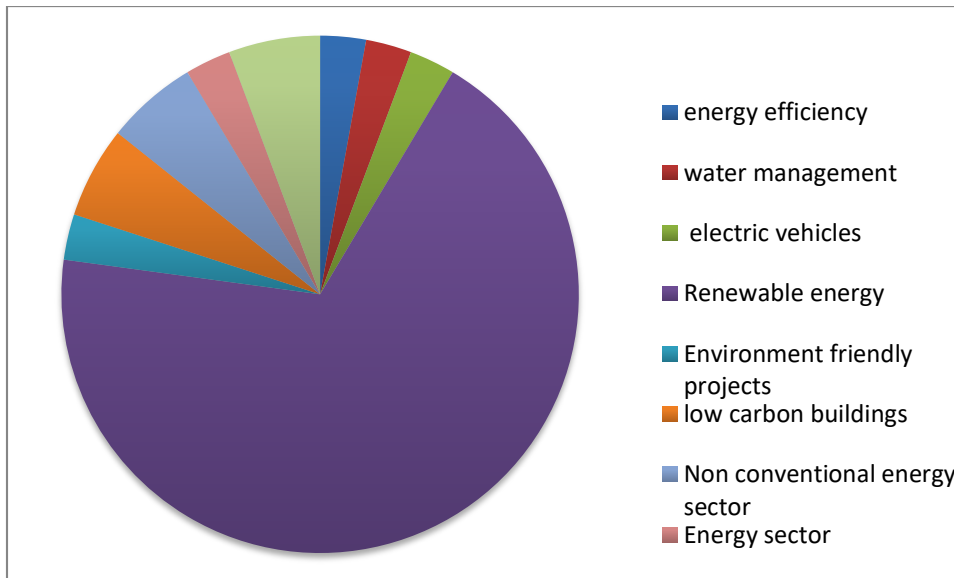
| Indian green bonds | | | | | | |
|--------------------|-----------------------------|------------|-------------|--------|------------------------|---|
| DATE | ISSUER | AMOUNT | COUPON | TENURE | CERTIFIED/ RATINGS | SECTOR |
| Feb-15 | YES BANK | INR 10 BN | 8.85 | 10 | N/A | Renewable energy and energy efficiency |
| Apr-15 | export import bank of India | USD 500 M | 2.75 | 5 | N/A | low carbon transport |
| Sep-15 | CLP Wind farms India | INR 6 BN | 9.15 | 12 | N/A | Renewable energy |
| Nov-15 | IDBI | USD 350 M | 4.25 | 5 | KPMG | Renewable energy, low carbon transport and water management |
| Feb-16 | Hero Future energies | INR 3 BN | 10.75 | 3& 6 | Climate bonds standard | Renewable energy |
| Apr-16 | PNB housing finance | INR 5 BN | 8.01 | N/A | N/A | low carbon buildings |
| Jun-16 | Axis bank | USD 500 M | 2.88 | 5 | Climate bonds standard | Renewable energy, low carbon building and transport |
| Aug-16 | ReNew Power | INR 5 BN | | | Climate bonds standard | Renewable energy |
| Aug-16 | NTPC | INR 20 BN | 7.38 | 5 | Climate bonds standard | Renewable energy |
| Aug-16 | Greenko | USD 500 M | 4.88 | 7 | Sustainalytics | Renewable energy |
| Dec-16 | YES BANK | INR 3.3 BN | 7.62 | 7 | N/A | Renewable energy |
| Feb-17 | ReNew Power | USD 475 M | 6 | 5 | Climate bonds standard | Renewable energy |
| Mar-17 | IREDA | INR 7 BN | 8.12 & 8.05 | 10 | Climate bonds standard | Renewable energy |

| | | | | | | |
|--------|----------------------------------|-------------|---------------|----------|------------------------|---|
| Jul-17 | L&T Infrastructure finance | USD 103 M | N/A | N/A | SEBI | Solar power projects and renewable energy |
| Sep-18 | SBI | INR 650 M | 2.94% | N/A | N/A | Environment friendly projects |
| Mar-19 | ReNew Power | USD 525 M | 6.67% | 5 and 10 | Climate bonds standard | Solar and Wind |
| Sep-19 | Azure power solar energy pvt ltd | USD 350 M | 5.65% | 5 | Climate bonds standard | Energy sector |
| Sep-19 | KIIFB | USD 250 M | 9.72% | 11 | N/A | Non conventional energy sector |
| Sep-19 | ReNew Power | USD 300 M | 6.67% | 5 and 10 | Climate bonds standard | Solar and Wind |
| Oct-19 | Urja global limited | USD 500 M | N/A | N/A | N/A | Renewable projects and electric vehicles |
| Oct-19 | Adani green | USD 362.5 M | 4.62% | 20 | Moody's and Fitch | Refinancing |
| Nov-19 | Greenko | USD 950 M | 5.55% & 5.95% | 7 | Sustainalytics | Renewable energy |
| Jan-20 | ReNew Power | USD 450 M | 6.67% | 5 and 10 | Climate bonds standard | Solar and Wind |
| Mar-20 | SBI | USD 100MN | N/A | | Fitch | Non conventional energy sector |
| Jul-20 | SB Energy | USD 600 M | N/A | 5 | Climate bonds standard | Non conventional energy sector |

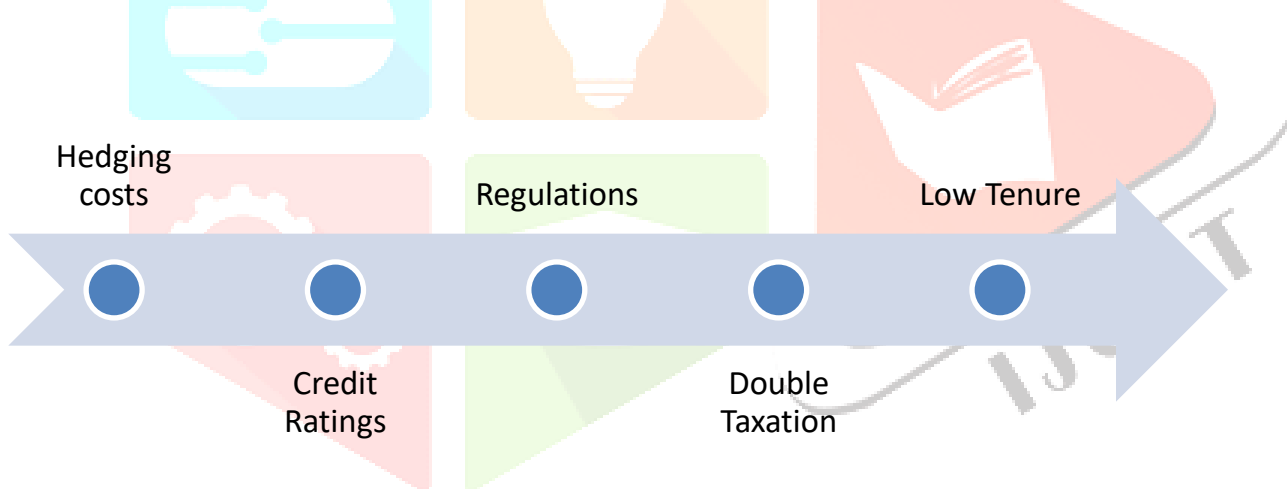
POTENTIAL GREEN BONDS ISSUER IN INDIA

| DEVELOPERS | | | |
|------------------------|------------------------|---------------------|-------------|
| ONGC | NSL Renewable | Tata Power | Panama Wind |
| NALCO | Bharat Light and power | Hero Future energy | |
| FINANCIAL INSTITUTIONS | | | |
| IREDA | ICICI | IDFC | PFC |
| PTC Financial | bank of Baroda | Union bank of India | HDFC bank |
| Kotak Mahindra | Punjab national bank | SREI | Axis bank |

MAJOR SECTORS OF INVESTMENT



BARRIERS TO GREEN BOND MARKET



While the green bonds segment has undoubtedly been successful in India over the last three years, especially for a nascent instrument, there is the possibility that it will soon peak or prove to be ineffective in advancing green growth, if certain steps and innovative solutions are not adopted to drive it forward. The key challenges that the market currently faces are as follows:

- Green bonds have a huge potential in accelerating climate actions and promoting sustainable development. However, due to the newness of the instrument and lack of understanding of all its implications, the average domestic investor is wary of investing in these, and perceives them as high-risk investments. This is especially true if the bond is not issued by one of the more recognized green sectors such as renewable energy.
- There's still a lack of accepted taxonomies, defining 'what is green' across different asset classes and industries. The range of assets widely accepted as 'green' is still limited today, which encourages issuers and bankers to be cautious about financing new asset classes in the green bond market.

- We need to understand that there is a need to define a domestic context while defining green and evaluating green bonds. This is because different countries are at a different trajectory of development, and therefore, their prioritized green or climate actions may vary from one country to another. Organizations such as CICERO and the Climate Bonds Initiative, along with leading international banks, have been pioneering the global green bonds market and have developed global standards for evaluating the green bonds, and have helped in providing an excellent start to countries to begin screening projects.

FUTURE OF GREEN MARKET

India is expected to be the fourth largest private wealth market by the year 2028. India is currently planning to reset its RE capacity addition target to 165 GW by 2022, in view of the significant RE potential in the country, estimated at ~ 3,000 GW. While the substantially higher capacity target will ensure greater energy security, improved energy access and enhanced employment opportunities, it will require higher capital investments, estimated at around USD 200 billion, over the coming years.

As per the government estimates, India would require USD 2.5 trillion (at 2014 -15 prices) to meet climate change action committed to be achieved till 2030.

Given the rising financing gap in India's water sector, it is imperative to utilise such innovative mechanisms for water infrastructure projects as well.

According to Bank of America -Merrill Lynch, the domestic green bond market has a \$125 -billion opportunity by 2025. It expects around \$32 billion of such bonds being sold over the next five years

THAILAND

GREEN BOND MARKET IN THAILAND

The market size of Thailand green bond market is \$947 million USD. In 2019, there were four green bond issuances by Thai entities for USD734m, representing 77% year on year growth, bringing the total to USD947m.

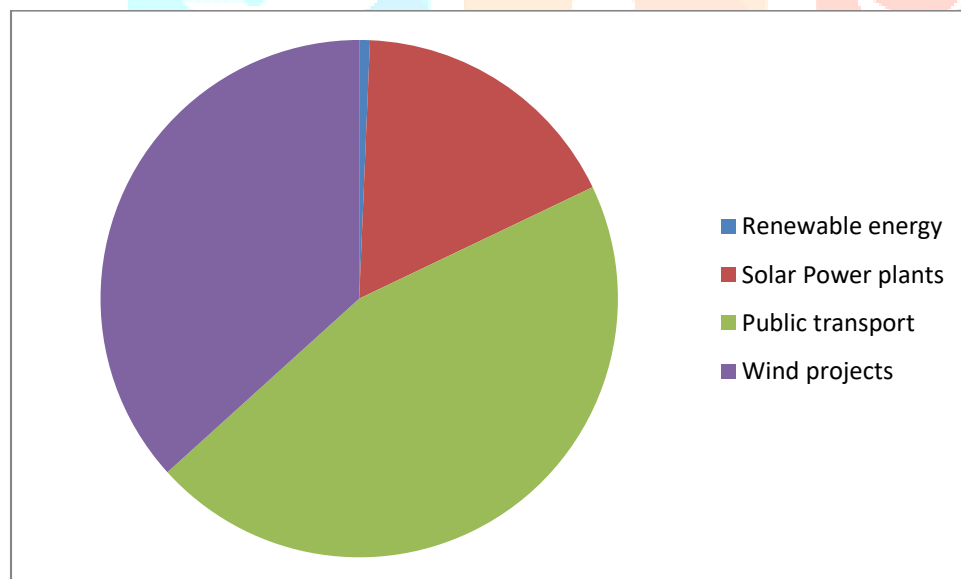
ISSUANCE OF GREEN BONDS

| THAILAND GREEN BOND | | | | |
|---------------------|------------------------|-----------|------------------------|--------------------|
| DATE | ISSUER | AMOUNT | CERTIFIED/RATINGS | SECTOR |
| Jun-18 | TMB Bank | USD 60 M | N/A | Renewable energy |
| Dec-18 | B.Grimm | USD 155 M | Climate Bonds standard | Solar Power plants |
| May-19 | BTS Group Holdings PCL | USD 408 M | Climate Bonds standard | Public transport |
| Oct-19 | Energy Absolute PCL | USD 330 M | Climate Bonds standard | Wind projects |

POTENTIAL GREEN BOND ISSUERS IN THAILAND

| POTENTIAL GREEN BOND ISSUERS IN THAILAND | | | | | |
|--|---|----------------------------|-------------------------|----------------------|----------------------------------|
| Energy sector | Ratchaburi Electricity Generating Holding | Banpu Power | Glow Energy | Global Power Synergy | IRPC |
| Real Estate sector | Central Pattana | Land And Houses | Pruksa Real Estate | | |
| Healthcare sector | Bangkok Dusit Medical Services | Bumrungrad Hospital | | | |
| Telecommunications | Advanced Info Service | Total Access Communication | Intouch Holdings | True Corporation | |
| Retail sectors | CP All | Home Product Center | Robinson | | |
| Public Sector | Bank for Agriculture | Government Housing Bank | Government Savings Bank | EXIM Thailand | Provincial Electricity Authority |

MAJOR SECTORS OF INVESTMENT



BARRIERS TO GREEN BOND MARKET IN THAILAND



- Fundamental preconditions for a deep, liquid domestic bond market
- The enabling environment for the development of green infrastructure projects that may be financed or refinanced through the bond markets.

FUTURE OF GREEN BONDS

Thailand's green bond potential has been recognized with the issuance of the country's first Certified Climate Bonds which will finance solar power plants with the potential to generate over 140,000 megawatt-hours of clean energy per annum as the country strives to achieve its 20% greenhouse gas emissions target.

INDONESIA

GREEN BOND MARKET IN INDONESIA

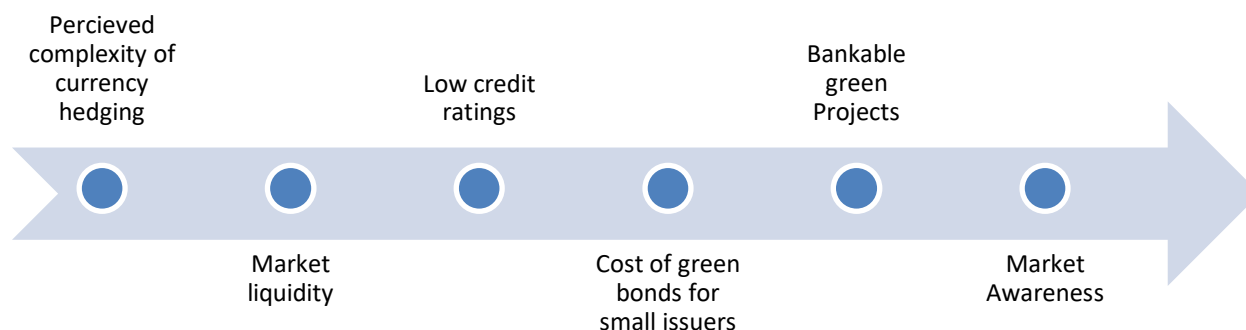
The market size of Indonesia green bond market is \$2.9 Billion USD. Indonesia became the first Asian country to sell green bonds internationally when the government issued a \$1.25 billion five-year green sukuk, or Islamic green bond.

CHARACTERISTICS OF GREEN BOND IN INDONESIA

In 2017, the Government of Indonesia set its own national framework and regulation for green bond issuance, as well as the national Green Bond and Green Sukuk Framework. According to these frameworks, the proceeds of green sukuk or green bonds will be used only to finance and/or re-finance "Eligible Green Projects".

Projects should either be related to renewable energy, energy efficiency, resilience to climate change or disaster risk reduction, sustainable transport, waste to energy and waste management, sustainable management of natural resources, green buildings, green tourism, and sustainable agriculture. Eligible green projects do not include those relating to new fossil-fuel-based electric power generation capacity, large scale hydro plants, or nuclear and nuclear-related assets.

BARRIERS TO GREEN BOND MARKET



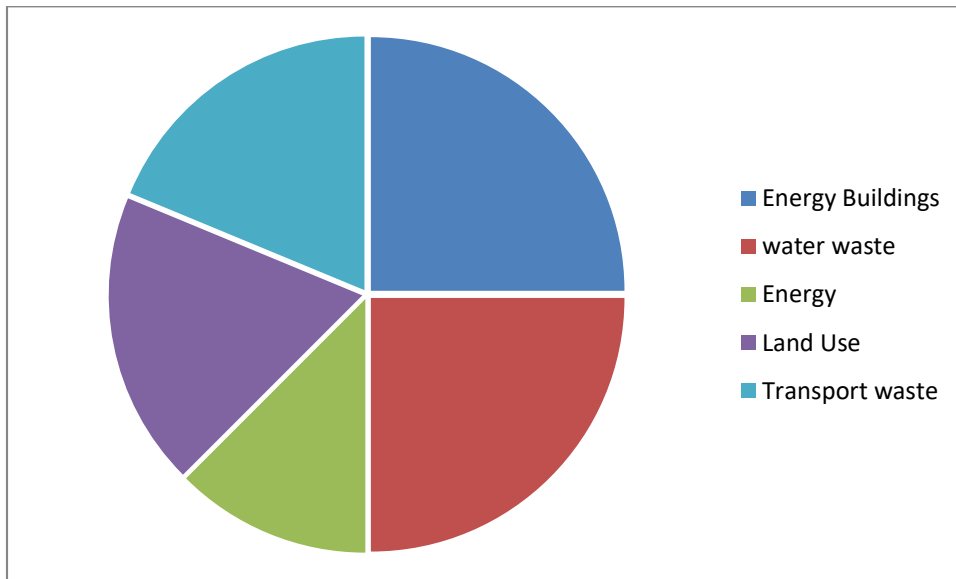
- To meet growing infrastructure requirements in Indonesia, foreign sources of capital will be required. Some investors require issuers to compensate for currency risk through the use of foreign exchange hedging tools which are often difficult to arrange.
- A green bond issuer must bear the additional costs and expenses of a review on the proceeds by an independent third party. Some costs are relevant to all types of bonds – e.g. obtaining a credit rating, drafting a bond prospectus and legal fees. These costs are insignificant for large transactions (>USD300m) but can be a barrier for smaller transactions.
- A poor credit profile rating makes it difficult to attract project financing. While an issuer may have a good local credit rating, foreign issuers rely on international ratings to make their investment decisions, as it offers a basis for comparison across bonds from various geographies. An international credit rating is often much lower than a local rating, due to additional risks (convertibility, currency exchange, etc.). This results in, for many domestic issuers, an inability to issue a green bond as investors require a certain level of credit enhancement, which can be difficult to obtain.

ISSUANCE OF GREEN BONDS

| DATE | ISSUER | AMOUNT | COUPON | TENURE | CERTIFIED/ RATINGS | SECTOR |
|--------------|----------------------------------|---------------------------|--|---------|---------------------------|---|
| 2019 2018 | Republic of Indonesia | USD 750m USD 1.25B | 3.75% | 5 & 5.5 | Climate Bonds Standard | Energy, Buildings, Transport, Waste, Land Use, Adaptation and Resilience |
| 2018 | PT Sarana Multi Infrastruktur | IDR 500bn | 7.55% (3 yrs) & 7.80% (5 yrs) | 3 & 5 | Climate Bonds Standard | Energy, Transport, Water, Waste, Land Use |
| 2018 | Star Energy | USD 580m USD (50 M) | 6.75% | 15 | Climate Bonds Standard | Energy |
| 2018 | OCBC NISP | USD 150M | n/a | 3 | n/a | Energy, building, waste water, Industry |
| 2018 | TLFF I Pte Ltd | USD 95m | 4.14% | 15 | Climate Bonds Standard | Land Use |

Public Issuance of Green Bonds Growth of green bonds issuance in Indonesia is driven by public issuance of green bonds. 99% of green bonds listed on the Indonesian Stock Exchange are issued by the Indonesian government. Public issuance of green bonds could be by city municipalities, development banks, and governments with the objective to provide initial market product pipelines and liquidity, engage investors, and educating them about green bonds.

MAJOR SECTORS OF INVESTMENT



FUTURE OF GREEN BONDS

Indonesia's economy has recorded strong growth over the past few decades. The economic performance has been shaped by government policy, a young and growing labor force and the utilization of Indonesia's abundant but finite natural resources. It's clear that for businesses to be able to continue creating value in the future, they need to evolve and become more sustainable. Sustainability in this sense is defined as meeting present needs without compromising the ability of future generations to meet their needs.¹ The need to consider sustainability issues such as climate change, pollution and natural resource depletion have revolutionized the way businesses operate and driven innovation across industries. Clean technology, such as solar power and wind turbines, is gaining stronger traction in the market, while process efficiency, waste reduction and emissions prevention are becoming global industry norms. Such a shift in business practices requires significant amounts of investment. UNFCCC identified that clean development requires investment amounting to US\$200-210 billion per annum by 2030.² The Indonesian Ministry of Finance, through its Climate Budget Tagging mechanism, has identified more than Rp 78 trillion (\$5,7 billion) of FY 2017 national budget component related to climate change impacts, amounting to a 32 percent increase over the FY 2016 budget.

CONCLUSION

Green bonds have been attracting an increasing degree of interest across Asia and the world, as an alternative source to finance low-carbon investments. Green finance is still at an early stage in ASIAN countries and it faces several critical challenges. These challenges exist both for issuers of green bonds and investors. Two distinct challenges that have been found in the paper for issuers include limited credit retention limit and costs of meeting green bond requirements. Challenges for investors include a limited investment capacity, lack of data and analytical ability, and a lack of green bond indices, listings, and ratings. The proceeds from green bonds issued in countries are mostly used for green buildings and renewable energy.

India has set ambitious renewable energy goals to improve energy access and energy security while taking action on climate change. To scale the necessary finance to achieve these national targets, new innovative financial instruments such as green bonds need to scale up. Therefore the objectives should be to strengthen and expand the market for green bonds in India with the aim to: Reduce the cost of capital, Stimulate demand from institutional and retail investors and Expand and diversify the issuer and investor base.

The green bond market in Indonesia has strong potential to grow further, but low penetration indicates it needs to be further developed, and faces challenges to reach a comparable scale with conventional investment. The regulator is also challenged to seize the opportunity by building market education of stakeholders and society to increase awareness of green investment, which may, in turn, stimulate supply and demand in the green bond market in the medium term.

Thailand, in particular, offers great opportunities for the development of an active green bond market because of its renewable energy potential and its active general bond market, which is the largest amongst Association of Southeast Asian Nations (ASEAN) members.

Thailand government will offer up to 30 billion baht of 15-year green bonds to investors in October 2020 to help finance coronavirus support measures. This is extremely helpful as it is going to pave the way for other countries to come forward and do the same.

Overall, the green bond market in Asia is growing at an exponential rate and has a great demand in the future. The market is opening up to new avenues of green bonds to further help the investors in choosing the right product. The market is bound to grow much faster as climate change is becoming a real threat to the world. The world leaders are willing to invest more in green bonds in order to push climate change back by a few years.

References:

Flammer, C. (2018, December 7). *Green Bonds Benefit Companies, Investors, and the Planet*. Harvard Business Review.

<https://hbr.org/2018/11/green-bonds-benefit-companies-investors-and-the-planet>

Weber, O. (2019, January 29). *Green Bonds: Current Development and Their Future*. Centre for International Governance Innovation. <https://www.cigionline.org/publications/green-bonds-current-development-and-their-future>

Azhgaliyeva, D., Kapoor, A., & Liu, Y. (2020). *GREEN BONDS FOR FINANCING RENEWABLE ENERGY AND ENERGY EFFICIENCY IN SOUTHEAST ASIA*. Adb.Org <https://www.adb.org/sites/default/files/publication/562116/adbi-wp1073.pdf>

Asean Green Finance-State of the Market. (2019). *Climatebonds.Net*. https://www.climatebonds.net/system/tdf/reports/cbi_asean_sotm_2019_final.pdf?file=1&type=node&id=47010&force=0

Kameyama, Y., Morita, K., & Kubota, I. (2016, August 1). *Finance for achieving low-carbon development in Asia: the past, present, and prospects for the future*. ScienceDirect. <https://www.sciencedirect.com/science/article/abs/pii/S0959652614013912#abs0010>

Tolliver, C., Ryota Keeley, A., & Managi, S. (2019). *Green bonds for the Paris agreement and sustainable development and goals*. Iopscience.Iop.Org <https://iopscience.iop.org/article/10.1088/1748-9326/ab1118/pdf>

Kala, V., & Garg, V. (2020, September 19). *Issue Paper: Green Bonds in India*. Green Growth Knowledge Platform. <https://www.greengrowthknowledge.org/resource/issue-paper-green-bonds-india>

Schipke, A., Rodlauer, M., & Zhang, L. (2019). *The Future Of China's Green Bonds*. Elibrary. <https://www.elibrary.imf.org/view/IMF071/25402-9781484372142/25402-9781484372142/ch07.xml?language=es&redirect=true>

Chiesa, M., & Barua, S. (2018). *The surge of impact borrowing: the magnitude and determinants of green bond supply and its heterogeneity across markets*. Taylor & Francis. <https://www.tandfonline.com/doi/abs/10.1080/20430795.2018.1550993>

Durrani, A., Rosmin, M., & Volz, U. (2020). *The role of central banks in scaling up sustainable finance – what do monetary authorities in the Asia-Pacific region think?* Taylor & Francis. <https://www.tandfonline.com/doi/full/10.1080/20430795.2020.1715095>

Schumacher, K., Chenet, H., & Volz, U. (2020). *Sustainable Finance In Japan*. Tandfonline. <https://doi.org/10.1080/20430795.2020.1735219>.

Azhgaliyeva, D., & Liddle, B. (2020). *Citations: Introduction to the special issue: Scaling Up Green Finance in Asia*. Tandfonline. <https://www.tandfonline.com/doi/citedby/10.1080/20430795.2020.1736491?scroll=top&needAccess=true>

Anouj, M., Sonia Chand, S., Belinda, K., & R. (2017). *Catalyzing Green Finance: A Concept For Leveraging Blended Finance For Green Development*. Adb.Org. <http://dx.doi.org/10.22617/TCS178941>

Ghosh, A. (2017, January 5). *State of Green Bonds in India by Abhirup Ghosh :: SSRN. Papers*. Ssrn. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2894278

Chen, J. (2020). *Green bonds can fuel a more sustainable and stable recovery amid Covid-19*. TheAsset. <https://www.theasset.com/article-esg/40400/green-bonds-can-fuel-a-more-sustainable-and-stable-recovery-amid-covid-19>

Liang, A. (2019). *Asia's First Index For Sustainable Bonds Launched*. Citywireasia. <https://citywireasia.com/news/asias-first-index-for-sustainable-bonds-launched/a1303998>

Kirchheimer, G. (2019). *Kazakhstan Leads Central Asia In Green Finance*. Bloomberg Media Studios. https://sponsored.bloomberg.com/news/sponsors/features/aifc/kazakhstan-leads-central-asia-in-green-finance/?adv=19268&prx_t=jn8FAAAAAAFEANA

Indonesia's Green Bond & Green Sukuk Initiative. (2018). UNDP.ORG <https://www.undp.org/content/dam/LECB/docs/pubs-reports/undp-ndcsp-green-sukuk-share.pdf>

Pirouz, J., Marie, A., Katarina, A., & Nawangsari, R. (2019). *Unlocking Green Bonds Indonesia*. ClimateBonds. <https://www.climatebonds.net/files/reports/climate-bonds-indo-barriers-20191219.pdf>

Jaulin, T., Hessenberger, T., & E.C. (2019). *Emerging Market Green Bonds*. IFC. <https://www.ifc.org/wps/wcm/connect/a64560ef-b074-4a53-8173-f678ccb4f9cd/202005-EM-Green-Bonds-Report-2019.pdf?MOD=AJPERES&CVID=n7Gtahg>

