

## Introduction

Over the past few decades, the global economy grew but at the cost of Earth's natural resources and environmental quality contributing to man-made climate change. Therefore, sustainable development has become of paramount importance to embrace economic growth and mobilize efficient use of resources to protect the environment and people living in it.

Environmental objectives pertain to reducing greenhouse gas emissions which is essential for climate change mitigation, committing to the global Paris Agreement of 2015 to limit global temperature rise to below 2°C above pre-industrial levels. A global shift to low carbon economy and more efficient use of energy is necessary to preserve the whole ecosystem. Researchers and policy makers find that finance is the engine that drives sustainable development. With increasing attention on the concept of green finance, multiple forms of green investments and financial tools have come to fruition, the most prominent are green bonds.

## Green Bonds

Recently investors have become more conscious of the environment and diligent with their investments, giving rise to green financing capital markets. This led to the development of green bonds, a novel financing method created by the World Bank, when in 2007 a Sweden group of pension funds wanted to invest in activities to combat global warming but unable to raise funds (Yeow and Ng, 2021). A Green Bond is defined as a fixed income financial instrument, issued primarily to finance with their proceeds efficient technology, renewable energy, green supply chain management, and low carbon activities. Although the issuer is obliged to report back to the investor how net proceeds from the issuance have been used, this purpose however isn't always guaranteed. This is due to the existence of imperfect markets where investors face information asymmetry, making it difficult to evaluate a green bond issuer's commitment to protect the environment. As a result, signalling theory comes to light where firm managers issuing green bonds send signals to the market to communicate their intentions and commitments to the cause. This reduces information asymmetry however it incurs the firm high costs as it requires substantial efforts and resources. Nevertheless, if their signals are credible the firms' environmental performance should improve through their issuance of green bonds, lowering their carbon footprint measured by GHG emissions (Flammer, 2021; Yeow and Ng, 2021; ICMA, 2018; Wang and Zhi, 2016). Fama and French (2007) highlight that the investors' taste in holding investments having uncertain payoffs is for the desire to be socially and environmentally responsible (Ng and Zheng, 2018).

## Governing Green Bonds

To issue bonds firms abide by the Green Bonds Principles (GBP) established in 2014 with the latest update in June 2021 describe a set of voluntary process guidelines created to support issuers of green bonds in financing eco-friendly and sustainable projects (Sartzetakis, 2021; ICMA, 2018).

The lack of public governance, of stringent guidelines and supervisions arises the issue of 'greenwashing' making it easy for businesses to claim that the bond is financing eco-friendly projects when it isn't just to increase customer base. (Yeow and Ng, 2021). Greenwashing is concealed behind misleading imagery and labelling of the product being green (capitalising on biodiversity symbols), lack of transparency and selective disclosure. So, although green bonds issuance sends a credible signal to the public that the company have genuine intentions to help the environment this could be a pretext of greenwashing (Flammer, 2021). However, aside from third party certifications, the robustness of the Intended Nationally Determined Contributions (INDCs) the countries abide by in adherence to the Paris agreement may regulate this issue and drive growth in the green bonds market (Löffler et al., 2021).

## Green Bonds Market Analysis

Data collected for the analysis of the green bonds market was collected from the Environmental Finance Bond Database. The total Bonds value as of March 2021 amounted to \$1651.92BN.

Figure 1: Green bonds value by type of bond (\$bn)

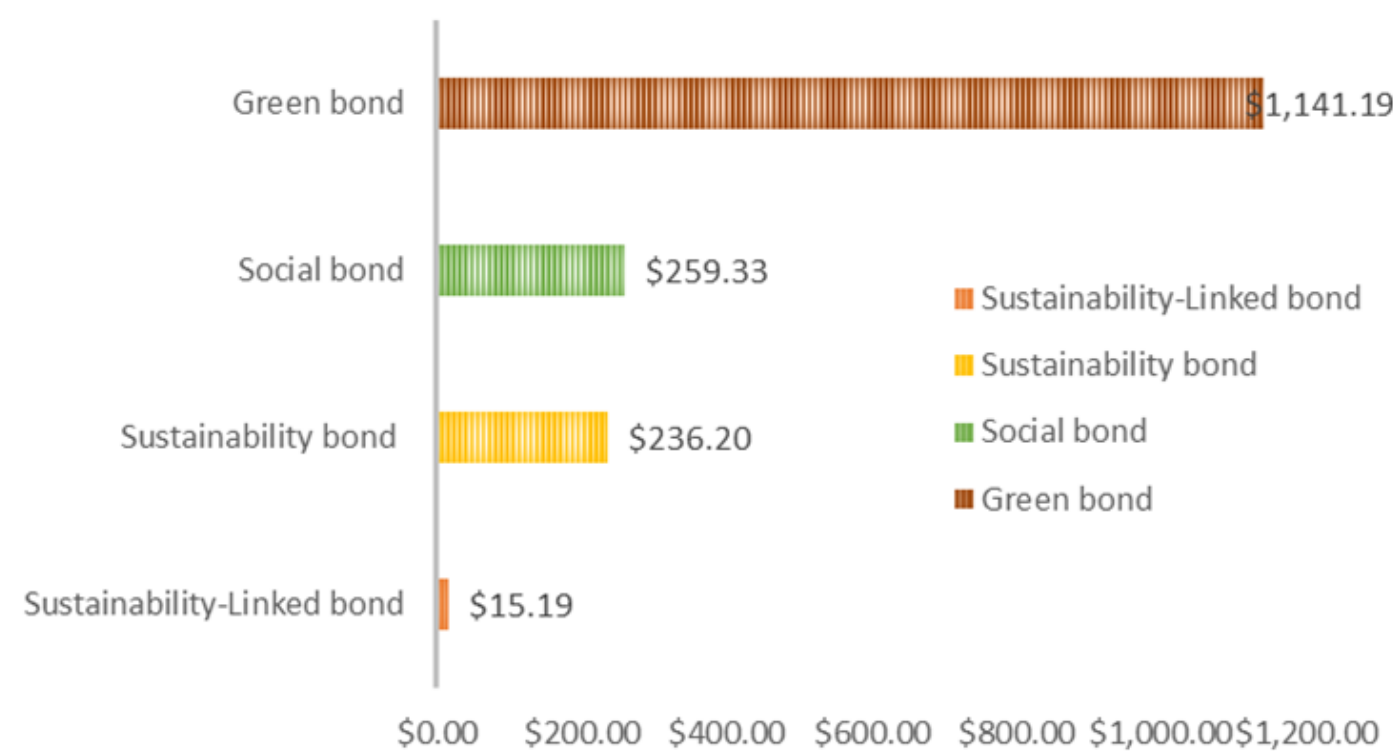


Figure 2: Uses of Green Bonds' proceeds

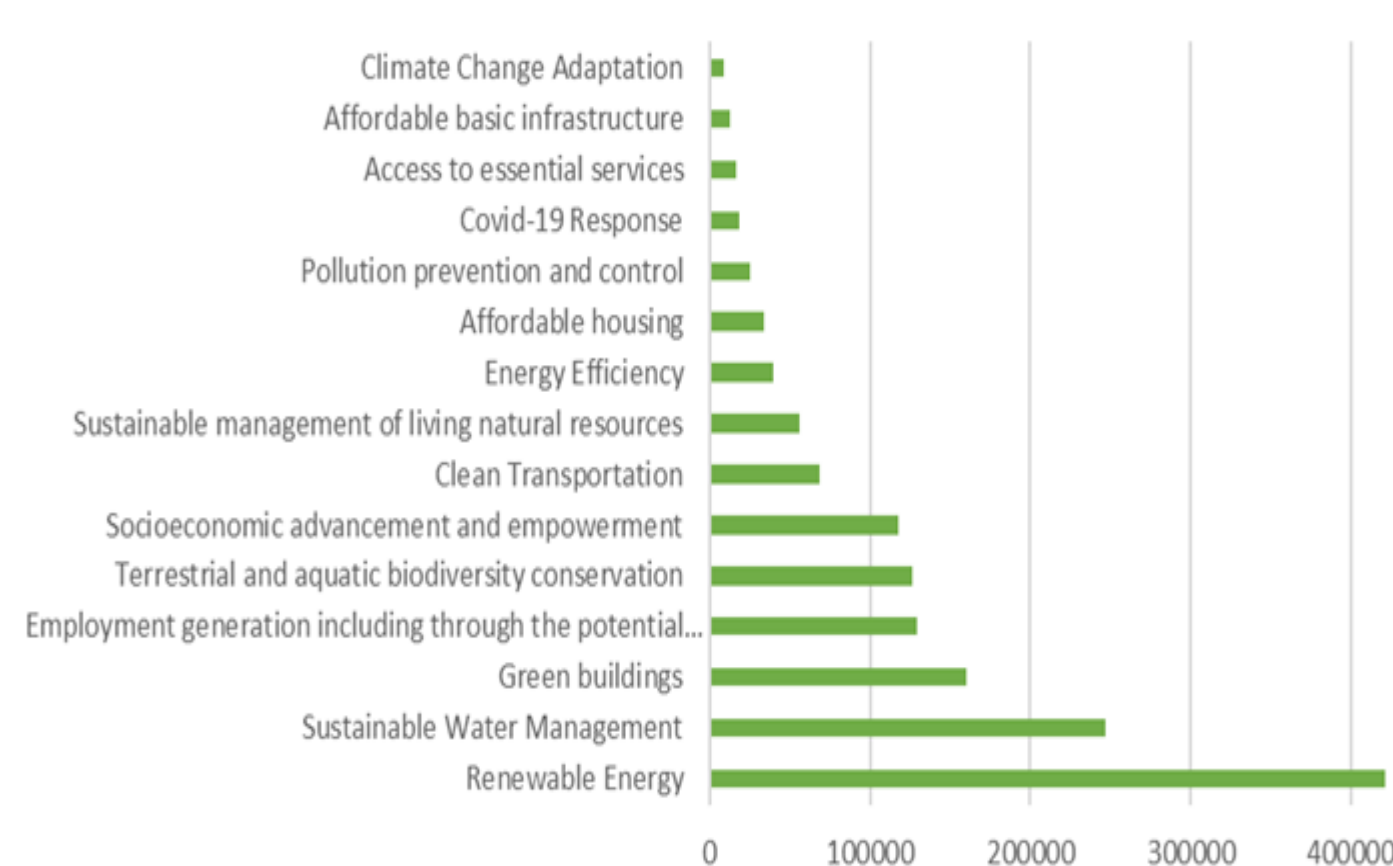


Figure 3: Green Bonds Issuer type

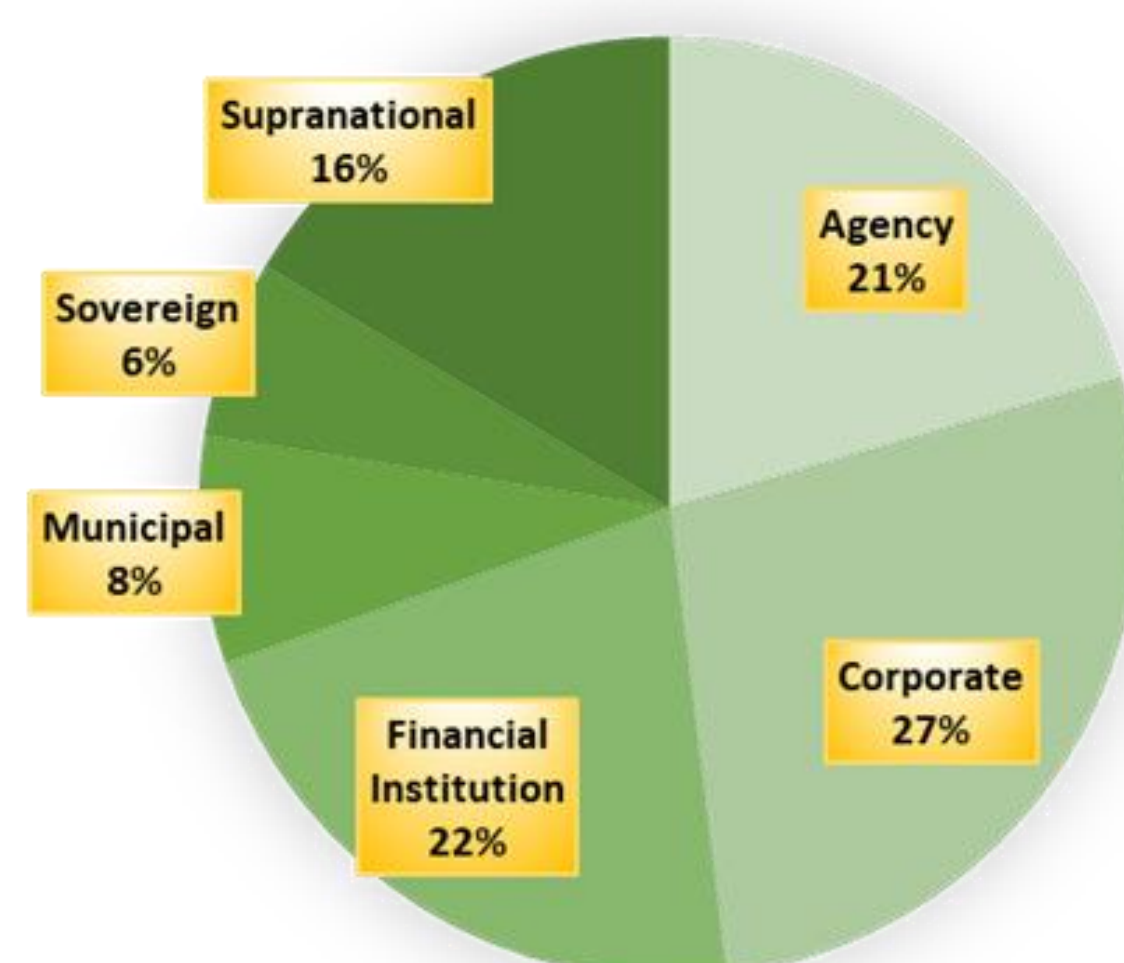


Figure 4: Green Bonds across years (2006-2021)

year	Number of deals	Dollar Volume (M)
2006	1	1000
2007	1	812.166
2008	2	605.936
2009	15	2317.661
2010	54	4336.754
2011	34	1513.013
2012	37	3442.461
2013	61	11642.55
2014	156	38195.97
2015	244	49913.93
2016	386	104248.9
2017	1653	195562.9
2018	1807	212841.4
2019	1836	325946.4
2020	1173	549955.5

Figure 5: Top issuers worldwide

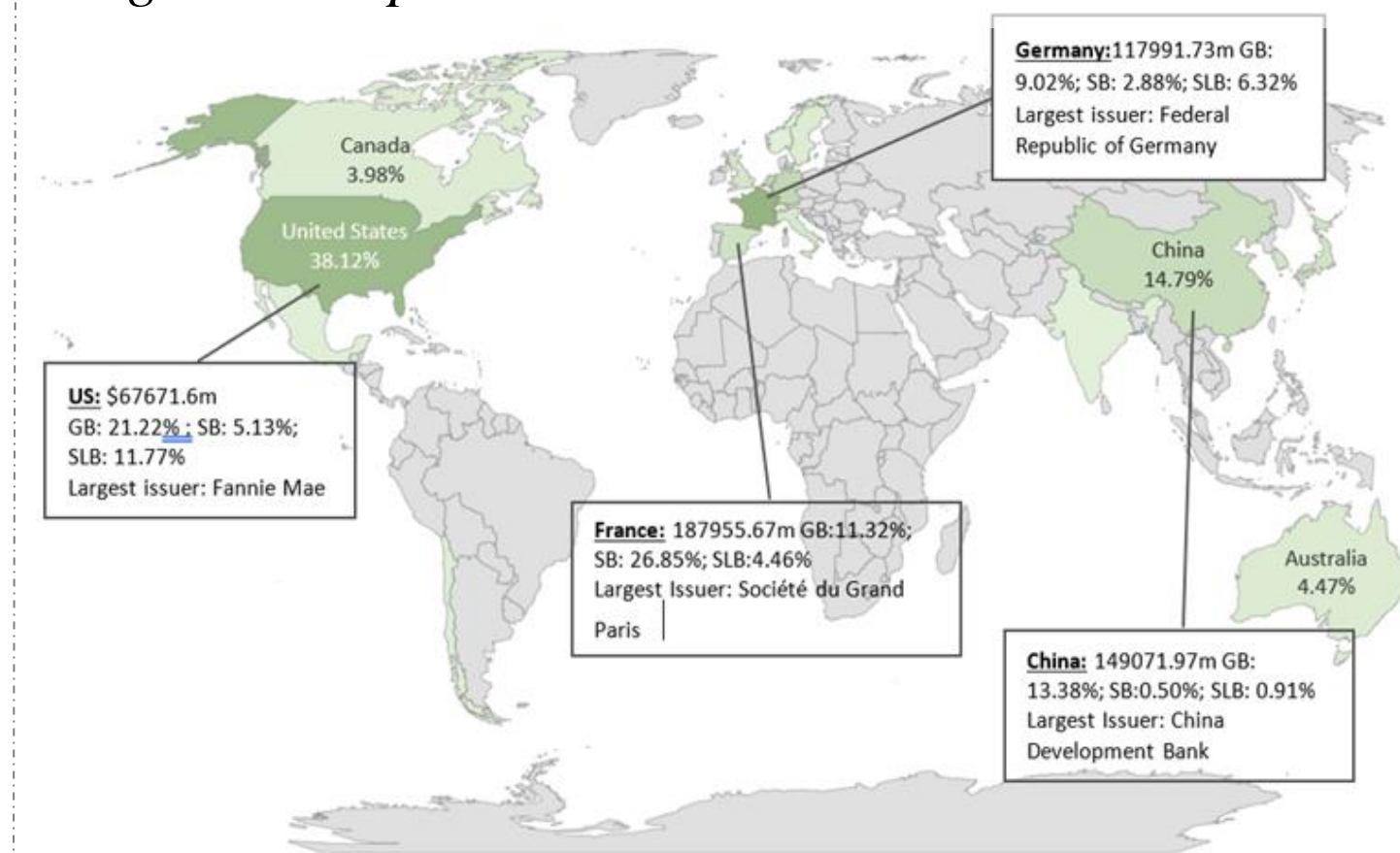
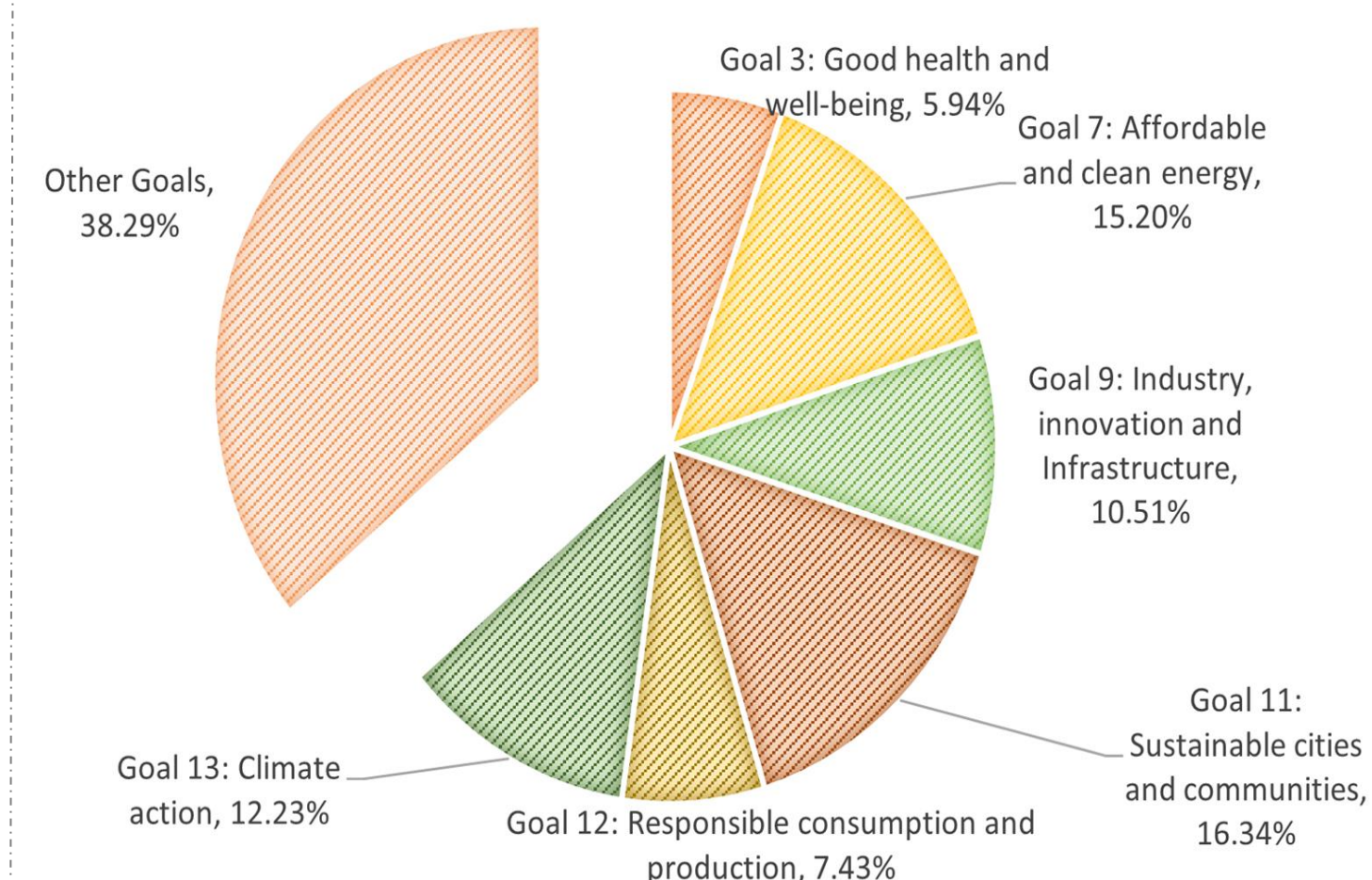


Figure 6: Green bonds alignment with SDGs (2020)



## References:

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