우리들의미래
Coalition for
Our Common Future

In Search of a Centralized Korean Green Financing Body

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1 | Background and Introduction

Korea's ambition to achieve carbon neutrality by 2050 requires not only robust policies but also a well-coordinated and efficient financial system capable of channeling resources toward sustainable development. The government has implemented key legislative frameworks such as the "Framework Act on Low Carbon and Green Growth" and the "Carbon Neutrality Framework Act," which provide a foundation for these efforts. However, the implementation of these policies has revealed significant challenges, particularly in governance, resource allocation, and coordination across institutions. These gaps have resulted in fragmented green finance initiatives, inefficiencies, and missed opportunities for synergy.

Green finance is an essential mechanism in addressing the global climate crisis, enabling investments in renewable energy, low-carbon technologies, and green infrastructure. Korea has made progress through mechanisms like the Korea Emissions Trading Scheme (K-ETS) and the Korean Green Taxonomy (K-Taxonomy), which aim to encourage private sector participation and establish clear standards for sustainable investments. However, these efforts must be further strengthened by aligning Korea's domestic initiatives with its international climate commitments under the Paris Agreement. Such alignment not only ensures consistency with global standards but also enhances Korea's credibility and leadership in the global fight against climate change. By leveraging insights from global best practices, Korea has the opportunity to reform its fragmented green finance ecosystem and contribute more effectively to the international effort to combat the climate crisis.

A particularly pressing example of this fragmentation is the management of the Climate Response Fund, a critical financial instrument primarily financed through the K-ETS framework, to support greenhouse gas (GHG) reduction efforts and the broader transition to a low-carbon economy. Currently, the fund operates under a decentralized governance structure, with multiple ministries and institutions managing various aspects of its allocation and use. This system has led to inefficiencies, overlapping responsibilities, and a lack of strategic coherence, ultimately limiting the fund's effectiveness in driving substantial GHG reductions. Integrating the management of the Climate Response Fund into a centralized system led by a single, capable institution would ensure more effective resource allocation, better coordination, and alignment with national climate goals. Among existing institutions, the Korea Development Bank (KDB) emerges as the most qualified candidate for this role, given its extensive experience in

policy financing, its leadership in green finance initiatives such as the "Policy Finance Leading the Climate Industrial Revolution," and its alignment with global best practices like those of the European Investment Bank (EIB). KDB's proven ability to mobilize resources, coordinate diverse stakeholders, and adhere to transparent sustainability standards makes it uniquely positioned to unify and streamline Korea's fragmented green finance ecosystem. Empowering KDB with the authority to centralize green finance mechanisms, including the Climate Response Fund, would address inefficiencies, enhance accountability, and accelerate progress toward national and international climate commitments.

To address these systemic challenges, this study adopts a multi-faceted methodology combining an analysis of Korea's current green finance ecosystem, a review of international best practices, and stakeholder engagement strategies. The scope of the research encompasses financial governance models, policy integration mechanisms, and institutional structures necessary for the development of a centralized green financing body.

This study underscores the pressing necessity of establishing a centralized Korean Green Financing body to address systemic inefficiencies and governance fragmentation. By consolidating key mechanisms, such as the Climate Response Fund, under unified oversight, this approach aims to enhance resource allocation efficiency, reduce administrative redundancies, and align strategic initiatives with national climate objectives. As mentioned above, multiple institutions and ministries currently oversee various green finance initiatives, and the resulting absence of a clear leadership body has resulted in overlapping responsibilities, inefficient resource allocation, and a lack of strategic direction. These systemic issues undermine Korea's ability to meet its climate objectives and necessitate a more cohesive approach to managing green finance.

By examining international case studies such as the EIB, this research explores how leading governance models enhance coordination, streamline resource allocation, and foster innovation in green finance. These institutions demonstrate the advantages of centralized leadership in effectively managing the complexities of sustainable finance and provide valuable lessons for Korea.

This research evaluates Korea's current green finance ecosystem, including the role of initiatives like the K-ETS and the Climate Response Fund, and identifies critical structural and operational challenges. Specifically, integrating the management of the Climate Response Fund within the scope of a leading central institution would eliminate

redundancies, enhance efficiency, and ensure that funds are directed toward projects with the greatest potential for emissions reduction and sustainability impact.

By designating a leading institution to serve as the central coordinating body, Korea can address these challenges and create a more integrated and efficient green finance system. This paper emphasizes that centralized leadership would not only enhance the efficiency and effectiveness of Korea's green finance programs but also position the country as a global leader in sustainable economic transformation. By aligning with Korea's international climate commitments and leveraging insights from global best practices, this research underscores the broader significance of these reforms in contributing to the global fight against climate change. A centralized system would also facilitate greater collaboration among stakeholders by providing a clear structure for engagement and decision-making. Ministries, private sector entities, and civil society organizations could coordinate more effectively under a unified framework, reducing redundancies and ensuring that resources are allocated to high-impact initiatives. This collaborative approach would foster innovation, build trust, and strengthen accountability, ultimately enhancing the overall impact of Korea's green finance ecosystem.

2 | Current Framework and the Green Investment Plan

2.1. Emissions Trading Scheme Market Overview

2.1.1 Overview of K-ETS

Korea implemented the K-ETS to promote technological innovation and provide flexibility for businesses in managing their GHG emissions (KRX, n.d.). Established under Article 46 of the "Framework Act on Low Carbon and Green Growth," enacted in January 2010, the K-ETS began its operation in 2015, following the passage of the "Act on the Allocation and Trading of Greenhouse Gas Emissions Allowances" by the National Assembly in 2012. This system marked a significant step in Korea's approach to emissions trading and GHG management (Korea Energy Agency, n.d.).

The K-ETS sets a total emissions cap aligned with the national roadmap for GHG reduction. Industries are required to either reduce emissions internally or trade allowances to comply with this cap. Under the system, Korean Allowance Units (KAUs) are allocated annually to GHG-emitting businesses, setting a limit on permissible emissions. Businesses can trade KAUs to address any surplus or deficit in their emissions relative to their allocated allowances.

Covering approximately 89% of Korea's total GHG emissions, K-ETS supports the country's goal of achieving carbon neutrality by 2050, a target established in the "Carbon Neutrality Framework Act" of 2021 (Yoon, 2023).

The K-ETS applies to 804 of Korea's largest GHG emitters across various sectors, including power generation, industry, buildings, waste management, transportation, domestic aviation, and maritime transport. Entities covered under this scheme are required to surrender allowances equivalent to their emissions (Influence Map, n.d.). These allowances are distributed through a combination of auctions and free allocations, with at least 10% of the total allowances mandated to be auctioned. Free allocations are primarily granted to sectors that are at risk of carbon leakage due to exposure to emission-intensive trade. These allocations are determined based on benchmarks that consider factors such as production costs and trade intensity. Since 2021, domestic financial intermediaries and other third parties have also been allowed to participate in the trading system, further enhancing market liquidity and participation (ICAP, n.d.).

In Phase Three, less than 90% of allowances are allocated for free to entities in sub-sectors that are subject to auctioning, while Energy-Intensive Trade-Exposed (EITE) sectors receive 100% free allocation. The scope of benchmarking has been expanded to 12 key sub-sectors, including industries like steel, petrochemicals, and buildings. The sectors covered under this phase include maritime, waste, domestic aviation, transport, buildings, industry, and power (ICAP, n.d.).

The allocation process relies on two main methods: the benchmark method, which considers benchmark values, historical activity levels, and carbon leakage factors, and the grandfathering method, which is based on average GHG emissions from a base year, also adjusted by correction and carbon leakage factors. The carbon leakage factor is set at 1.0 for sectors at significant risk and 0.9 for others (Kwon and Ritchie, 2021).

Auctioning plays a growing role, with at least 10% of allowances in auction-subject sub-sectors being auctioned. Entities are permitted to purchase up to 15% of the allowances offered, and the government intends to increase the share of allowances allocated through auctions gradually. The auction volumes were approximately 20.46 million in 2021, 23.24 million in 2022, and around 19 million in 2023, representing about 3% of the total cap for the corresponding year (Yoon, 2023).

Since its implementation, the K-ETS has achieved moderate success in reducing GHG emissions. According to the Ministry of Environment, emissions from covered entities decreased by approximately 4.7% between 2018 and 2022, highlighting the scheme's potential in driving reductions (MoE, 2023). However, challenges remain. Businesses in emission-intensive sectors have raised concerns regarding compliance costs and the risk of losing global competitiveness, especially in the absence of carbon border adjustment mechanisms. Additionally, the relatively low percentage of auctioned allowances and limited penalties for non-compliance have been

criticized for weakening the system's effectiveness. To address these issues, further refinements are needed, including increasing the share of auctioned allowances, strengthening enforcement mechanisms, and enhancing market liquidity through broader participation.

2.1.2. Trends in K-ETS

A significant recent development in K-ETS is the introduction of new measures by the government in September 2023 aimed at revitalizing the market. These measures focus on expanding participation, diversifying financial products, stabilizing the carbon market, and enhancing the trading infrastructure (KIM & CHANG, 2024).

To broaden market participation, the government announced its plan to allow financial institutions, such as asset management companies, to enter the market starting in 2024. Additionally, legal amendments are underway to permit consignment transactions of emission permits, with a potential that future expansions could include individual participants (National Assembly, 2024).

To enhance the financial sophistication of K-ETS, the government plans to introduce a derivatives market by 2025 (PCCNGG, 2023). This will equip participants with tools to manage risks associated with price fluctuations in emission permits. Starting in 2024, financial institutions will also be able to offer emissions-linked financial products such as Exchange-Traded Notes (ETNs) and Exchange-Traded Funds (ETFs), aimed at encouraging private investment in the carbon market (Financial Supervisory Service [FSS], 2024).

The introduction of emissions-linked financial products such as ETFs and ETNs holds significant potential for increasing private sector participation and improving market liquidity. By offering these products, financial institutions can lower the entry barriers for investors, allowing them to indirectly participate in the carbon market without directly trading emissions allowances. These products could also attract a more diverse investor base, including retail and institutional investors, which would enhance market depth and stability. Moreover, emissions-linked financial products provide opportunities for portfolio diversification and offer investors exposure to a growing market segment closely aligned with global sustainability goals.

However, the successful implementation of these products and the broader derivatives market also face potential risks and barriers. One key risk is the possibility of speculative trading, which could lead to excessive price volatility and undermine the primary goal of stabilizing the carbon market. Additionally, insufficient market infrastructure, such as inadequate data transparency and a lack of robust risk management tools, may deter investor confidence. Regulatory challenges, including ensuring proper oversight and preventing market manipulation, will also be critical to address. Lastly, the limited understanding of emissions-linked products among general investors and the relatively low liquidity of the current carbon market may slow adoption and

limit their effectiveness in driving market activity. For these measures to succeed, targeted regulatory frameworks, education campaigns, and transparent market practices will be essential.

2.1.3. Key Discussions on the Transition to Phase Four of K-ETS

As Korea transitions to the fourth phase of K-ETS, covering the period from 2026 to 2030, significant updates have been proposed to enhance the system’s effectiveness in meeting the country's climate goals. The recently released draft plan outlines a comprehensive restructuring of the allocation, market operation, and support mechanisms to better align with Korea's Nationally Determined Contributions (NDCs) and 2050 carbon neutrality objectives. This section incorporates the latest discussions and updates into the context of ongoing policy considerations.

Redefining Total Allowances

A critical aspect of the fourth phase involves redefining the total emission allowances. The government plans to include previously designated market stabilization reserves within the total cap, ensuring tighter alignment with the enhanced national GHG reduction targets. The allocation will now differentiate between the "power" and "non-power" sectors, with the latter encompassing industries, transportation, and buildings. This differentiation aims to address sector-specific emission reduction challenges while maintaining equity across stakeholders.

Increasing Auctioned Allowances

Expanding the proportion of auctioned allowances is a central feature of the new plan, particularly in the power sector. While the specific percentage for the auctioned share has not been finalized, it is expected to be significantly higher than the current 10%. Drawing from international best practices, such as the European Union Emissions Trading System (EU ETS), where 100% of power sector allowances are auctioned, Korea intends to gradually increase auction-based allocations. In non-power sectors, the government will tailor the auction proportions to account for competitiveness and the commercialization of abatement technologies. Furthermore, the adoption of benchmark-based allocation methods will exceed 75% of the allowances, incentivizing operational efficiency among businesses.

Enhancing Market Participation

To address liquidity issues and market inefficiencies, the government plans to broaden the pool of market participants. Starting in 2026, financial institutions, including banks, asset managers, and insurance companies, will be permitted to trade in the carbon market. This expansion will eventually include individual participants, facilitated by the ongoing development of a carbon market trading platform. Additionally, the restrictions on allowance carryover will be eased, providing businesses with greater flexibility in managing surplus allowances between compliance periods. The Korean Market Stability Reserve (K-MSR) will also be implemented to dynamically adjust the supply of allowances and stabilize the market during periods of price volatility.

Improving MRV Standards and Support Systems

The Measurement, Reporting, and Verification (MRV) standards will undergo significant upgrades to align with international best practices, simplifying verification procedures while reducing the administrative burden on companies. The government will also revise the limits for offset credits, potentially increasing the allowable use of offsets beyond the current 5%. To further incentivize innovation, revenues from auctioned allowances will be reinvested into company-led emission reduction initiatives, including the adoption of advanced technologies. A Carbon Contracts for Difference (CCfD) mechanism will be introduced to subsidize increased production costs associated with decarbonization processes.

Strengthening the Role of K-ETS in NDC Alignment

The fourth phase places greater emphasis on the integration of K-ETS into Korea's broader climate strategy. The basic plan explicitly ties K-ETS operations to the national carbon neutrality roadmap, ensuring that all adjustments in allocation and market design are consistent with the enhanced NDC target of a 40% emissions reduction by 2030 compared to 2018 levels. To achieve this, industry-specific reduction pathways and tailored incentives will be developed in consultation with stakeholders.

2.1.4. Transition from Third to Fourth Phase

The transition from Phase Three to Phase Four of K-ETS reflects Korea's commitment to strengthening the scheme as a central pillar of its climate policy. Several key trends and improvements are evident in the fourth Basic Plan:

Increased Reliance on Benchmarks and Auctioning

The benchmark allocation method, which rewards businesses with lower emissions intensity, will be significantly expanded. The government projects that by the end of Phase Four, over 70% of free allocations will be determined using benchmarks, compared to approximately 50% in Phase Three (National Assembly, 2024). Auction revenues are also expected to rise significantly, with projections indicating an increase of up to 30% in annual auction revenues, providing a critical funding source for domestic emissions reduction projects. These changes incentivize businesses to enhance operational efficiency and adopt cleaner technologies, as higher efficiency directly translates to lower costs under the benchmark system. Additionally, the allocation of auction revenues will be aligned with transparent guidelines, ensuring they are directed toward high-impact initiatives, including funding for low-carbon innovation and sector-wide decarbonization efforts.

Comprehensive Impact Assessments

Unlike previous phases, the fourth phase includes robust impact assessments to evaluate the environmental, economic, and social implications of proposed changes. Preliminary findings from early Phase Four assessments highlight a projected 12% reduction in GHG emissions by 2030 compared to Phase Three levels, largely driven by stricter benchmarks and increased auctioning. These assessments also emphasize the importance of minimizing compliance costs for businesses, ensuring that the system remains economically viable. By conducting regular and comprehensive reviews, the system can adapt to changing circumstances and ensure alignment with Korea’s long-term climate goals. For instance, early assessments revealed the need for enhanced monitoring frameworks to prevent market manipulation, leading to the introduction of new oversight mechanisms.

Proactive Planning and Governance Reforms

The fourth phase emphasizes the importance of long-term planning and stakeholder engagement. Allocation plans, enforcement decrees, and other critical guidelines will be finalized well before the start of the trading period, providing participants with the certainty needed for effective compliance. Governance reforms will introduce a new central agency tasked with coordinating between the Ministry of Environment, Ministry of Economy and Finance, and private sector representatives. The creation of this agency aligns with best practices observed in the EU ETS, where centralized governance has enhanced market oversight and participant confidence. Additionally, decision-making processes will prioritize transparency, including regular public consultations and detailed reporting on allocation and

auction results. These reforms are expected to improve stakeholder trust and enhance the system's credibility.

Integration with Other Policy Mechanisms

The fourth phase envisions a more integrated approach, where K-ETS is closely coordinated with other climate policies, including the Climate Response Fund. For example, auction revenues from K-ETS will be co-managed with the Climate Response Fund to establish coordinated funding streams targeting renewable energy projects and industrial decarbonization programs. Shared targets, such as achieving a 40% reduction in GHG emissions by 2030, will guide these integrated efforts, ensuring resources are deployed efficiently across sectors. Moreover, synergies between K-ETS and other policies, such as the Green Taxonomy, will help standardize emissions reporting and ensure consistency in sustainability criteria.

By addressing the limitations of previous phases and incorporating global best practices, the fourth phase of K-ETS aims to serve as a model for effective emissions trading, driving Korea closer to its carbon neutrality goals. Anticipated benefits include enhanced market stability through increased liquidity, higher investment in low-carbon technologies driven by robust auction revenues, and stronger alignment with Korea's NDCs and carbon neutrality targets for 2050. These improvements are expected to foster a more dynamic and responsive market mechanism, support corporate competitiveness, and position Korea as a global leader in sustainable economic transformation.

2.2. Strategies for Expanding Green Investments by Institutions

2.2.1. Ministry of Environment

2.2.1.1. Enhancement and Expansion of the K-Taxonomy

The K-Taxonomy establishes clear principles and standards for identifying "environmentally sustainable economic activities" that support six major environmental goals, including reducing GHG emissions and adapting to climate change.[1] To promote green finance and prevent greenwashing, the Ministry of Environment, under the Act on the Support of Environmental Technology and Environmental Industry, released the initial draft of the K-Taxonomy guidelines

[1] The six major environmental goals are: ① Greenhouse gas reduction, ② Climate change adaptation, ③ Sustainable conservation of water resources, ④ Transition to a circular economy, ⑤ Pollution prevention and management, ⑥ Conservation of biodiversity.

on December 30, 2021. The K-Taxonomy is organized into two categories (Law Firm (LLC) Hwawoo, 2023):

- **Green Sector**: Covers economic activities that directly contribute to the six environmental objectives.
- **Transition Sector**: Temporarily acknowledges activities essential for achieving carbon neutrality.

Following the publication of the draft guidelines, the Ministry of Environment launched pilot projects to test the K-Taxonomy. After gathering stakeholder feedback and drawing on the European Union's experience, the Ministry released a revised draft in September 2022 and finalized the amended guidelines in December 2022.

Since its establishment, the K-Taxonomy has provided a foundational framework for defining green economic activities and has been applied to financial products such as green bonds and green Asset-Backed Securities (ABS). By 2023, green bonds had attracted 4.63 trillion KRW in investment, and green ABS issuance reached 155.9 billion KRW, marking a notable milestone in Korea's green finance development. However, financial institutions continue to face challenges in deploying the K-Taxonomy broadly. Specifically, securing specialized personnel and managing the high cost of external verification have limited its application to financial products beyond bonds.

In accordance with the "Plan for Expanding Green Investment to Accelerate the Transition to a Low-Carbon System" announced on March 19, 2024, the Ministry of Environment, in collaboration with the Financial Services Commission, plans to partially revise the K-Taxonomy by 2025. This update will add new industrial and economic activities, tailored to domestic conditions, and will establish working groups focused on each environmental goal[2] to improve the K-Taxonomy's practical applicability. The updated guidelines will expand the scope of the K-Taxonomy, initially limited to bonds, to include a broader range of financial instruments such as loans, disclosures, stocks, and funds. By the end of 2024, the Financial Services Commission and the Financial Supervisory Service will jointly develop Green Loan Management Guidelines, enabling the application of the K-Taxonomy to loans. Furthermore, by 2025, a pilot project will be launched to incorporate the K-Taxonomy as a voluntary standard in climate-related and environmental disclosures, advancing Korea's efforts to embed sustainability in its financial systems.

[2] Planned for implementation by 2025, discussions will involve various stakeholders, including relevant ministries, industries, the financial sector, and experts, focusing on the four environmental goals other than climate change (water, circular economy, pollution prevention, and biodiversity). These discussions will also include preemptively gathering on-site opinions and conducting life cycle assessments (LCA) on anticipated climate change-related issues.

2.2.1.2. Establishment of a Green Investment Foundation

Under the revised “Act on the Support of Environmental Technology and Environmental Industry” (April 2021), Korea requires institutions subject to the environmental information disclosure system to compile and publicly disclose information on their environmental goals, resource conservation efforts, pollutant emission reduction initiatives, and activities related to green management. This disclosure includes the development and use of environmental products and services, along with performance metrics in environmental management. (Administrative Rules, 2021)

In 2023, the Ministry of Environment reformed the environmental information disclosure system to align with global standards, including those set by the International Sustainability Standards Board (ISSB).[3] The reform simplified classifications into "common industry standards" and "industry-specific standards," standardized disclosures at the corporate level, and made GHG emissions reporting mandatory. These updates aim to strengthen Korea’s response to global environmental disclosure practices and include the provision of Environmental, Social, and Governance (ESG) consulting services for Small and Medium-sized Enterprises (SMEs).

The main goal of these disclosure standards is to encourage proactive green investments. However, companies and investors face challenges, including limited expertise and concerns about greenwashing, which can hinder investment activity. To address these barriers, the Ministry of Environment, through the "Plan for Expanding Green Investment to Accelerate the Transition to a Low-Carbon System," introduced key initiatives to reduce uncertainty in green investments, support investor decision-making, improve financial institutions’ expertise, and ease companies' disclosure burden.

These are the key initiatives included in the Plan:

1. **Establishing Clear Standards for Green Investment**

- In 2024, a joint guideline for calculating GHG emissions, a mandatory disclosure item, will be published. To further support green investments, the Ministry is exploring methods to integrate the K-Taxonomy with the environmental industry classification system.

[3] The International Sustainability Standards Board (ISSB) is a committee established under the IFRS Foundation to create global sustainability disclosure standards. In June 2023, it announced the final drafts of general and climate-related disclosure standards, which serve as a benchmark for disclosure standards in various countries.

- Additionally, the Life Cycle Inventory DataBase (LCI DB)[4] will be expanded for critical sectors such as basic chemicals, steel products, and battery materials, with a focus on carbon-regulated and export-related products. Enhanced methods for calculating environmental performance[5] will also be developed to effectively communicate this information to consumers.

2. Developing Policies and Incentives for Green Investment

- Policies to encourage green investment include the potential introduction of a CCfD system and a recycled material usage labeling system. The CCfD program is a government-supported initiative that guarantees a fixed carbon price for companies implementing innovative low-carbon technologies, such as Carbon Capture, Utilization, and Storage (CCUS), over a specified period. This is expected to encourage adoption of advanced emission reduction technologies and reduce uncertainties in green investments.

- In 2024, the recycled material usage labeling system will be evaluated and implemented, with mandatory use of recycled PET materials for final product manufacturers planned by 2025.

3. Developing Green Finance Expertise

- To support financial institutions in applying the K-Taxonomy, the Ministry will introduce specialized training based on procedures and case studies related to K-Taxonomy compliance. Advanced ESG education programs tailored to environmental regulations will also be developed to provide targeted support based on each company's regulatory needs. This initiative will be fully implemented by 2025.

4. Reforming the Environmental Information Disclosure System

- The disclosure system will be updated to support climate-related disclosures, taking into account international standards and domestic conditions to improve convenience for companies. Key items, such as carbon emissions and renewable energy usage, will be prioritized, and the disclosure schedule will be advanced to align with both domestic and international timelines.

[4] Life Cycle Inventory DataBase (LCI DB) refers to the foundational data necessary for conducting life cycle assessments of products. It quantifies and catalogs the environmental impacts throughout the entire process of resource extraction, production, consumption, and disposal of a product. As of 2023, 307 databases have been established, with plans to expand this to 1,050 by 2030.
[5] This refers to the method of quantifying environmental information generated throughout the life cycle of a product and communicating it to consumers through certification. As of March 2024, it is limited to 25 product categories, but there are plans to expand this to 120 product categories by 2030.

- The reform will standardize terminology and disclosure categories, reflecting the "Plan for Enhancing the ESG Infrastructure" announced in December 2022, and will add provisions for mandatory compliance recognition. These updates will be rolled out in stages, accounting for corporate characteristics and company size.

2.2.1.3 Expansion of Capital Supply to Green Markets

The importance of expanding private investment in the green sector has been consistently emphasized. In this effort, the Ministry of Environment and the Financial Services Commission have played a pivotal role by establishing public-private joint funds and providing loans and interest subsidies for GHG reduction initiatives. For instance, the “Future Environmental Industry Investment Fund”, created through a public-private partnership, supports small and venture businesses in the environmental sector that contribute to carbon neutrality and green transformation. Since its inception in 2017, the fund has grown to a total of 324 billion KRW across 10 sub-funds. As of March 2024, it has successfully invested approximately 200 billion KRW in 84 companies. (Ministry of Environment, 2024) However, green SMEs have faced funding shortages, while the financial sector continues to experience a mismatch between supply and demand, as it struggles to identify suitable green investment opportunities.

In response, the Ministry of Environment, as part of its "Plan for Expanding Green Investment to Accelerate the Transition to a Low-Carbon System," announced plans to collaborate with the Financial Services Commission to enhance support for green finance aligned with the K-Taxonomy. The planned allocations for various financial products are as follows:

- Interest Support for Green Bonds: 7.68 billion KRW will be allocated for interest cost subsidies on green bonds.

- Green Asset-Backed Securities (ABS): Funding for green ABS will increase from 6 billion KRW to 13.68 billion KRW.

- Expanded Issuer Support: Institutions eligible to issue green bonds will be expanded to include companies with exemplary green technologies.

From 2024 to 2027, financial support will include annual funding of 2 trillion KRW for K-Taxonomy-compliant loans, with continuous financial assistance planned for qualifying green investments. To further diversify capital sources for the green market, the Ministry will establish a "Green Export Fund" to invest 400 billion KRW in overseas projects by Korean companies by 2028, enhancing these firms' bidding potential and operational stability. Additionally, a new "Green Industry Technology Guarantee" initiative will be introduced in partnership with the Technology Guarantee Fund to increase the guarantee scale for companies with promising green technologies, supporting the growth of green enterprises.

2.2.1.4 Advancement of the Emissions Trading System

As previously mentioned, Korea introduced the Emission Trading System (ETS) in 2015 to manage high-emission companies, incentivize reductions, and contribute to the nation's GHG reduction goals. However, issues such as market-driven carbon price declines and permit allocation inefficiencies have limited the system's effectiveness in encouraging robust GHG reductions.

As part of the Ministry of Environment's "Plan for Expanding Green Investment to Accelerate the Transition to a Low-Carbon System," several initiatives to enhance the ETS are underway:

1. **Development of the Fourth Basic Plan for ETS**

- As mentioned above, the Ministry has introduced the "Fourth Basic Plan for the Emission Trading System," applicable from 2026 to 2030, with a focus on achieving the NDCs for GHG reductions. This plan will strengthen the setting of total emission allowances and refine the differentiated paid allocation policies by industry. Emphasis will be placed on expanding benchmark allocations, thus promoting technological advancements compared to the grandfathering method, which is based on historical emissions.

2. **Diversification of Carbon Trading Forms**

- To stimulate the carbon market and mitigate price volatility, the Ministry will gradually introduce carbon-linked financial products, such as ETNs and ETFs, enabling indirect investments by third parties and broader market participation.

3. **Entrusted Trading of Emission Permits and Market Infrastructure**

- Following the February 2024 revision of the Emission Trading Act, entrusted trading of emission permits will be introduced, with detailed operational plans for futures markets[6] to follow. This approach is expected to enhance transaction convenience for companies and expand third-party participation, allowing securities firms and other intermediaries to facilitate stable trading of emission permits.

[6] Carbon emissions futures are financial products that allow for the buying and selling of emission permits at a predetermined price on a specified future date, effectively locking in the future price of carbon permits. The contract size for futures is 100 tons, and they are available for the delivery months of March, June, September, and December.

2.2.2. Other Institutions

2.2.2.1. Public Financial Institutions

Many public and private financial institutions have begun to introduce various methods of green finance. Here, we analyse the different green finance approaches of three public financial institutions (Korea Technology Finance Corporation, Korea Development Bank, and the Industrial Bank of Korea) and three private financial institutions (Shinhan Bank, Kookmin Bank, and NH Investment and Securities). Our analysis covers three aspects for each institution: their unique background and specialties, their primary green finance products, and their collaborative or systematic efforts to advance green finance.

A. Korea Development Bank

Korea Development Bank (KDB) was established in April 1954 under the Korea Development Bank Act and is recognized as Korea's leading policy finance institution, boasting the highest credibility among domestic financial institutions. In 2017, KDB became the first institution in Korea to receive accreditation as an implementing entity of the Green Climate Fund (GCF). Furthermore, in 2021, it was selected as the representative institution for the Asia region by the Equator Principles Association Steering Committee, demonstrating its leadership in green finance management

As a policy finance institution, KDB performs tasks similar to general financial institutions, such as issuing bonds and providing loans. At the same time, under the slogan "Policy Finance Leading the Climate Industrial Revolution," KDB actively addresses climate change, identifies diverse environmental sectors in Korea in alignment with government policies, and expands financial support to promote green finance. (Lee, S., 2023) These initiatives form the core of KDB’s green finance operational strategy.

Since the declaration of carbon neutrality by 2050, various sectors have faced a growing need for significant investment. Critical areas such as industrial restructuring, fostering new industries, and transitioning to renewable energy require substantial financial resources to drive carbon neutrality. However, meeting these demands solely through limited government budgets is insufficient. Additionally, the low initial returns typical of green industries highlight the need for support from policy finance institutions.

As a policy finance institution, the Industrial Bank aims to position itself as the nation’s leading climate finance bank, driving Korea’s carbon neutrality and green growth. To achieve this goal, the bank is dedicated to actively supporting these priority sectors through its green finance initiatives.

Strengthening Green Finance

KDB has applied the K-Taxonomy framework to design its financial products and establish a robust support system to strengthen green finance. By reflecting the six environmental objectives of the K-Taxonomy (GHG reduction, climate change adaptation, water conservation, resource circulation, pollution prevention and management, and biodiversity conservation), KDB has identified four key priority areas for support : (1) energy transition, (2) low-carbon industrial restructuring, (3) fostering green materials, components, and equipment industries, and (4) promoting an eco-friendly society. To provide financial support for these focus areas, a total of five dedicated green finance products for facility funding have been established: Energy Transition Fund, KDB Carbon Spread (Carbon Reduction), KDB Carbon Spread (Low-Carbon Ecosystem), Eco-Friendly Society Fund, and KDB Carbon Net-Zero Program. As of 2022, these products were operated with a combined scale of 7.8 trillion KRW.

- **Energy Transition Funds**: Facilitates investments in renewable energy projects.
- **KDB Carbon Spread (Carbon Reduction)**: Promote the Low-Carbon Transition of High GHG-Emitting Industries and the Development of Low-Carbon New Industries.
- **KDB Carbon Spread (Low-Carbon Ecosystem)**:Support projects aimed at fostering a low-carbon ecosystem and developing green materials, components, and equipment industries.
- **Eco-Friendly Society Fund**: Support the five environmental objectives(climate change adaptation, sustainable water conservation, resource circulation, pollution prevention and management, and biodiversity conservation) of the K-Taxonomy, other than GHG reduction.
- **KDB Carbon Net-Zero Program**: Provide risk-absorbing venture capital for green businesses with significant GHG reduction effects and broad ripple effects, but with technology and markets at an early stage. The KDB Carbon Spread (Carbon Reduction) and KDB Carbon Net-Zero products are blended finance instruments, funded through the Industrial Bank's own resources and the government’s Climate Response Fund. These products aim to promote low-carbon facility investments by enterprises and facilitate the commercialization of key domestic carbon neutrality infrastructure as well as early-stage green projects and technologies.

Additionally, KDB works to prevent greenwashing by aligning its green finance offerings with the K-Taxonomy, ensuring funds are directed toward genuinely eco-friendly economic activities.

Building a Bank-Wide Climate Response System

KDB established a comprehensive system to address climate-related risks and opportunities. To further support environmental goals, KDB monitors and reduces Scope 3 carbon emissions, aiming for a 50% reduction by 2030, with a goal of carbon neutrality by 2040. This effort includes promoting Korea's RE100 initiative, transitioning to zero-emission vehicles for business use, and adopting high-efficiency energy systems.

Reinforcing Environmental Responsibility Management

KDB applies best practices for sustainability across all aspects of the bank's operations. KDB has minimized its exposure to the coal industry, ceasing new coal-related investments, except under ESG Planning Department approval, while supporting the transition of coal-dependent companies toward alternative energy sources. (Korea Development Bank., n.d.)

As a policy-based financial institution, KDB prioritizes facilitating private capital participation in large-scale projects. For example, in the country's largest offshore wind farm project in Sinan-gun, Jeollanam-do, the bank combined its Climate Response Fund with its own resources to attract private investment, securing 120 billion KRW in support. For the hydrogen liquefaction terminal construction, 150 billion KRW was allocated from the Energy Transition Fund and Climate Response Fund, playing a key role in providing early-stage financing and managing risks for private sector participants. Beyond these, the bank has partnered with private institutions on various energy transition initiatives, including the establishment of lithium-ion battery production facilities, onshore wind power projects, and biodiesel production plants.

KDB's green finance efforts align closely with Korea's 2050 Carbon Neutrality Roadmap. These efforts include investments in renewable energy to facilitate the energy transition, the KDB Carbon Spread initiative to promote low-carbon industrial restructuring, and the allocation of funds to support the creation of an eco-friendly society. Furthermore, its proactive partnerships with private entities emphasize the bank's pivotal role in driving the transition toward a sustainable, carbon-neutral economy.

B. Korea Technology Finance Corporation

The Korea Technology Finance Corporation (KOTEC), established in April 1989 under Article 12 of the Korea Technology Finance Corporation Act, operates under the Ministry of SMEs and Startups. As a government-funded institution, KOTEC aims to enhance the technological competitiveness of domestic firms and foster sustainable economic growth. Its primary mission is to support technology-oriented enterprises through technology guarantees and assessments, enabling them to strengthen their innovative capabilities. By identifying and supporting small

and venture businesses with unique technologies, KOTEC plays a critical role in promoting balanced and innovative growth within the technology sector. Its key responsibilities include providing technology guarantees and evaluations, facilitating technology transfer and commercialization, protecting intellectual property, managing guarantee-related investments, and overseeing indemnity rights.

In response to global trends emphasizing environmentally sustainable financing, KOTEC has expanded its green finance strategies and products. The corporation has set an ambitious goal of advancing green finance and supporting carbon neutrality by 2030. To achieve this, KOTEC has adopted both internal strategies focused on fund management and emission reductions and external strategies aimed at encouraging SMEs to adopt ESG practices. This discussion focuses on the latter.

KOTEC's carbon neutrality initiative aims to provide 10 trillion KRW through climate finance. As outlined in the *2022 KOTEC ESG and Sustainability Report,* the institution employs four key initiatives to achieve this goal:

1. **Carbon Value Assessment Guarantee**
   Since 2022, KOTEC has implemented the "Carbon Value Assessment Guarantee," supported by its Climate Response Fund. Using a proprietary carbon value assessment model, the corporation quantifies companies' carbon reduction efforts in monetary terms and provides guarantee support accordingly. This fund, established under the "Framework Act on Carbon Neutrality and Green Growth for Climate Crisis Response," issued guarantees totaling 500.7 billion KRW in 2022.

2. **Renewable Energy Guarantees**

   In collaboration with the Korea Energy Agency, KOTEC has provided guarantees for renewable energy projects since 2021, applying the same carbon value assessment model. This program evaluates companies' technical and business capabilities through both the carbon value assessment model and the climate technology assessment model. Additional financial support is provided beyond initial working capital limits to assist companies involved in renewable energy generation or related industries. Renewable energy generation companies typically install renewable energy facilities for self-use or commercial distribution, while industrial companies manufacture, install, or commercialize renewable energy-related technologies. In 2022, the renewable energy guarantee amount reached 111.8 billion KRW.

3. **Climate and Environmental Guarantees**

   KOTEC offers "Climate and Environmental Guarantees" to firms operating in green growth, environmental, or energy industries. Guarantee eligibility is determined by

assessing a company's GHG reduction levels. In 2022, support under this initiative amounted to 744.5 billion KRW.

4. **Green Certification Evaluations**

   Since 2010, KOTEC has served as a Green Certification evaluation body under the "Framework Act on Carbon Neutrality and Green Growth". To encourage private-sector investment in green industries, KOTEC conducts Green Certification evaluations for promising green technologies, products, and specialized enterprises. There are three types of Green Certification:

- **Green Technology Certification:** Awarded to technologies that substitute fossil fuels and optimize resource and energy efficiency to support carbon neutrality and green growth.
- **Green Specialized Company Verification:** Granted to businesses that derive 20% or more of their revenue from certified green technologies or products after at least one year of operation.
- **Green Technology Product Verification:** Provided for products developed using certified green technologies and intended for commercialization, as per Article 60(2) of the Framework Act.

In 2022, KOTEC conducted a total of 555 Green Certification evaluations, including 148 Green Technology Certifications, 2 Green Specialized Company Verifications, and 405 Green Technology Product Verifications. These accounted for 47.3% of all green certifications issued by 11 evaluation institutions in Korea that year, making KOTEC the leading certifying institution.

C. Industrial Bank of Korea

Industrial Bank of Korea (IBK), under the group vision of becoming a "Sustainable Bank Rooted in Fundamentals," is solidifying its ESG management and establishing a green finance strategy. IBK has laid the foundation for green finance by adopting principles such as the "No Coal Financing" principle and establishing green management guidelines and processes. It is also expanding financial support for the green transition by increasing investments in renewable energy. Moving forward, IBK aims to issue ESG bonds, including green bonds, and expand the proportion of green finance to become a global green bank that supports SMEs.

IBK's green finance strategy, built on the vision of becoming a "Global Green Bank Supporting SMEs," is focused on two key objectives: establishing IBK's green foundation with an infrastructure for sustainable growth, and providing differentiated support for green transitions to ensure that SMEs are not left behind. To achieve these goals, IBK is working on specific

initiatives such as building governance structures, establishing management principles and processes, managing GHG emissions, creating a net-zero transition rating system, and supporting high-emission companies in their transition.

1. **Supporting SMEs' green transitions**

   IBK has increased the proportion of loans to green companies when offering new loans. In 2021, 3.3% of IBK's total new corporate loans were green loans. Through the introduction of new products linked to Sustainability-Linked Loans (SLL), IBK plans to increase the share of green loans to 13% of total loans by 2030.

2. **Investment in eco-friendly businesses**

   Aligning with the government's Green New Deal policy, IBK is also consistently investing in eco-friendly projects such as renewable energy. The bank announced plans to increase its investment in new renewable energy project financing from KRW 130 billion in 2022 to KRW 500 billion by 2030. The primary focus is on supporting green energy projects, including solar energy, hydrogen fuel cells, and wind power, as part of its broader effort to expand green finance support.

Main Product Name	Product Description	Amount (Unit: 100 million KRW)
IBK Solar Power Generation General	Investment funds created for solar power generation project capital and loan receivables investments.	1,979
IBK Combined Heat and Power General	Investment funds created for energy business operations related to combined heat and power in Osan, Gyeonggi Province.	915
IBK C&I ESS General	Investment funds created for electricity cost reduction in industrial use through the installation and operation of ESS (Energy Storage Systems).	335

「Table 1. IBK Investment Performance in the Eco-Friendly Sector (as of 2023)」
Source : 2024 IBK Sustainability Report, 2024

3. **Greenhouse gas emissions management**

   In 2021, IBK's GHG emissions totaled 56,795 tons. The bank has set emission reduction targets of 27,203 tons by 2030 and aims to achieve net-zero emissions for its own operations by 2040. Additionally, IBK has committed to achieving net-zero emissions for its financial assets by 2050. To achieve its carbon neutrality goals, the bank actively measures and manages Scope 1 (direct emissions) and Scope 2 (indirect emissions).

As a state-owned bank, IBK is also actively engaged in carbon finance. As a market maker in the ETS, the bank plays a policy role in stabilizing and revitalizing Korea's emissions trading market. To support companies in navigating the ETS, IBK provides "Corporate Carbon Asset Management Consulting." Furthermore, IBK participates in the Financial Services Commission's Green Finance Task Force to support financial policy development.

2.2.2.2. Private Financial Institutions

A. Shinhan Bank

Established in September 2009, Shinhan Bank has become one of Korea's leading private financial institutions, recognized for its commitment to ESG and green finance. In May 2023, the bank joined the "Digital RE100," pledging to convert 100% of its energy consumption to renewable sources by 2040. Shinhan Bank was also the first in Korea to issue a Korean Green Bond in 2022 and actively participates in the Ministry of Environment's "Korean Green Bond Issuance Interest Subsidy Support Project," offering interest subsidies to companies that issue green bonds.

There are three pillars of Shinhan Bank's green finance strategy:

1. **Expanding Green Financial Products**

   As of December 2023, Shinhan Bank's cumulative eco-friendly finance initiatives reached 2.5177 trillion KRW, including:

- Eco-Friendly Corporate Loans: 2.1704 trillion KRW
- Eco-Friendly Personal Loans: 59.9 billion KRW
- Direct and Indirect Green Investments: 287.4 billion KRW

Shinhan Bank has issued green bonds totaling 150 billion KRW and continues to expand eco-friendly finance through collaborations with government agencies. For example, the bank works with the Korea Environmental Industry & Technology Institute to implement interest-subsidized loans, a program that reached 1.38 trillion KRW by December 2023. Additionally, in partnership with the Korea Real Estate Board, Shinhan provides financial support for companies aiming to reduce energy consumption in buildings, with a focus on SMEs and microbusinesses. By the end of 2023, Shinhan's eco-friendly finance portfolio had reached 13.3 trillion KRW, with a target of 30 trillion KRW by 2030.

2. Applying the Green Taxonomy to Achieve Net Zero

Shinhan Bank is actively expanding the use of the K-Taxonomy to support the country's Net Zero ambitions. Through a business agreement with the Financial Supervisory Service to develop the K-Taxonomy Supporting System (KTSS)[7], Shinhan is participating in a pilot task force aimed at broadening the taxonomy's application. Since December 2023, Shinhan has integrated the K-Taxonomy into its corporate loan system, assessing loan applicants based on green criteria. By strategically reinvesting savings from green bond participation into green loans, Shinhan creates a sustainable cycle to further expand green bond issuances.

3. Increasing ESG Awareness and Eco-Friendly Practices

Shinhan Bank is committed to raising customer awareness of ESG principles and promoting eco-friendly management practices through consulting and assessment services. The bank has established a dedicated ESG consulting division to assist clients in calculating GHG emissions, implementing reduction measures, and aligning with ESG standards. In 2023, Shinhan signed agreements with the Startup Promotion Agency to support ESG management for startups and with the Korea Real Estate Board to develop ESG loan products and share energy data with companies. As of December 2023, Shinhan had conducted 140 ESG consulting sessions and issued 40 diagnostic reports, benefiting companies across various industries, including steel, petrochemicals, automotive, and textiles.

Additionally, to support SMEs, Shinhan Bank launched the SME Green Loan program in May 2024, utilizing the K-Taxonomy to assess and qualify companies for green loans. The taxonomy's criteria include activities, recognition, exclusion, and protection, and Shinhan Bank applies these standards to offer preferential interest rates for loans over 1 billion KRW to qualifying SMEs (Jeong, E., 2024).

[7] K-Taxonomy Supporting System (KTSS) is an IT-based program currently under development to facilitate the application of the Korean green taxonomy in the financial sector. A total of 10 financial institutions, including Shinhan Bank, are voluntarily participating in the program's development.

Preparing for Carbon Neutrality through Finance
Shinhan Financial Group has established the "Zero Carbon Drive" strategy, aiming to provide KRW 30 trillion in eco-friendly financial support by 2030 and is expanding eco-friendly financing efforts.

Zero Carbon Drive

2023 Eco-Friendly Finance, Green Bond

(*Cumulative new target as of December 2023*)

- **Eco-friendly finance: KRW 25.177 trillion**
  - Eco-friendly corporate loans: KRW 21.704 trillion
  - Eco-friendly personal loans: KRW 599 billion
  - Eco-friendly investments (bonds + projects): KRW 2.874 trillion
- **Green Fund Target: KRW 150 billion**

Group's Eco-Friendly Finance Goals

(*Cumulative new target for the group*)

- **2022:** KRW 8.2 trillion (loans: KRW 6.4 trillion)
- **2023:** KRW 13.3 trillion (loans: KRW 2.55 trillion)
- **2030 Goal:** KRW 30 trillion

B. KB Kookmin Bank

Kookmin Bank was officially established in 1963 following the promulgation of the “Kookmin Bank Act” at the end of 1961, aimed at expanding financial services for the general public. In 2001, it merged with the “Housing and Commercial Bank” and changed its name to "KB Kookmin Bank". KB Kookmin Bank is now the largest private financial institution in Korea by asset size, (Korea Deposit Insurance Corporation, n.d.) and has a primary focus on supporting public finance. (Digital Gangnam Cultural Encyclopedia, n.d.)

To promote green finance, KB Kookmin Bank announced the "KB Green Wave 2030" goal, which aims to expand the scale of ESG products, investments, and loans to KRW 50 trillion (including KRW 25 trillion for environmental initiatives) by 2030. The bank is focusing on environmentally friendly investments, green loans, and ESG bond issuance to achieve this goal. (KB Kookmin Bank, 2022)

1. Environmentally Friendly Investments

KB Kookmin Bank is steadily increasing its investments in renewable energy and other green initiatives to support the transition to a net-zero economy. As of 2022, the bank's green investments rose by approximately 190% compared to the previous year, reaching KRW 2.9 trillion. Notable projects include funding for the construction of a solar power plant and energy storage facilities in California, USA, in 2021 (loan amount: USD 70 million), and the Jeju Hallim Offshore Wind Power Project in 2022 (loan amount: KRW 119.5 billion). These investments demonstrate the bank's commitment to fostering a sustainable society through increased investments in green energy. (KB Kookmin Bank, 2022)

2. Green Loans

KB Kookmin Bank supports green industries and sustainable growth through various environmentally friendly loan products. Among these, the largest is the "KB Green Wave_ESG Excellence Loan," a sustainability-linked loan product that offers preferential interest rates and credit limits to companies meeting the bank's ESG evaluation criteria. As of the end of 2022, the total loan volume was KRW 755.3 billion, a decrease of approximately 13% from the previous year. KB Kookmin Bank's ESG evaluation criteria consist of four key categories: ESG integration, Environment, Social, and Governance. A description of each category is outlined in the table below.

Category	Key Details
ESG Integration	- Organizations selected and recommended based on an MOU with KB Kookmin Bank - Companies with "KB ESG Self-Diagnosis Service" ratings of ESG grade 4 or higher (ESG comprehensive)
Environment	- Companies rated BBB or higher in environmental evaluations, such as the green management financing support system (enVinance) of the Korea Environmental Industry and Technology Institute
Society	- Social enterprises or job-creating companies - Companies with certifications related to human/occupational safety
Governance	- Companies with active board operations (minimum of 4 meetings) in the past year

「Table 3. KB Kookmin Bank's ESG Evaluation Criteria」
Source : KB Kookmin Bank, 2022

3. ESG Bond Issuance

KB Kookmin Bank actively issues various ESG bonds, including sustainability bonds, social bonds, and green bonds, to support environmentally friendly projects. To do this, the bank has developed a "Sustainable Finance Framework" aligning with the Sustainability Bond Guidelines established by the International Capital Market Association (ICMA). After issuance, the ESG bonds are managed under the supervision of the KB Sustainability Finance Committee. Between 2021 and 2022, the total volume of ESG bonds issued amounted to USD 700 million and EUR 1 billion, equivalent to approximately KRW 2.5 trillion. Through these ESG bond issuances, the bank supported renewable energy development projects both domestically and internationally, achieving a reduction of approximately 772,535.5 tons of CO_2 emissions. (KB Kookmin Bank, 2022)

In addition, KB Kookmin Bank provides free customized ESG solutions for sustainable growth through its "KB ESG Consulting Service" tailored for SMEs. To support this initiative, the bank developed its own ESG diagnostic criteria using global ESG standards and the K-ESG Guidelines. The service includes diagnostics, on-site visits, and consultations to share sustainable management expertise. Since the service's launch in July 2022, the bank has conducted approximately 400 consultations as of 2024. (Park, H., 2024)

Finally, KB Kookmin Bank also participates in global ESG finance initiatives such as the UNEP Finance Initiative (UNEP FI), the Net-Zero Banking Alliance (NZBA), and RE100, reinforcing its role in environmental leadership (Korea Federation of Banks et al., 2022).

C. NH Investment and Securities

NH Investment & Securities, established by the National Agricultural Cooperative Federation (NongHyup), has been managing the credit sector since 2012. It plays a key role in securing funds and generating the revenue necessary for NongHyup's core activities while offering a wide range of financial services. In response to the growing demand for ESG management, the company has announced its commitment to developing a carbon-neutral management strategy and providing diverse ESG infrastructure.

NH Investment & Securities has been continuously publishing in-depth reports on ESG issues, ESG bonds, and ESG funds. Through the analysis of ESG bonds, the company aims to promote both quantitative and qualitative growth in the domestic ESG bond market.

1. **Trends and Growth of the Domestic ESG Bond Market**

   According to the 2024 analysis of domestic ESG bonds, there was a 6.4% increase compared to the previous year. Although social bonds and sustainability bonds have decreased year-on-year, green bonds have surged by approximately 90%, resulting in an overall increase in total issuance.

   Nevertheless, social bonds still dominate domestic ESG bond issuance, accounting for 84.5% of the total, which contrasts with the global market, where green bonds hold a larger share. In the domestic market, it is understood that the high proportion of social bonds is due to public corporations' bonds being certified as social bonds.

   In the case of financial and corporate bonds, the proportion of green bond issuance significantly expanded, from 22.1% to 56.3% and from 42.1% to 64.4%, respectively, influenced by the Ministry of Environment's “Korean Green Bond Issuance Support Program”.

2. **ESG Finance Strategy and Climate Action**

   In line with this, the company announced its commitment to increasing the share of green bond issuances, guided by the Ministry of Environment’s “Korean Green Bond Guidelines”. In 2021, NH Investment & Securities established an ESG bond management framework and became the first securities company to issue KRW 110 billion in ESG bonds denominated in Korean won. The proceeds from these bonds were allocated to renewable energy projects, eco-friendly building initiatives, and job creation programs. Furthermore, the company set an ambitious cumulative ESG investment target of KRW 5 trillion by 2030.

   The company is also developing its own strategies to address the climate crisis. It operates a climate risk management process to identify climate-related factors associated with its transactions and has established exclusion and cautionary sectors based on environmental and social considerations. In particular, it has intensified its scrutiny of high-carbon-emission industries.

   Additionally, in 2021, the Sustainability Council was established, and in 2023, a total of three Sustainability Council meetings were held to actively discuss ESG implementation plans, strategies, and performance activities.

3 | Management of Green Financial Resources

3.1. Securing and Allocating Financial Resources

Korea's current Green Growth Policies

Due to Korea's high reliance on export-driven manufacturing, the country is significantly impacted by carbon emissions and energy consumption, making environmental regulation a critical factor in maintaining corporate competitiveness. The Financial Services Commission has acknowledged that failure to proactively respond to carbon regulations could result in reduced exports, which may negatively affect the nation's economic growth. In response, the Financial Services Commission has expressed its commitment to providing financial support through the report, *Measures for Expanding Financial Support in Response to the Climate Crisis*.

The Korean government has set ambitious goals to address climate change. It has committed to a 40% reduction in GHG emissions by 2030 compared to 2018 levels, as outlined in its NDCs. Furthermore, the government has developed a roadmap for achieving carbon neutrality by 2050. As part of its climate action strategy, Korea introduced the aforementioned K-taxonomy in 2021, established the Climate Action Fund in 2022, and in 2023 finalized the First Basic Plan for National Carbon Neutrality and Green Growth.

3.1.1. K-ETS Climate Action Fund

The carbon pricing system aims to address market failures by requiring greenhouse gas emitters to pay a price proportional to their emissions, based on the polluter-pays principle. Representative examples include carbon taxes and emissions trading systems. Korea introduced an emissions trading system (ETS) in 2015, currently in its third phase (2021–2025) after completing the first (2015–2017) and second (2018–2020) phases. With each phase, the scope of covered entities has been expanded, and the proportion of allowances allocated through auctions has increased to contribute to emissions reductions. However, since 2022, the price of emission allowances has shown a consistent downward trend. This decline in allowance prices not only fails to heighten the awareness and urgency of greenhouse gas reductions within the industrial sector but also undermines the stable operation of Korea's Climate Response Fund, a key green finance policy asset funded by the revenue generated from emissions allowance auctions.

The Climate Response Fund is a critical financial instrument designed to support Korea's efforts to combat climate change and transition to a carbon-neutral society. Established as part of the "2050 Carbon Neutrality Promotion Strategy," this fund plays a vital role in securing the

necessary resources for addressing the climate crisis and facilitating the shift toward green growth (Yi, D., 2023).

Objective and Purpose

The primary objective of the Climate Response Fund is to establish efficient financial support programs that help Korea respond to the climate crisis and accelerate the transition to a carbon-neutral society. The fund's key purposes include (Yi, D., 2023):

- Establishing and operating the government's GHG reduction framework.
- Supporting industrial, labor, and regional economic transformation.
- Assisting corporate GHG reduction activities.
- Providing financial support for job conversion and creation in sectors impacted by the climate crisis, as well as for workers and communities affected by the transition to a low-carbon economy.
- Investing in green Research and Development (R&D), human resources training, loans, investments, education, promotion, and international cooperation.

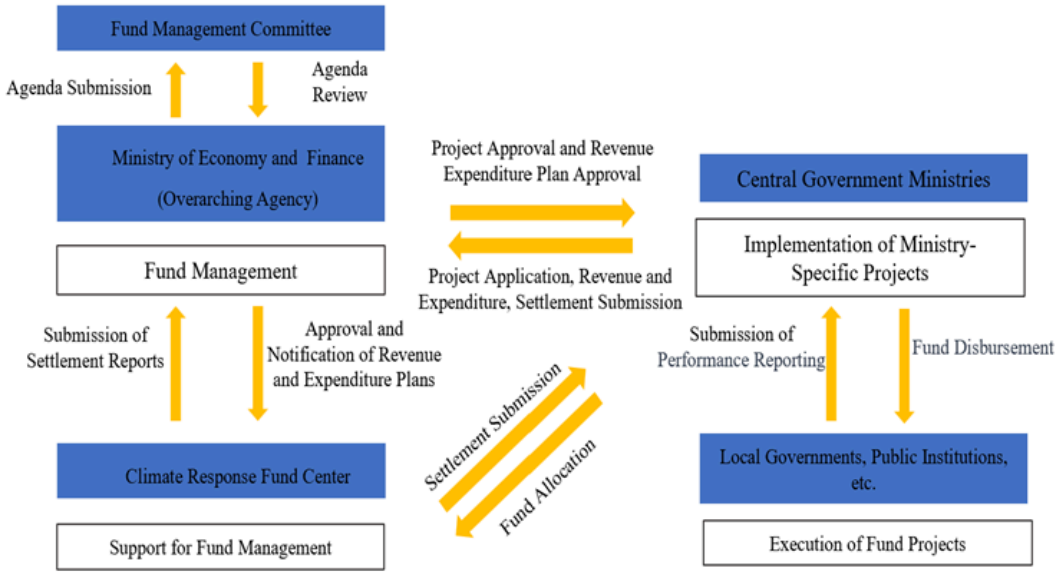
Legal Guidelines

The governance of the Climate Response Fund is structured according to the "Carbon Neutrality Framework Act", its Enforcement Decree, and the "Climate Response Fund Operation and Management Regulations". In March 2023, the Ministry of Economy and Finance established the "2023 Climate Response Fund Management Plan Execution Guidelines" to provide clear directives on the administration of the fund. These guidelines apply to the Climate Response Strategy Department of the Ministry of Economy and Finance, which oversees the fund, as well as the central government agencies and institutions responsible for executing specific projects under the fund (Ministry of Economy and Finance, 2023).

Governance Structure

The Ministry of Economy and Finance is responsible for the overall coordination and supervision of fund operations, including selecting the areas to be funded and adjusting resource allocation in line with the "2050 Carbon Neutrality Strategy". Meanwhile, individual ministries such as the Ministry of Environment, Ministry of Trade, Industry and Energy, and Ministry of Land, Infrastructure and Transport, among others are tasked with implementing specific projects

(Korea Law Information Center, n.d.). In 2022, 16 ministries were involved in executing these projects. The operation of the fund is managed by the Korea Environment Corporation, the entrusted organization.



「Figure 1. Governance Structure of the Climate Response Fund」
Source : Lim, J., & Jang, H., 2023

Financial Structure and Size

Since its inception, the Climate Response Fund has grown significantly in importance and scale. Initially established with 250 million KRW in 2022, the fund has become a key financial tool within Korea's carbon neutrality budget, accounting for 20% of the total budget by 2023 (National Assembly Budget Office, 2021). It is now the second-largest budgetary resource for GHG reduction, following the "Energy and Resources Special Account", and the largest among dedicated funds.

The fund is financed through a combination of government contributions, transfers from general and special accounts, and income from the auction of emission allowances. A significant portion of its funding comes from the Transportation Energy Environmental Tax (44%) and revenue from the auction of emission allowances (17%). 7% of the Transportation, Energy, and Environmental Tax is transferred to the general account, and all revenue generated from the auctioning of emission allowances is utilized. In addition, deposits from the Public Capital Management Fund are also used to establish the fund.

In 2023, the fund's total operational size was approximately 2.49 trillion KRW, which slightly decreased to about 2.42 trillion KRW in the 2024 budget, reflecting a 2.9% reduction (National Assembly Budget Office, 2021).

Category			2022			2023	
			Actual	Revised Plan (A)	Final Statement Details	Revised Plan (B)	Revised Plan (C)
Own Revenue	Emission Rights Sales Revenue (Settlement Amount)		7,306 (29.7%)	4,476 (20.6%)	3,188 (15.6%)	4,009 (16.1%)	4,009 (16.1%)
Internal Revenue	General Account Transfers	Transportation Tax	10,766 (43.8%)	7,632 (35.2%)	7,632 (37.3%)	7,803 (31.4%)	7,803 (31.3%)
		Expenditure Deficit Subsidy	-	-	-	4,420 (17.8%)	4,420 (17.7%)
	Special Account Transfers	Special Account for Education	3,000 (12.2%)	3,000 (13.8%)	3,000 (14.7%)	3,000 (12.1%)	3,000 (12.0%)
	Fund Transfers		2,000 (8.1%)	2,000 (9.2%)	2,000 (9.8%)	2,910 (11.7%)	2,956 (11.9%)
	Fund Deposit Returns		1,522 (6.2%)	4,601 (21.2%)	4,601 (22.5%)	2,726 (11.0%)	2,726 (11.0%)
	Surplus Fund Balance Returns		-	-	44 (0.2%)		
Total			24,594	21,709	20,465	24,868	24,914

(Unit: 100 million KRW)

「Table 4. 2022~2023 Financial Structure of the Climate Response Fund」
Source : WWF-Korea (2023), based on data from Korea Strategy and Finance Committee (2021a, 2022a)

The Expenditure Structure

The Climate Response Fund consists of a total of 11 sub-projects across its four core areas (programs). As mentioned above, as of 2023, a total of 16 ministries, including the Ministry of Economy and Finance, the Ministry of Trade, Industry, and Energy, the Ministry of Environment, the Ministry of Justice, and the Ministry of Land, Infrastructure, and Transport, are responsible for implementing the projects within each program.

Program	Unit Project	Project Budget (Million KRW)		Implementing Departments (2023)
		2022	2023	
Greenhouse Gas Reduction	Urban and National Carbon Neutrality	324,945	290,544	Ministry of Land, Infrastructure and Transport, Ministry of Justice, Ministry of Interior and Safety, Ministry of Environment
	Industrial Carbon Neutrality	283,026	413,623	Ministry of Economy and Finance, Ministry of Trade, Industry and Energy, Ministry of Environment, Small and Medium Business Administration, Saemaul Foundation
	Carbon Absorption Adjustment	341,852	282,457	Ministry of Environment, Korea Forest Service
Low-Carbon Ecosystem Creation	Green Finance	454,250	446,250	Financial Services Commission, Ministry of Trade, Industry and Energy, Ministry of Environment, Small and Medium Business Administration
	Circular Economy	43,572	50,964	Ministry of Trade, Industry and Energy, Ministry of Environment
	Fostering Skilled Workforce for Carbon Neutrality	145,777	139,208	Ministry of Employment and Labor, Ministry of Trade, Industry and Energy, Ministry of Environment, Small and Medium Business Administration, Ministry of Oceans and Fisheries, Korea Forest Service
Fair Transition	Adaptation and Risk Management	15,996	24,909	Ministry of Environment
	Regional Public Transition	39,706	54,455	Ministry of Trade, Industry and Energy, Ministry of Environment
	Support for Vulnerable Groups	127,952	124,417	Ministry of Employment and Labor, Ministry of Trade, Industry and Energy

Building a Carbon Neutral Foundation	Technology Development	548,129	580,597	Ministry of Science and ICT, Ministry of Trade, Industry and Energy, Ministry of Land, Infrastructure and Transport, Ministry of Environment, Ministry of Oceans and Fisheries, Korea Forest Service, Small and Medium Business Administration, National Fire Agency
	System Operation	28,748	46,994	Ministry of Trade, Industry and Energy, Ministry of Environment, Ministry of Land, Infrastructure and Transport, Korea Meteorological Administration, Ministry of Agriculture, Food and Rural Affairs

「Table 5. Unit Projects of the Climate Response Fund」
Source: WWF-Korea (2023), based on data from Korea National Assembly Budget Office (2021a, 2021b), Strategy and Finance Committee (2022), Korea Government (2022), Open Fiscal Data

Expenditure Status and Effectiveness

Based on the 2025 plan, the Climate Response Fund is set to allocate KRW 860.7 billion to greenhouse gas (GHG) reduction initiatives, KRW 568.4 billion to low-carbon ecosystem development projects, KRW 207.7 billion to just transition programs, and KRW 686.4 billion to carbon neutrality infrastructure. Among these categories, the GHG reduction sector has consistently received the largest share of funding since the fund's establishment. Specifically, KRW 978.4 billion was allocated to GHG reduction in 2024, KRW 986.6 billion in 2023, and KRW 949.8 billion in 2022.

However, the GHG reduction outcomes achieved through Climate Response Fund projects have been deemed insufficient to meet the necessary targets. According to Kim T's (2024) study, the GHG reduction impact of the fund's projects in 2023 amounted to 1.55 million tons, which exceeded the planned target of 1.53 million tons. Despite this, the cumulative reduction achieved by 2023 was only 10.05 million tons, falling short of the 13.08 million tons required to meet the 2030 goal. One significant factor behind this shortfall was the failure to implement the "Low-Carbon Clean Fuel Conversion Project," which was expected to yield substantial GHG reduction benefits but could not proceed due to insufficient demand.

Project Name	Budget (Unit: KRW)
Support for Carbon Neutral Transition Frontline Projects	223.6 billion
Creation of Low-Carbon Industrial Complex Environments	109.5 billion
Future Environmental Industry Investment Fund	63.3 billion
Expansion of Recycling Resources Infrastructure	39.8 billion
Climate Change Adaptation and Public Practice	32.0 billion

「Table 6. Key Projects of the Climate Response Fund」
Source: National Assembly Budget Office

3.1.2. Plan to Expand the Scale of Green Finance

The Climate Response Fund, as previously reviewed, is planned and managed by the Ministry of Economy and Finance, one of Korea's government agencies, and is utilized to support various projects across government ministries. However, it is widely recognized that public sector efforts alone will not be sufficient to meet the investment demands required to achieve carbon neutrality. The government has acknowledged the recommendation from the **United Nations Framework Convention on Climate Change (UNFCCC)** that 70% of total investment should be sourced from private capital, underscoring the necessity of private sector participation. Accordingly, the government, led by the Ministry of Environment and the Financial Services Commission(2024), has announced plans to actively leverage policy finance institutions to expand green finance resources.

3.1.2.1. Phase 1: Short-term Goals by 2030

The first phase emphasizes reducing carbon emissions by 40% by 2030 and building a foundation for public-private collaboration in carbon-neutral investments. The Ministry of Environment has proposed strategies to secure funding and improve systems to achieve four main objectives: strengthening the role of policy-based financial institutions, expanding investments in renewable energy, increasing investments in climate technologies, and reforming the climate finance system.

Strengthening the Role of Policy Finance Institutions for Low-Carbon Transition
While policy-based financial institutions have mobilized resources, the Climate Response Fund

is primarily managed around government policy projects. Additional funding will be required by 2050 to expand investments and operations in the private sector. The government plans to increase policy finance support to 420 trillion KRW by 2030, a 67% rise from the previous annual average of 36 trillion KRW to 60 trillion KRW annually.

Category	Institution	Past 5 Years	Next 7 Years	Key Support Areas (Examples)
Carbon Neutral Transition *(Estimated 1,410 trillion KRW)*	Korea Credit Guarantee Fund	410 trillion KRW	1,000 trillion KRW	- Priority guarantees for improving carbon-neutral processes - Guarantees for energy transition projects
	Korea Technology Finance Corporation (KOTEC)	210 trillion KRW	410 trillion KRW	
Low-Carbon Facility Investments, Product Manufacturing, Technology Support *(Estimated 2,790 trillion KRW)*	Korea Development Bank (KDB)	710 trillion KRW	1,540 trillion KRW	- Investments in early green technology and projects - Interest rate incentives for carbon emission reductions - Support for eco-friendly ships and other loans
	Industrial Bank of Korea (IBK)	100 trillion KRW	380 trillion KRW	
	The Export-Import Bank of Korea	370 trillion KRW	870 trillion KRW	

Note: The amounts by supply category are examples and may differ from actual supply amounts.

「Table 7. Key Support Areas of the Climate Response Fund」

Source : Financial Services Commission. (2024, March 19)

This increase is projected to reduce GHG emissions by approximately 85.97 million tons by 2030, representing 29.5% of the national target reduction of 291 million tons.

Expanding Investment in Renewable Energy

Recognizing the rising demand for clean energy among global corporations, Korea has prioritized investment in renewable energy. The projected investment requirement is 160 trillion KRW. To address long loan recovery periods (up to 25 years) that may deter lenders, the government and commercial banks will provide 23 trillion KRW of the required 54 trillion KRW as venture capital. Policy finance institutions will supply 14 trillion KRW in subordinated loans, with commercial banks contributing 9 trillion KRW by 2030 to establish a “Future Energy Fund”. Six commercial banks will form a consortium, each contributing 210 billion KRW for periodic

consultations. If successful, the renewable energy share in electricity generation is expected to reach 21.6% by 2030, as per the Basic Plan of Long-Term Electricity Supply and Demand.

Developing Climate Technology through Targeted Investment

To foster climate technology development, the government plans to invest 9 trillion KRW in public-private partnerships. The Industrial Bank of Korea and five commercial banks will contribute 3 trillion KRW to a “Climate Technology Fund”, while the government will support innovation with a 5 trillion KRW “Innovation Growth Fund” and a 1 trillion KRW “Growth Ladder Fund”. Investment targets will be identified using frameworks such as the Ministry of Science and ICT’s climate technology classification and the Climate Neutrality and Green Growth Commission's classifications.

Institutional Reforms to Support Climate Finance

Clear criteria for identifying green activities are essential to expand climate finance. Despite the introduction of the K-taxonomy in 2021, challenges remain in its application. The Ministry of Environment previously announced its plan to revise the K-Taxonomy. Thus, the Financial Services Commission is developing "Green Loan Management Guidelines," which will define green loans, outline assessment methods, and clarify processes for meeting K-taxonomy standards. Additionally, the Financial Services Commission plans to implement a climate risk management system to mitigate the potential impact of transition costs on financial institution profitability, revising existing "Climate Risk Management Guidelines" as needed.

3.1.2.2. Phase 2: Long-term Goals by 2050

Beyond the 2030 goals, the Financial Services Commission will identify further tasks through the “Future Finance Task Force” to support Korea's carbon neutrality target by 2050. Details of the Task Force’s composition and phased initiatives will be disclosed at a later stage.

To ensure effective allocation of climate finance, the Financial Services Commission will establish a “Climate Finance Council,” led by the Director-General of the Financial Policy Bureau. While the focus is on financial support through 2030, additional planning will be necessary to meet the 2050 carbon neutrality target. The Financial Services Commission intends to address these needs in the second phase of support measures, as further defined by the Future Finance Task Force.

3.2. Challenges in the Current and Future Green Finance

The climate response fund and various planned green capital initiatives have played a crucial role in advancing Korea's environmental policies and fostering eco-friendly industries. However, they still face several limitations. This report aims to discuss the challenges encountered by the Climate Response Fund, which has been operational since 2022, along with potential solutions and the need for these issues to be considered in the future planning of green capital.

3.2.1. Volatility in Size of Financial Resources

As mentioned above, the Climate Response Fund's primary revenue sources such as the emissions trading auction proceeds and the Transportation, Energy, and Environmental Tax, exhibit significant annual variability for various reasons, making it challenging to maintain a stable fund size.

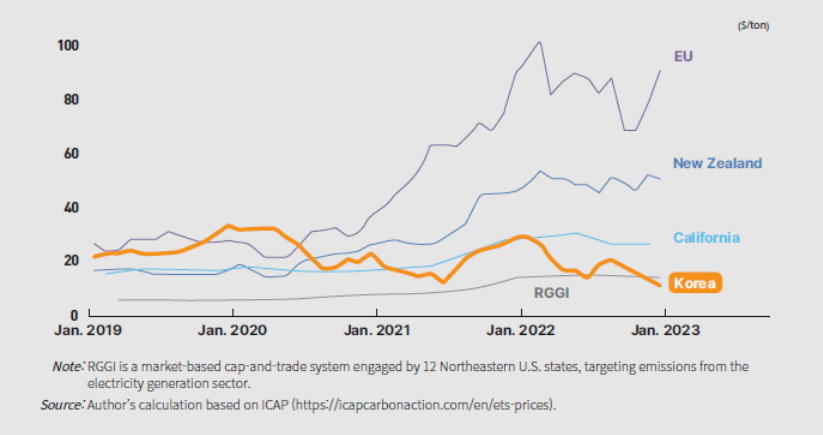
Volatility of the Transportation Energy Environmental Tax

The Transportation, Energy, and Environmental Tax, which accounts for 44% of the fund’s resources, exhibits significant annual volatility. While this tax has generally shown an upward trend, its stability is often impacted by fluctuations in tax rates and broader economic conditions. For instance, there was a notable 19% increase in tax revenue in 2021 compared to 2020. However, in 2022, revenue from this tax decreased by approximately 29.1% from the planned amount due to the government's fuel tax reduction measures. Since the Transportation, Energy, and Environmental Tax is set to be discontinued in 2024, following the enactment of a repeal bill in 2009, there is a need for a stable source of funding thereafter. Furthermore, as the adoption of electric and hydrogen vehicles accelerates, the transfer amount from the Transportation, Energy, and Environmental Tax is likely to decrease.

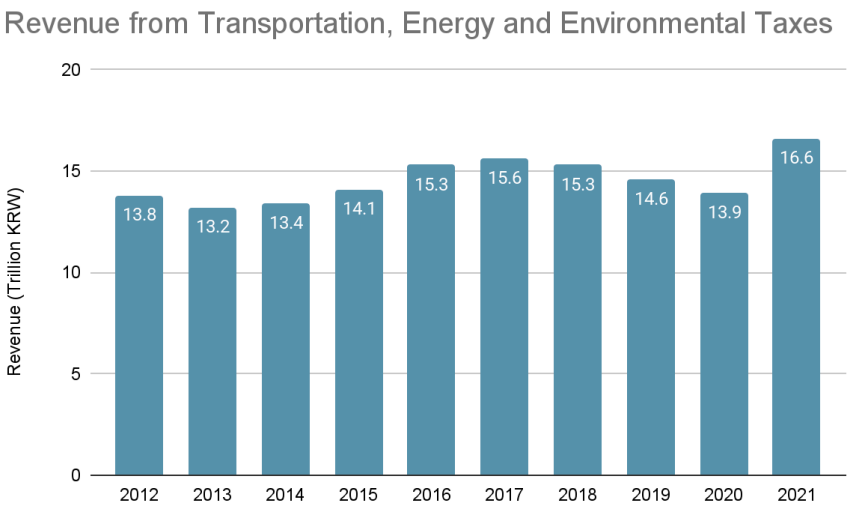
Volatility of the Carbon Emission Permit Prices

The revenue from the sale of emission permits often differs from the initial estimates made during the fund planning stage, which negatively impacts the stability of the fund's operations. This variability in revenue is primarily due to fluctuations in the price of emission permits, influenced by factors such as national reduction targets, the emissions trading scheme cap, increased production in allocated industries, and investments in GHG reduction. For example, while the revenue from emissions trading auctions grew from 232.2 billion KRW in 2019 to 318.6 billion KRW in 2022, future revenues remain highly uncertain due to price volatility and potential

changes in the proportion of allowances auctioned. In 2023, the auction's income showed significant instability, with fluctuations in both bid rates and prices. The bid rate dropped from 70-80% to around 30% by October, and the bid price fell from approximately 13,000 KRW to 8,000-10,000 KRW (KRX, n.d.). As a result, revenue from carbon permit auctions in 2023 reached only 21.3% of the target, contributing to a reduction in the fund's overall budget from 2.49 trillion KRW in 2023 to 2.39 trillion KRW in 2024, reflecting a 3.8% decrease.



「Figure 2. Monthly Emission Allowance Price Trends - Korea vs. International」
Source : Yoon (2023), based on data from ICAP

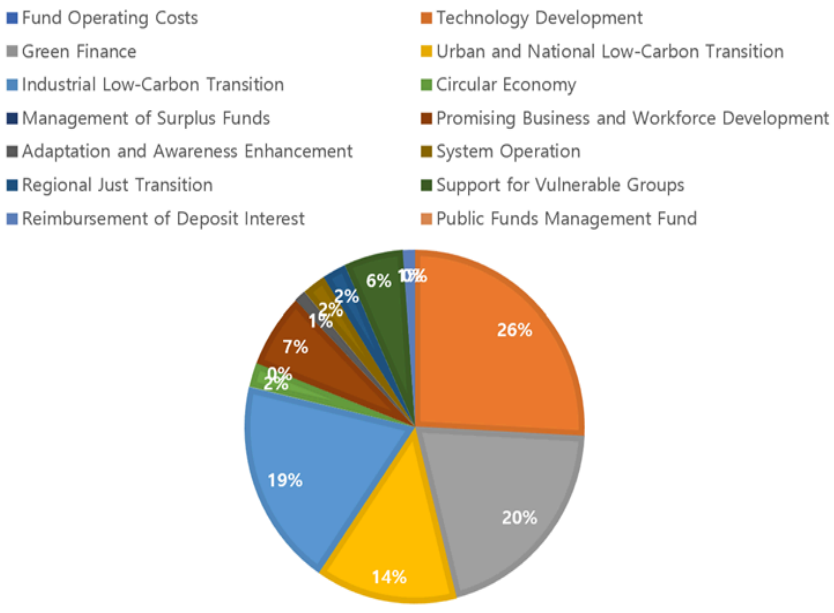


「Figure 3. Revenue from Transportation, Energy and Environmental Taxes (Trillion KRW)」
Source : Energy Platform News (2022)

Such fluctuations have led to revenues from the fund falling short of expectations, raising concerns about the reliability of the fund as a financial resource. As evidenced by the challenges faced by the Climate Response Fund, it is crucial to establish a consistent and stable method for fund creation. However, the three new green capital initiatives announced by the Ministry of Environment—420 trillion KRW for policy-based financial institutions, 23 trillion KRW for renewable energy investments, and 9 trillion KRW for climate technology investments—only specify the funding institutions and amounts, with no details provided on how the funds will be raised. For these funds to be established and operational by 2030, discussions on the method for fund creation must be initiated promptly.

3.2.2. Fund Management Efficiency

The operational inefficiency of the current Climate Response Fund can be attributed to two primary factors. First, the scale of the fund is relatively small compared to its intended scope of utilization. Despite being allocated across diverse areas, including greenhouse gas (GHG) reduction (40%), low-carbon ecosystem development (27%), fair transition (8%), and system and infrastructure development (25%), the fund accounts for only 0.12% of Korea's GDP. In contrast, comparable funds in the European Union, such as the Innovation Fund, Modernisation Fund, and Social Climate Fund, collectively represent 2–3% of the EU's GDP (European Commission, n.d.).



「Figure 4. The Climate Response Fund Budget by Sector」
Source: Ministry of Economy and Finance & Lim et al., Strategic Direction for Phase Four of Korea's Emission Trading Scheme

The average annual budget for the Climate Response Fund stands at 2 trillion KRW, supporting approximately 140 projects annually. This translates to an average project budget of 15.56 billion KRW under the Ministry of Environment, 9.88 billion KRW under the Ministry of Science and ICT, and 10.85 billion KRW under the Ministry of Trade, Industry and Energy. However, in the case of the EU Innovation Fund, 95% of GHG reductions achieved are attributed to large-scale projects. Established in 2017 to support the early commercialization of innovative low-carbon technologies, the EU Innovation Fund began supporting large-scale projects in July 2020. During its first round, the fund selected seven proposals, committing a total of €1.1 billion (approximately 1.48 trillion KRW, based on the 2022 exchange rate) over 10 years. This equates to an average annual support of approximately 21.16 billion KRW per project—more than double the average project funding in Korea.

Category	Number of Projects	Total Amount (Billion KRW)	Advance Amount (Billion KRW)	Execution Amount (Billion KRW)
Total	139	21,630	155.6	20,164
Ministry of Employment and Labor	4	278	69.5	215
Ministry of Science and ICT	13	1,285	98.8	1,285
Ministry of Land, Infrastructure and Transport	16	2,625	164.1	2,625
Financial Services Commission	2	1,750	875.0	1,450
Ministry of Agriculture, Food and Rural Affairs	1	44	44	44
Ministry of Justice	1	72	72	57
Korea Forest Service	5	2,670	534.0	2,651
Ministry of Trade, Industry and Energy	49	5,317	108.5	4,746
Saemaul Foundation	1	6	5.0	6
Small and Medium Business Administration	8	1,341	167.6	1,231
Ministry of Oceans and Fisheries	6	316	52.7	296
Ministry of Interior and Safety	2	259	129.5	218
Ministry of Environment	31	5,667	182.8	5,340

「Table 8. Climate Response Fund Project Count and Scale」
Source: WWF-Korea (2023), based on data from the Ministry of Economy and Finance (2022)

Second, the Climate Response Fund has not been proactive in identifying and supporting suitable projects for investment. The fund's primary goal is to establish an effective financial support program that enables Korea to respond to the climate crisis and accelerate its transition to a carbon-neutral society. To uphold this mission, it is essential to actively identify and provide concentrated support for projects that align with the fund's objectives. In particular, greater flexibility is required in supporting the development and demonstration phases of new technologies essential for achieving carbon neutrality.

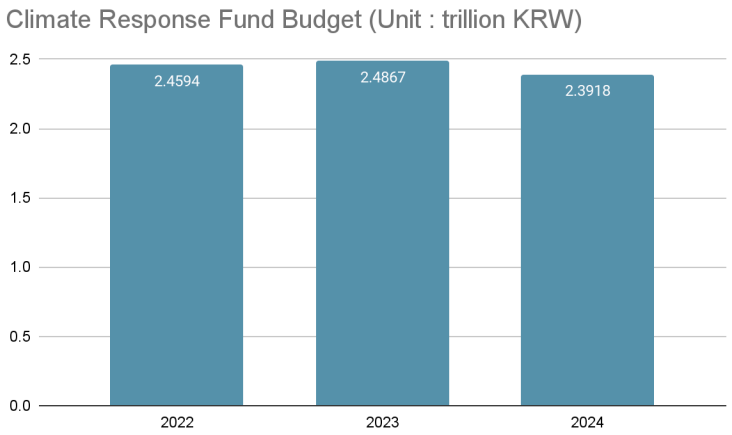
According to the Climate Response Strategy Division of the Ministry of Economy and Finance, considering the limited resources available, it is necessary to focus on R&D for low-carbon transition technologies in industries where the return on fiscal investment is high, thereby enhancing operational efficiency. However, the current fund primarily focuses on existing technologies, placing relatively little emphasis on fostering innovation. In contrast, the European Union actively supports the adoption and demonstration of new technologies from the early stages of projects and includes funding for operational costs. The EU distinguishes between large-scale and small-scale projects, providing financial support for both capital and operational expenses in large-scale projects (European Commission, n.d.). This approach highlights the disparity with Korea's current focus, which lacks prioritization and support for early-stage technology development.

Government investment in technology development is a critical metric, as it leads efforts in economically less viable fields where private sector investment is challenging. Therefore, the Climate Response Fund must take on a more active role in researching and pioneering investment areas to foster innovation and advance the nation's climate response goals. In addition, it is essential to ensure that the areas of investment for the Climate Response Fund do not overlap with those of the Ministry of Environment's upcoming Renewable Energy Investment Fund and Climate Technology Investment Fund. While the Ministry of Environment has outlined the direction for how these funds will be used, the details regarding how the target companies or institutions will be selected, the criteria for selection, who will set these criteria, which department will oversee and lead the entire process, and the roles of the participating departments have not been disclosed. These details are crucial, as they play a significant role in determining the effectiveness of the funds when they are established and operated. Therefore, alongside the active identification of investment areas for the Climate Response Fund, the management of these new funds is also of utmost importance.

3.2.3. Governance Structure Complexity

Governance is one of the biggest limitations of the Climate Response Fund. As previously discussed, the governance structure of the Climate Response Fund is dual in nature. While the Ministry of Economy and Finance is responsible for budget planning, the actual implementation

of projects is carried out by 16 government ministries, including the Ministry of Environment. Although this issue has been consistently raised, challenges in fund management persist despite the number of supported projects decreasing from 152 to 144 this year (WWF Korea, 2023). The involvement of multiple ministries in budget planning and project implementation continues to create several difficulties.



「Figure 5. 2022~2024 Climate Response Fund Budget」
Source : Ministry of Economy and Finance

First, responsibility becomes fragmented because the ministry planning the fund's expenditure and the ministries implementing the projects are separate entities. While the opinions of implementing ministries are reflected during the planning phase, accountability for expenditure lies with the Ministry of Economy and Finance, while the responsibility for project execution rests with the 16 ministries. However, identifying whether issues stem from budget planning or project implementation is not straightforward. As a result, despite all activities operating under a single fund, determining accountability for each project increases unnecessary administrative costs. This structure also creates ambiguity in accountability, reducing the motivation to actively improve projects, making it inherently inefficient.

Second, there are limitations in processes such as budget deliberation and legal reviews necessary for project implementation. The Ministry of Economy and Finance oversees the planning of the Climate Response Fund, meaning that the executing ministries do not directly handle deliberations on budget proposals. However, since the transfer of project information from the executing ministries to the Ministry of Economy and Finance, which conducts final evaluations, is limited, it is difficult to conduct a substantive review of the completed projects. Additionally, the review of budget proposals and legal evaluations is carried out by different entities. While the standing committee of the executing ministry reviews the laws underpinning

project implementation, this fragmented review process across different committees delays the consistency and efficiency of project planning.

Third, the fund fails to effectively manage the performance of its fiscal projects. According to the National Finance Act in Korea, all fiscal projects must systematically manage their entire lifecycle—from budget planning, review, execution, and settlement—based on the performance information obtained. However, because the Climate Response Fund is not directly implemented by the Ministry of Economy and Finance but rather by individual ministries, it is excluded from performance management oversight. Consequently, there is no integrated management system to oversee the multiple projects under the fund, the goals of individual projects lack alignment, and the fund is not subject to parliamentary budget review based on performance information.

The most effective solution to address these challenges is to integrate the ministries responsible for budget planning and execution. Doing so would clarify accountability for fund utilization in individual projects, streamline the necessary administrative review processes, and enable integrated performance management.

	Climate Response Fund **(Kim, T., 2024)**	**Measures for Financial Support for Climate Crisis Response** **(Financial Services Commission, 2024)**	**Measures for Expanding Green Investments for Low-Carbon Transition System** **(Ministry of Environment, 2024)**
Establishment Date	2022	Announced on March 19, 2024	Announced on March 19, 2024
Background	Based on the 「Framework Act on Carbon Neutrality and Green Growth for Climate Crisis Response 」	In response to the flow of climate change policies in the global and domestic market.	Emphasizing the need for private green investments to support the transition to a low-carbon economic and social system across industries.
Fund Management Entity	Ministry of Economy and Finance ** Implementation agencies include 16 ministries such as the Ministry of Environment, Ministry of Trade, Industry and Energy, Ministry of Land, Infrastructure and Transport, Ministry of Employment and Labor, and the Ministry of Forestry.* The fund management and implementation agencies operate in	Financial Services Commission	Ministry of Environment

	a two-layered structure.		
Objective	To effectively address the climate crisis and facilitate a carbon-neutral society by ensuring the resources required for promoting green growth.	Achieve carbon neutrality by 2050.	Accelerate the transition to a low-carbon economy and society through the activation of green investments.
Total Fund Size	2.624 trillion KRW (based on 2025 plans).	420 trillion KRW	30 trillion KRW
Categories	Greenhouse gas reduction: 860.7 billion KRW Creation of low-carbon ecosystems: 568.4 billion KRW Just transition: 207.7 billion KRW Establishing carbon-neutral infrastructure: 686.4 billion KRW Others: 299.2 billion KRW	Transition to low carbon: 141 trillion KRW (estimated) Support for low-carbon equipment, product manufacturing, and technology: 279 trillion KRW (estimated) Future Energy Fund (additional): 90 trillion KRW	Green bonds: 3 trillion KRW Green asset securitization rights: 1.368 billion KRW Loans: 8 trillion KRW Export funds: 400 billion KRW Scale-ups: (-) Green industry technology guarantees: (-)
Timeline		Total of 420 trillion KRW in policy financing until 2030. By 2030, expand the annual average amount of green financing provided directly by policy financial institutions by 67% compared to the previous five-year average. Yearly details: **2024**: 48.6 trillion KRW **2025**: 51.7 trillion KRW **2026**: 55.1 trillion KRW **2027**: 58.7 trillion KRW **2028**: 63.4 trillion KRW **2029**: 68.6 trillion KRW **2030**: 74.4 trillion KRW	30 trillion KRW in green market funding until 2027

「Table 9. Comparison of Korea's Three main Green Investment Plans」

Unfortunately, the three newly proposed funds announced by the Ministry of Environment also fail to designate a central authority to oversee and manage the funds comprehensively. Korea's proposed Green Investment Plan, while ambitious, faces several significant limitations. As shown in Table 9, the fund management entities, fund categories, and timelines vary across the different investment plans, resulting in a lack of coherence and efficiency in driving successful green investments. Moreover, the plan does not outline a clear mechanism for monitoring progress across these initiatives. Without a robust system to track the intermediate progress of each management entity, issues such as unclear accountability and potential free-riding could emerge, undermining Korea's ability to meet its ambitious objectives.

These challenges stem from the absence of a centralized authority to provide cohesive leadership. Establishing a central governing body to oversee and coordinate the fragmented components of the Green Investment Plan is crucial. Such a body would offer strong leadership and clear direction, mitigating inefficiencies and ensuring committed participation from all stakeholders involved.

4 | Case Study: Centralized Green Bank of EU

The establishment of a centralized green finance body in Korea could streamline efforts to achieve national carbon neutrality targets, enhance the coordination of financial resources, and support green technology innovation. The following case study examines the centralized green finance institution in the EU, highlighting its organizational structures, roles, and activities to serve as a model.

EU: European Investment Bank (EIB)

In December 2019, the European Union launched the European Green Deal—a comprehensive strategy to achieve carbon neutrality—alongside the European Green Deal Investment Plan. Around the same time, the EIB transitioned into the EU's dedicated "Climate Bank" under its Climate Bank Roadmap, aligning its operations with the Green Deal and the Paris Agreement. The EIB's approach included plans to phase out fossil fuel lending and channel significant investments into renewable energy, low-carbon transport, and other green initiatives.

The EIB's transition underscores the importance of a centralized institution that aligns funding mechanisms with national and international climate objectives. By serving as the central policy finance institution for the EU's Sustainable Europe Investment Plan, the EIB has mobilized over one trillion euros of climate-related investments through blended finance mechanisms. While its

successes highlight the advantages of a centralized governance model, challenges such as resource dependency, transparency, and consistent definitions of "green" investments remain

Limitations

This section examines four structural barriers that may prevent the EIB from fulfilling its “Climate Bank” pledge and shifting its investments toward net-zero targets in a timely manner.

1. **Self-Preservation**

   Historically, the EIB has maintained independence via profitability, so fully embracing climate goals that jeopardize its balance sheet could be restrained. This raises the risk of “organized hypocrisy,” where bold declarations are not matched by meaningful action.

2. **Resource Dependency**

   The EIB’s reliance on EU Member States and capital market investors may conflict with its climate commitments. Certain countries, for instance, resist phasing out gas or seek to include nuclear power. Investors and rating agencies might also be reluctant to back higher-risk green projects, limiting the EIB’s climate ambitions.

3. **Transparency and Accountability**

   The complex nature of green finance—along with the EIB’s past practice of restricting information—makes it difficult for stakeholders to assess whether climate objectives are genuinely being met. The bank’s technical expertise, proprietary data, and reliance on intermediaries can hamper external oversight.

4. **Taxonomy Challenges**

   Defining what counts as “green” remains highly political, and the EIB’s direct involvement in setting these standards may introduce conflicts of interest. Without a clear, universal yardstick, risks of “greenspeak” or “greenwashing” increase.

Ultimately, a key indicator of the EIB’s sincerity is how much capital it sets aside for potential losses on climate-related investments. If that risk provisioning rises—reflecting genuine higher-risk climate projects rather than poor investment choices—it will signal that the EIB is putting its balance sheet on the line for net-zero goals. However, achieving this will also require

robust public oversight and the willingness of both Member States and private investors to support the climate bank model.

Lessons for Korea

Korea's unique governmental and industrial structure requires a tailored application of the EIB model. Unlike the EU, where member states share climate responsibilities, Korea's centralized government provides a clearer hierarchy for decision-making. This centralization could facilitate the integration of existing green finance initiatives, such as the Climate Response Fund, under a single body, potentially led by the Korea Development Bank. By adapting the EIB's Climate Bank Roadmap, Korea can develop a similar strategy aligned with its specific goals, such as expanding renewable energy capacity or decarbonizing heavy industries like steel and petrochemicals.

Like the EIB, a Korean green finance body could adopt blended finance approaches to de-risk investments in innovative but high-risk green technologies. Public funds could be leveraged to attract private investments, creating a multiplier effect. Moreover, Korea could emulate the EIB's commitment to phasing out fossil fuel investments by establishing decarbonization thresholds for projects financed under government-supported programs. Lastly, Drawing from the EIB's challenges with transparency, Korea should establish robust monitoring and reporting frameworks to ensure accountability for its green finance initiatives.

Comparison Between the EIB and Korea's Current Green Finance System

Korea's current green finance initiatives, such as the Climate Response Fund and K-ETS, operate under a fragmented governance structure. Unlike the EIB's centralized role in coordinating EU-wide initiatives, Korea's multiple ministries and institutions often work in silos, leading to inefficiencies and overlapping responsibilities. For example, while the EIB directly channels auction revenues into green investments, Korea's auction revenues under K-ETS are dispersed across various programs with limited strategic coherence.

By learning from the EIB's successes and challenges, Korea can establish a centralized green finance institution tailored to its domestic needs. This institution would integrate existing mechanisms like the Climate Response Fund and K-ETS, address gaps in resource allocation and policy alignment, and promote private sector participation through innovative financing mechanisms. With a strong governance structure and lessons from global best practices, Korea has the potential to create a transformative green finance framework that not only achieves national carbon neutrality goals but also positions the country as a leader in global sustainable finance.

5 | Addressing Fragmentation in Korea's Green Finance Framework

This study has explored the current structure of Korea's green finance framework and underscored the urgent need for a centralized Korean Green Financing body. Although Korea has made significant strides in advancing green finance through mechanisms such as the K-ETS, the Climate Response Fund, and the K-Taxonomy. The current framework is hindered by a critical flaw: fragmentation. Policies and initiatives are dispersed across various institutions and ministries, each operating independently with limited coordination.

This decentralized approach has led to inefficiencies, overlapping responsibilities, and a lack of unified strategic direction. A recent report by the World Wildlife Fund (WWF) highlights the issue of duplication between the Climate Response Fund and Korea's 2022 Carbon Neutrality and Green Growth Budget Plan. This overlap has not only created confusion in the allocation of financial resources for green projects but has also faced criticism during the government budget proposal review process (WWF Korea, 2023). As a result, the inefficiencies within the system have hindered the Climate Response Fund from effectively implementing initiatives and accelerating the transition to a green economy. Without a centralized governance body to oversee and harmonize these efforts, the overall impact of Korea's green finance initiatives remains constrained.

The absence of a central leadership institution has created gaps in policy alignment, resource allocation, and stakeholder coordination. For Korea to fully realize its climate ambitions, it is essential to establish a body capable of providing clear oversight and leadership. This institution would address the structural inefficiencies in the current system by coordinating policies across ministries, ensuring efficient allocation of resources, and driving innovation in green finance. Moreover, such an institution could enhance accountability, foster transparency, and build trust among stakeholders, both domestically and internationally. The need for centralized leadership is clear, and among the existing institutions, the Korea Development Bank (KDB) emerges as the most qualified candidate to fulfill this role.

The case for KDB as the Central Green Finance Leader

KDB is uniquely positioned to lead Korea's green finance strategy due to its extensive experience, institutional credibility, and strategic alignment with national climate objectives. Established in 1954 under the Korea Development Bank Act, KDB has long been recognized as the nation's leading policy finance institution, with a proven track record in financing large-scale industrial and infrastructure projects. Its role as the first Korean institution accredited as an implementing entity of the GCF and its selection as the Asia region representative for the

Equator Principles Association Steering Committee in 2021 underscore its leadership in sustainable finance.

KDB has already demonstrated its commitment to green finance through its initiative, "Policy Finance Leading the Climate Industrial Revolution," which sets an ambitious target of providing 100 trillion KRW in cumulative green financing by 2030 and achieving operational carbon neutrality by 2040. To achieve these goals, KDB has implemented key programs such as the KDB Carbon Spread, Energy Transition Funds, and KDB Carbon Net Zero, all of which align with the K-Taxonomy to ensure that resources are directed toward genuinely sustainable activities. Additionally, KDB has actively worked to prevent greenwashing by rigorously adhering to transparent standards and monitoring its Scope 3 emissions, aiming for a 50% reduction by 2030.

The bank's ability to mobilize resources and coordinate stakeholders further strengthens its case as the leader of Korea's green finance framework. With a dedicated ESG Planning Department and approximately 7.8 trillion KRW in green finance products under its management, KDB has the capacity to integrate and streamline the fragmented efforts currently spread across ministries and institutions. Its alignment with global best practices, as demonstrated by similar institutions like the EIB and Germany's KfW, provides a model for success that KDB is well-equipped to emulate. These international examples highlight the benefits of centralized governance in driving innovation, mobilizing resources, and achieving climate goals—benefits that Korea could harness by empowering KDB.

To address the fragmentation in Korea's green finance framework, it is essential to grant KDB the authority and resources to assume a central leadership role. This involves structural reforms to consolidate existing mechanisms, such as the Climate Response Fund, under KDB's management. Additionally, establishing a governance framework that ensures accountability, transparency, and effective monitoring will be critical to enhancing the efficiency and impact of green finance initiatives. Furthermore, KDB must be equipped with the necessary resources to expand and specialize its workforce, strengthen its ESG capabilities, and secure sufficient capital funding. These measures will enable KDB to effectively lead and coordinate financial institutions, fostering a more cohesive and strategic approach to green finance. Given KDB's ability to engage diverse stakeholders, including government ministries and private financial institutions, it is well-positioned to unify and drive Korea's green finance agenda.

While the need for a centralized green finance body is evident, several challenges and risks must be carefully considered. First, consolidating the green finance initiatives of various financial institutions under a unified framework will require extensive negotiations and careful balancing of competing interests. Criticisms regarding KDB's suitability for the leadership role may also arise. Second, centralization could potentially stifle innovation, as a decentralized structure may allow for greater flexibility and experimentation in green finance initiatives. Lastly, dismantling the existing framework in favor of a new one carries the risk of losing valuable time that could otherwise be used for implementing critical green finance projects. These risks can

be mitigated through proactive planning and thorough stakeholder engagement. The transition toward a centralized green finance body must be preceded by a comprehensive decision-making process that incorporates the perspectives and needs of all relevant stakeholders. The finalized structure should be designed to maximize the contributions of each institution while ensuring operational efficiency within a unified framework. Additionally, implementing a mutual monitoring system among participating institutions could play a crucial role in maintaining accountability. Such a system would provide regular assessments of the central body's leadership capacity and operational effectiveness, creating incentives for transparent and efficient management. Moreover, it would serve as a mechanism for evaluating progress, identifying areas for improvement, and ensuring that the transition to a centralized system remains adaptive and responsive to evolving challenges.

By designating KDB as the central institution for green finance, Korea can overcome the inefficiencies of its current fragmented system and accelerate its transition to a sustainable, low-carbon economy. With its proven expertise, strategic focus, and alignment with national and global objectives, KDB is well-equipped to lead the nation's green finance efforts. This shift would not only enhance the effectiveness of Korea's climate policies but also position the country as a global leader in the fight against climate change. Through centralized leadership under KDB, Korea can ensure that its green finance framework is not just robust but transformative, driving meaningful progress toward its carbon neutrality goals.

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