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The Impact of Starting a Housing Subsidy Program for Low-Income Households on Achieving Carbon Neutrality in South Korea

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Abstract

Carbon neutral building, a building that is designed, constructed, and operated to produce zero net carbon emissions over its lifetime. The goal of carbon neutral buildings is to reduce the negative impact of buildings on the environment and to mitigate climate change. In order to promote the achievement of carbon neutrality goals by building carbon neutrality buildings, South Korea employs the Green Standard for Energy and Environmental Design (G-SEED) and designed Green Building Certification System (GBCS) to evaluate environmental performance of buildings and promote the dissemination of green buildings. However, low-income households are particularly vulnerable to the impacts of climate change and face challenges in accessing affordable, energy-efficient housing. A housing subsidy program for low-income households can help address these challenges and contribute to achieving carbon neutrality. Measures such as allocating more funds, establishing clear eligibility criteria, monitoring and evaluating the program, and promoting the benefits of sustainable living to the public can help achieve carbon neutrality goals in South Korea.

Keywords: Housing subsidy; carbon neutral buildings; carbon neutrality; policy recommendations.

The world is facing the challenge of climate change, which is caused by excessive greenhouse gas emissions, including carbon dioxide, methane, and nitrous oxide. According to the Intergovernmental Panel on Climate Change (IPCC), human activities have caused approximately 1.1°C of warming since 1850-1900, and global temperatures are expected to reach or exceed 1.5°C of warming over the next 20 years (IPCC, 2021).

South Korea, which was the world's 15th largest carbon emitter in 2018, has moved higher and higher in recent years. According to network data monitoring, South Korea entered the world's top 10 carbon-emitting countries in 2021. To address this issue, the Korean government has set a goal of achieving carbon neutrality by 2050 (UNCC, 2020). One of the major sources of greenhouse gas emissions in Korea is buildings, which account for about 20% of all GHG emissions (Kwak et al., 2019). The Korean government has been promoting the construction of carbon-neutral buildings. However, the high cost of constructing such buildings has made it difficult for low-income

households to access them.

This paper argues that starting a housing subsidy program for low-income households can help achieve carbon neutrality in Korea by increasing the adoption of carbon-neutral buildings. The housing subsidy program could be designed to cover a portion of the construction cost of a green building or to provide low-interest loans to low-income households to help with the construction of carbon-neutral buildings.

1. Method

To conduct this analysis, a search was conducted using the following databases: Google Scholar, Web of Science, and Scopus. The keywords used in the search included "housing subsidy program," "low-income households," "carbon neutrality," and "South Korea." Filters were applied to limit the search to articles written in English and which have open access availability.

The selected sources were chosen based on their relevance, credibility, and publication date. The articles had to be published in recent years to ensure that the information was up-to-date. The relevance of the articles was determined by their title, abstract, and keywords. Only articles that highly addressed the importance of a housing subsidy program for low-income households in achieving carbon neutrality were selected. The credibility of the articles was determined by the reputation of the journals in which they were published and the credentials of the authors.

The articles which were selected were grouped into two categories: those that focused on the importance of a housing subsidy program for low-income households on achieving carbon neutrality in South Korea and those that analyzed the effectiveness of existing housing subsidy programs in other countries.

The articles that focused on the importance of a housing subsidy program for low-income households on achieving carbon neutrality in South Korea found that such a program could help reduce carbon emissions from the housing sector by promoting the adoption of energy-efficient technologies and practices. These articles also highlighted the need for targeted policies that address the unique needs of low-income households, such as access to affordable financing and technical assistance. The articles that analyzed the effectiveness of existing housing subsidy programs in other countries found that such programs can be effective in reducing energy consumption and carbon emissions from the housing sector.

However, the success of these programs depends on factors such as the design of the program, the availability of financing, and the level of public awareness and participation. Achieving carbon neutrality goals requires significant financial support and a certain amount of trial and error, so patience and perseverance are crucial.

2. Results

2.1. Challenges and opportunities

Starting a housing subsidy program for low-income households in South Korea has both challenges and opportunities in terms of achieving carbon neutrality.

One of the main challenges is the cost of implementing such a program. The government would need to allocate a significant amount of funding to subsidize housing for low-income households, which may be difficult to do given other competing priorities. Additionally, the construction and renovation of housing units to meet carbon-neutral standards can be costly, which may limit the number of households that can benefit from the program.

Another challenge is ensuring that the program is effective in reducing carbon emissions. The government would need to establish clear eligibility criteria and monitoring systems to ensure that the housing units meet the necessary carbon-neutral standards. It is also important to ensure that the program does not inadvertently lead to increased energy consumption or other negative environmental impacts.

Despite these challenges, there are also opportunities to achieve carbon neutrality through a housing subsidy

program for low-income households. One opportunity is to use the program as a way to promote the adoption of renewable energy sources, such as solar panels, in low-income households. This can help to reduce carbon emissions and increase energy independence for these households.

Another opportunity is to use the program to promote sustainable urban development. By providing housing subsidies in areas with access to public transportation and other sustainable infrastructure, the program can encourage low-carbon lifestyles and reduce the need for private vehicles.

2.2. Recommendations

Based on the literature analysis, several recommendations can be made to address the gaps and challenges in starting a housing subsidy program for low-income households on achieving carbon neutrality in South Korea.

First, allocate sufficient funding for the housing subsidy program to ensure that it can reach a significant number of low-income households. This funding could come from a variety of sources, including government budgets, private sector contributions, and international aid (Yoon & Song, 2023).

Second, develop clear eligibility criteria for the program to ensure that it reaches those who need it most. This could include income thresholds, age requirements, and other factors that are relevant to low-income households.

Third, establish a monitoring and evaluation system to ensure that the upgrades made to homes are effective in reducing energy consumption and greenhouse gas emissions. This could include regular inspections of homes, surveys of participating households, and data analysis to track energy consumption and emissions.

Fourth, provide education and outreach to participating households to ensure that they understand how to use the energy-efficient upgrades effectively and maintain them over time. This could include workshops, training sessions, and informational materials that are tailored to the needs of low-income households.

In conclusion, starting a housing subsidy program for low-income households can play a crucial role in achieving carbon neutrality in South Korea. It can help address the challenges that low-income households face in accessing affordable, energy-efficient housing and can have a positive impact on reducing greenhouse gas emissions.

3. Discussion

3.1. Why is carbon reduction necessary in south korea

Asia is the world's largest carbon emitter, with China the world's largest carbon emitter and Japan consistently in the top five.

By comparison, it seems that South Korea's carbon emissions are not that big and the figure actually dropped in these years. In reality, however, as industries returned to normal in 2021 following the COVID-19 pandemic, economic growth drove up carbon emissions in South Korea (see Figure 1).

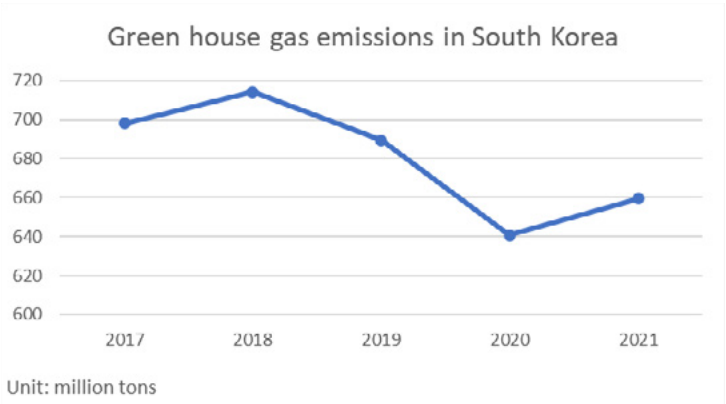

Figure 1. South Korea's Green house gas emissions from 2017 to 2021 (Data source: Ritchie, H., & Roser, M., 2022)

According to Seo Heung-won, head of the Greenhouse Gas Inventory and Research Center, there has been a rise in energy production, industrial manufacturing, and transportation fuel consumption in Korea (Im, E., 2022). It can also be seen from the figure that if South Korea does not take proactive measures to reduce carbon emissions, higher carbon emissions will be seen in the future.

3.2. What can be learned from other Housing Subsidy Programs

There are two housing subsidy programs to be discussed.

One example of a successful housing subsidy program for low-income households is the Low-Income Home Energy Assistance Program (LIHEAP) in the United States. LIHEAP provides financial assistance to low-income households to help them pay their energy bills and make energy-efficient improvements to their homes. The program has been successful in reducing energy consumption and improving the living conditions of low-income households (U.S. Department of Health and Human Services, 2019).

Another failed example is the Green Deal. It was a government scheme designed to help homeowners and businesses in England to make energy-efficient improvements to their properties. Under the Green Deal, property owners could apply for loans to fund energy-saving measures, such as insulation, heating, and lighting upgrades. The Green Deal was intended to help reduce greenhouse gas emissions by improving the energy efficiency of buildings in England, as well as to create jobs in the energy efficiency sector. However, the scheme was ultimately deemed unsuccessful due to low uptake and high interest rates on the loans. The Green Deal was officially discontinued in 2015 (Rosenow, J., & Eyre, N., 2016).

Why LIHEAP has been successful while The Green Deal has failed? Through the background analysis of the two programs, three reasons can basically be concluded here:

Firstly, LIHEAP has a clear and specific goal of providing low-income households with assistance to pay their energy bills, while The Green Deal had a more complex and ambitious goal of reducing carbon emissions and promoting energy efficiency. Secondly, LIHEAP has a well-established and efficient system for delivering benefits to eligible households, while The Green Deal faced challenges in terms of implementation and uptake. Thirdly, LIHEAP has enjoyed bipartisan support and stable funding, while The Green Deal was a more politically divisive initiative that faced opposition from some stakeholders.

Korea can draw valuable lessons from both the successes and failures of LIHEAP and The Green Deal. The targeted assistance provided by LIHEAP, which is based on clear eligibility criteria, is an effective way to ensure that low-income households receive the assistance they need. Additionally, LIHEAP's provision of a range of services, including energy assistance, weatherization, and energy education, can help to address the multifaceted needs of low-income households.

On the other hand, The Green Deal's reliance on loans that were attached to the property made it unattractive to homeowners who were concerned about the potential impact on their property values. Korea can learn from this failure by designing a program that is financially viable and attractive to homeowners. Additionally, it is important to set realistic goals and targets, and to establish effective monitoring and evaluation mechanisms to ensure that the program is achieving its intended outcomes.

3.3. Special advantages

According to a study conducted by the Korea Energy Agency in 2017, the adoption of carbon neutral buildings could reduce energy consumption by up to 40% compared to conventional buildings. If South Korea can successfully promote the construction of carbon-neutral buildings, it will become a pioneer in this field in Asia, with the ability to provide guidance to other countries and increase its international influence.

In fact, China and Japan, as carbon-emitting countries, have issued many regulations on energy-saving buildings. However, China has not given high priority to carbon-neutral buildings due to its economic development needs and large land area, which makes policy promotion difficult. Japan's building industry is highly developed, but its location in the Pacific seismic zone means it has some special requirements for building materials, making it challenging to adjust the building market.

South Korea has several advantages when it comes to promoting carbon-neutral buildings. Compared with China,

South Korea has a smaller land area and higher population density, making policy implementation faster and public opinion feedback more immediate. Compared with Japan, although South Korea is also located in the Pacific seismic zone, there are fewer earthquakes, and the building structure is relatively simple, making it easier to adjust the related industry.

Furthermore, providing housing subsidies for low-income families may help alleviate internal social class conflicts in South Korea. With rapid economic growth and accelerated modernization, social class differentiation in South Korea is becoming increasingly serious. The implementation of the housing subsidy program can help low-income families rent or purchase affordable housing, reducing their economic burden and improving their quality of life. This can help alleviate internal social class conflicts in South Korea.

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