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Introduction and Application of Green Bonds on the Green Buildings Policy

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A Study on Introduction and Application policy of Green Building Bonds

SUMMARY

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Chapter 1 Introduction

The「2030 Greenhouse Gas Reduction Roadmap amendment」states that the national reduction target is to reduce the amount of overseas reductions as set out in the existing roadmap for 2016 and to increase the amount of reduction by sector. The Ministry of Environment (2018.7.24.) stated that the Plan for the allocation of emission allowances by 2030 was strengthened from the existing 161.4 million tCO2 to 132.7 million tCO2 by the amendment of the 2030 Greenhouse Gas Reduction Roadmap. This is an increase of 32.7% from 18.1% of 2030 emission expectation(Business As Usual, BAU), that Korea set as standard.

Due to the increased burden on greenhouse gas reduction projects through the creation of green buildings owing to the strengthening of greenhouse gas reduction targets in the building sector, the government feels limited due to financial support policies such as government-led subsidies and subsidies and policy measures to mitigate construction regulations. In addition, buildings targeted for greenhouse gas reduction are mainly located in cities, and environmentally constrained greenhouse gas reductions by enhancing the performance of green buildings by applying new and renewable energy. The demand for green building incentives centered on economic benefits is required because it affects the supply of zero-energy buildings, which are expected to be mandatory for new buildings.

This study aims seeking green building incentives which minimize the financial burden of the government in accordance with market principles. In order to enable the public to live in green buildings and zero-energy buildings, this study tries to find suggestions to government to expand the green building using financial system so that the environmental constraints discussed above could be removed through financial techniques. It also tries to understand the marketability of buildings in order to enhance the participation of the financial sector. In other words, it tries to propose a financial approach that can build a cyclical market base through increasing green building profitability and increasing demand.
In this study, major research questions were set as follows.

Major research questions of this study

- What are the limitations of the current green building incentive system?
- What is the size of the green building market needed to introduce economic incentives for green buildings?
- What is the structure of the financial system that is necessary for the expansion of green buildings in Korea?

Chapter 2 Green Building Financial System

In order to reduce greenhouse gas emissions, we explored trends in domestic and foreign financial policies, trends in climate-related financial products, and the operation and introduction of green finance. The results of this study are summarized based on the results of comprehensive analysis.
In Korea, the financial sector for the revitalization of green architecture is at an early stage compared with the international level, and a new strategic approach is needed due to the limit of the unique financial structure combined with the construction market of Korea alone. From the autonomous market-based financial system, which minimizes the financial burden of the government, it is confirmed that there are various cases from the government intervention to the system to effectively reduce the greenhouse gas. It is necessary to draw up a financial system that meets the conditions of our country where the market and the country are appropriately combined and operated through the case of progressing to a better policy through some failing policies.

Recently, green bonds issued in Korea are internationally proven financial instruments composed of ethical investors and are utilized as investment funds for various climate change response projects. Until now, green bonds have been issued according to marketability without the involvement of the government. However, if green bonds are issued by the leading of the government, investors will be able to secure stability in terms of credit worthiness. Furthermore, it can be utilized as a special purpose resource for the green building and the zero energy building market, which are inferior to general buildings due to high additional construction costs in Korea, and it can be considered as a basis for developing various financial derivative products.

Chapter 3 Construction of green building financial system and policy system

In order to integrate the green building finance system in Korea, we have identified the basic conditions that are needed in advance, and based on this, we have arranged the financial structure of green and zero energy buildings. We have created a scenario assuming that the financial structure of green and zero energy buildings is applied to policies.

At present, the basic condition of green and zero energy construction in Korea is closely related with the real estate market. In Korea, the economic view considers the reason for the existence of buildings lays on the increase of the real estate value. Therefore, it is recognized that green and zero energy buildings, which require additional facilities in general buildings, are not economically feasible due to additional investment costs. However, the government plans to significantly reduce energy efficiency standards from 2025 on the level of zero-energy buildings to reduce greenhouse gas emissions in buildings. In other words, green and zero energy buildings are regarded as low-cost real estate in the market, but the government is paradoxically preparing a policy to enlarge it.

Currently, the government's green building support policy can be summarized as tax relief, subsidy support, and relaxation of building standards. This is a modest level of support to overcome the economies of vulnerable green and zero energy buildings.

There is a limit to the direct financial support of the government, which is insufficient to apply to the universal expansion of green building policy. Therefore, it is necessary to shift from the government-led green and zero energy construction project to a market-led project based on economics. Therefore, the government should review the new system so that it can overcome the low business feasibility of green and zero-energy buildings by using real estate deregulation and green bond system.
In this chapter, we propose a green bond financial structure, in which green bonds are introduced directly, and a financial structure centered on government-specialized companies. The green bond financial structure is a financial structure that utilizes the internationally active green bonds, minimizing the direct financial input by the government. Through the portfolio-based investment-profit structure, It aims to spread business for the green and zero energy architecture and renewable energy buildings. Government-specialized financial structure can be classified according to the role of individual subject in the national, public and private market areas, and financial companies-specialized firms serve as intermediaries between the national and public sectors and private market areas. It has the ability to develop various derivatives and sell them to the public.
Finally, we examined the situation that could occur in reality by constructing a series of processes from securing financial resources to business application to green bond financial structure and financial structure centered on government-specialized companies.

Chapter 4 Analysis of the virtual operation effect of green building financial system

To estimate the market size needed to operate the financial system, we estimated the green and zero energy building market by 2030. In this study, virtual operating conditions were set for this. The virtual operating conditions are as follows.

- Dualization for the building market: In accordance with the mandatory construction of zero-energy buildings in 2025, the existing buildings will be green buildings through green remodeling and the new buildings will become the zero energy buildings.

- Spreading of new renewable energy generation market in architecture field: With the spread of zero energy, it is expected that new and renewable energy generation business market will be formed using buildings.
- Financial market perspective: Before the green and zero energy market became popular, the financial market will look to the government from a conservative point of view.
- Reflecting the effects of low fertility and aging: It is estimated that the building supply market responds to changes in the construction demand, such as an increase in one person-occupied households, and it is estimated based on the correlation between the population estimate and the building.

In the green and zero energy building market, we estimated the annual volume based on the increasing floor space of existing buildings, and solar power generation capacity utilization. The amount of new construction is estimated to decrease continuously every year as a zero energy building market, and the total floor area of existing buildings is calculated to increase gradually as a green remodeling market. In terms of solar power generation using buildings, new buildings were estimated to decrease and existing buildings were estimated to increase.

We estimated the total market size based on volume. As a result, the market for zero-energy construction is expected to grow at an annual average of 38 trillion won, and the market for green remodeling is expected to grow at an annual average of 7.8 trillion won. It is estimated that an average annual 51 trillion won market will be opened for the solar power generation project utilizing the buildings. It is estimated that the new building market is decreasing and the existing building utilization market is increasing.

Assuming a 5-year maturity, bond yield of 2.18% and a green bond amounting to 300 billion won, we took a simulation to judge whether or not a virtual investment is suitable for 2020, which is a mandatory zero-energy requirement for public buildings, and 2025, which is zero-energy mandatory term for private buildings. In 2020, when the public zero energy building, green remodeling, and building use photovoltaic power generation business is composed of one portfolio and it is assumed that it invested for five years, the result is that the profit of the real estate is expected to be a deficit, but the profit in the other fields is calculated, and there is no problem in operation. If the investment is made in the same way for a portfolio that

includes private buildings, green remodeling, and photovoltaic power generation projects in 2025, investing in the entire construction capital of new buildings will lead to losses in the business profit structure and profit in the financial profit structure. The results were derived and it was judged difficult to apply the reality. However, when invested only in the zero-energy addition facility of newly constructed buildings, both the profit structure and the financial profit structure were found to be profitable.

By combining the results of the simulation, it is possible to utilize green bonds as a basic resource to invest in green and zero energy construction projects. When zero-energy buildings are newly built, resources are invested in increasing equipment costs, and it is recommended that solar power generation projects utilizing buildings be included as revenue projects.

Chapter 5 Conclusion

The policy proposal for the introduction and application of green building bonds proposed in this study is related to the new policy, so the policy proposal based on limitations and implications is presented.

The limitation is that the introduction of a new management system and consideration of flexible business feasibility are required at the present time as green bonds are used as financial resources and domestic and foreign debts will increase because they use overseas funds. Also, since it have to concentrate on the projects that can generate profits, comprehensive projects for the public sphere are limited.

However, since the project to spread the green and zero energy buildings is based on the financial resources provided by the green bonds, it will move with economic efficiency, so that the direct financial burden of the government can be minimized and the business can secure re-investment money due to generate profit in the financial field and business field. In addition, by investing in new and renewable energy generation projects in the construction sector, which are currently constrained by commercialization, the amount of greenhouse gas reduction attributed to the conversion sector will be secured as a profitable business in the building sector.

Therefore, the government needs to form a policy from a market perspective in order to spread green and zero energy buildings. In other words, by utilizing the fact that

buildings are assessed as real estate assets, the government should make institutional arrangements such as easing regulations on real estate limited to green and zero energy buildings and operating investment products using derivative green building bonds, so that the real value added to the people can return to a larger extent.

In addition, the government should support credit enhancement through government guarantees and insurance that can compensate for the lack of business in the beginning of the business. The government should relax the regulations and encourage the projects so that new projects, remodeling, and building-use power generation projects can be combined rather than a single project considering the publicity.

The government should strengthen the provision of support and exception for the "Green Building Promotion Act" from the recommendation so that professional companies can actively participate in the business and enhance their professional capabilities so that they can be linked with job creation. And the government should reinforce the legal basis for credit enhancement and investment of business expenses by participating companies. Furthermore, the profits generated from publicly operated businesses need to be legislated so that they can be utilized as a source of funds for the revitalization of green and zero energy buildings.

Keywords:
Green bonds, Green bond funds, Climate change adaptation, Green buildings, Zero energy buildings