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2023 KOREAN EMISSIONS TRADING SYSTEM REPORT



Ministry of Environment

Greenhouse Gas Inventory and Research Center

1

Notes for Readers

- ① This report presents the results for 2022, the second compliance year of Phase III (2021–2025) for the Korean Emissions Trading System (K-ETS) (the year in the title of the report is the year of publication). It analyzes the allocation, trading, and surrender of emission permits for covered entities designated in accordance with Articles 8 and 9 of the Act on the Allocation and Trading of Greenhouse-Gas Emission Permits (Act).
- ② This report is based on greenhouse gas (GHG) emissions and emission permits data provided by the National GHG Management System (NGMS), Emissions Trading Registry System (ETRS), Offset Registry System (ORS), and the Korea Exchange (KRX):
 - National GHG Management System (NGMS): a database for the GHG and Energy Target Management System and the K-ETS that collects and manages all data related to the emission activities of business entities, such as emissions reports, implementation plans, performance reports, application forms for allocation, and emissions monitoring plans (<http://ngms.gir.go.kr>)
 - Emissions Trading Registry System (ETRS): a computerized system for the registration and management of data related to the allocation, trading, banking, and borrowing of emission permits and certified GHG emissions, etc. (<http://etrs.gir.go.kr>)
 - Offset Registry System (ORS): a computerized system for the registration and management of data related to methodologies for external offset projects for the reduction, absorption, or removal of GHGs and certified GHG reductions (<http://ors.gir.go.kr>)
 - Korea Exchange (KRX): an emission permit exchange designated in accordance with Article 22 of the Act
- ③ All numbers in this report are rounded, so some sums and totals may not match.
- ④ This report uses CO₂ equivalent ton (tCO₂eq.) based on the global warming potential (GWP) for GHGs as the unit for the allocation and surrender of emission permits, and it is marked as t (ton), kt (thousand ton), and Mt (million ton). However, abbreviations (KAU, KCU, and KOC) are used when describing market transactions for emission permits:

- 1 KAU, 1 KCU, 1 KOC : 1tCO₂eq.
- **Korean Allowance Unit (KAU)**: emission permits allocated to covered entities in accordance with Article 12 of the Act
- **Korean Credit Unit (KCU)**: emission permits converted from KOCs in accordance with Article 29 of the Act
- **Korean Offset Credit (KOC)**: certified reductions from external offset projects obtained from the reduction, absorption, or removal of GHGs outside the scope of business operations monitored by the K-ETS in compliance with international standards, in accordance with Article 30 of the Act (※ For ease of use, KOCs are also referred to as a type of emission permit in this report)

2

Summary

1 Overview of the K-ETS

An emissions trading system is a market-based greenhouse gas (GHG) reduction scheme in which the government sets an emissions cap in each of the covered sectors and allocates annual emission allowances to entities that emit more than a certain amount of GHGs, meaning that they can emit GHGs up to the limit set by the emission allowances they hold. It is more cost-effective than direct regulation in that entities participating in the scheme can sell surplus allowances to others through market transactions or make up any deficit in their emission permits through auctions or market transactions.

For Phase I (2015–2017), in order to securely establish the Korean Emissions Trading System (K-ETS) and accumulate experience, the government allocated all emission permits free of charge, applied benchmarking (BM) as an allocation method only for certain sub-sectors, and introduced flexibility mechanisms (e.g., offsetting, banking, and borrowing). For Phase II (2018–2020), with the operational objectives placing emphasis on gradually increasing the size of the reduction in GHG emissions by covered entities, the government enhanced standards for the calculation of the cap and the allocation of emission permits so that they were higher than the level employed in Phase I. In addition, in order to solve problems such as an imbalance in supply and demand for emission permits, the government established standards for the banking of surplus emission permits and implemented measures to activate the emission trading market, such as the introduction of market makers.

For Phase III (2021–2025), the government established the Master Plan for the Emissions Trading System in December 2019 in order to support the effective achievement of Korea's Nationally Determined Contribution (NDC). The Master Plan focuses on promoting strategies such as further developing allocation methods, encouraging a substantial reduction in GHG emissions, and expanding market functions. For the implementation of these strategies, the government established detailed standards regarding total emission allowances, free allocation and auctions, and benchmark-based allocations through the Allocation Plan for Phase III (2021–2025) of the K-ETS in September 2020.

In October 2021, Korea announced the updated NDC, under which the country has set an enhanced target of reducing its total national GHG emissions by 40% from the 2018 level by 2030, with the aim of achieving the goal of carbon neutrality. This enhanced NDC was adopted in close consideration of the

purpose of Korea's carbon neutrality policy¹⁾) and its role as a member of the international community.

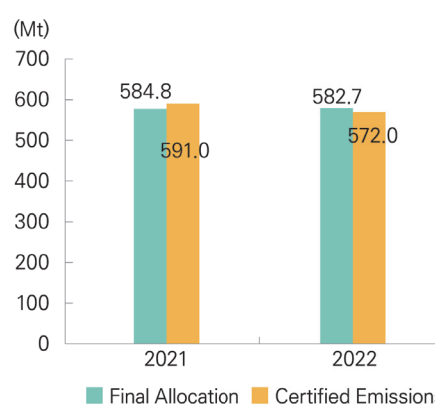
The K-ETS, which was developed with the goal of establishing a stable system in Phase I and reducing a significant amount of national GHG emissions in Phase II, has played a pivotal role in achieving Korea's NDC. Institutional improvements, such as the revitalization of the emissions trading market, improvement of allocation methods, and adjustment of the emissions cap, are required to efficiently support the achievement of the enhanced NDC.

1) The Framework Act on Carbon Neutrality and Green Growth for Coping with Climate Crisis stipulates the government shall set the target of reducing national GHG emissions by a minimum of 35% from the 2018 level by 2030 (Art. 8(1)). The amount of GHG emissions in 2018 was 727.6 Mt, and the target amount of GHG emissions for 2030 is 436.6 Mt.

2 K-ETS Operational Results

For the 2022 compliance year, the pre-allocation amount was 567.4 Mt (684 entities), while the final allocation amount, which reflected changes such as additional allocations, allocation revocations, and the succession of rights and obligations, was 582.7 Mt (714 entities).²⁾ The final allocation in 2022 was 0.4% lower than the previous year (584.8 Mt), which was due to an increase in the amount of emission permits whose allocation was revoked, which led to a decrease in the amount of allocation changes after the pre-allocation of emission allowances. The final allocation amount (582.7 Mt) consisted of 570.1 Mt of free allocation (97.8%) and 12.6 Mt of auctioned allowances (2.2%).

According to the results of the government's verification of the emissions reports submitted by the 714 entities that received allocated emission allowances, the certified emissions for 2022 amounted to 572.0 Mt, which was 3.2% lower than the previous year (591.0 Mt, 687 entities). The amount of emission permits surrendered by covered entities in the 2022 compliance year was 572.0 Mt (713 entities), made up of 564.4 Mt from Korean Allowance Units (KAUs) (98.7%) and 7.6 Mt from Korean Credit Units (KCUs) (1.3%). While the amount of KAUs surrendered decreased, the amount of KCUs surrendered remained at a similar level compared to the previous year. In the 2022 compliance year, one entity went bankrupt and failed to meet its obligation to surrender emission permits.



〈Final allocation and emissions in 2021–2022〉

In addition to emission permits allocated by the government, emission permits banked from the previous compliance year (2021), emission permits borrowed from the next compliance year, or KCUs may be utilized by covered entities to meet their obligation to surrender emission permits. The amount of emission permits banked from the previous compliance year by covered entities to surrender and trade emission permits amounted to 20.9 Mt (513 entities). The amount of emission permits carried over to the next compliance year (2023) after the surrender for 2022 was 39.3 Mt (509 entities). The amount of emission permits borrowed from the next compliance year was 0.7 Mt (38 entities), which was used only in the surrender of emission permits. In addition, for the 2022 compliance year, a total of

²⁾ A total of 30 entities have been added due to new entries and the succession of rights and obligations (i.e., designation of new covered entities arising from, for example, the splitting of covered entities).

7.6 Mt of Korean Offset Credits (KOCs) (6.96 Mt from domestic projects and 0.65 Mt from overseas projects) was converted into KCU22, all of which was used for the surrender of emission permits (65 entities).

Broken down by sector, the amount of certified emissions exceeded the final allocation amount in the power, waste, and public services/other sectors. However, in all sectors, an amount of emission permits equivalent to the amount of certified emissions was surrendered (i.e., emission targets were met) through the utilization of the trading, banking of emission permits and offset mechanisms.

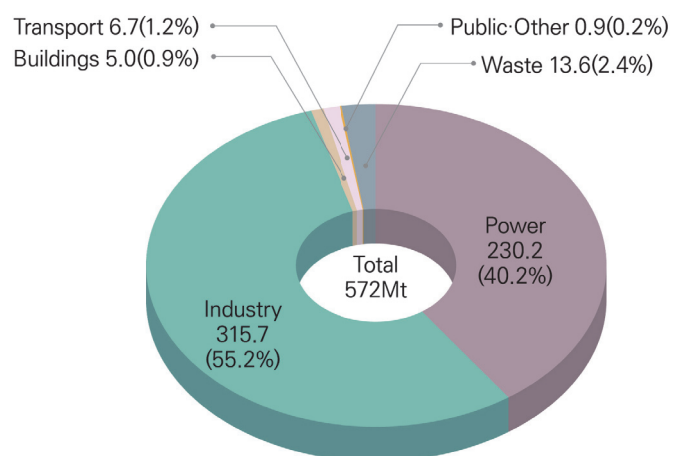
For the 2022 compliance year, the amount of certified emissions for the power sector was 230.2 Mt, which was 8.8 Mt (3.7%) lower than the previous year. Due to changes in the government's energy policy, power generation increased from 576.8 TWh to 594.4 TWh, while the amount of emissions decreased.

The amount of certified emissions from the industry sector decreased to 315.7 Mt, which was lower than the previous year by 10.8 Mt (3.3%). Factors such as the suspension of operations in the steel sub-sector caused by Typhoon Hinnamno, the increase in crude oil import prices due to the Russia-Ukraine war, and the global economic slowdown have led to a decrease in GHG emissions.

City gas consumption increased as a result of the increase in production within the service industry triggered by the relaxation of government measures in response to the coronavirus disease (COVID-19) pandemic and the decrease in the average annual temperature. Consequently, the amount of certified emissions of 40 covered entities in the buildings sector increased to 5.0Mt, which was higher by 0.3Mt(0.3%) compared to the previous year.

In the transport sector, demand for mobility increased with the complete lifting of social distancing measures, which led to an increase in the amount of emissions in land passenger and road freight transport. The amount of emissions from a total of 66 covered entities in this sector increased to 6.7 Mt, which was higher by 0.2 Mt (3.2%) compared to the previous year.

The amount of certified emissions from the waste and public services/other sectors remained similar to the previous year at 13.6 Mt (82 entities) and 0.9 Mt (2 entities), respectively.



〈Certified emissions by sector in 2022〉

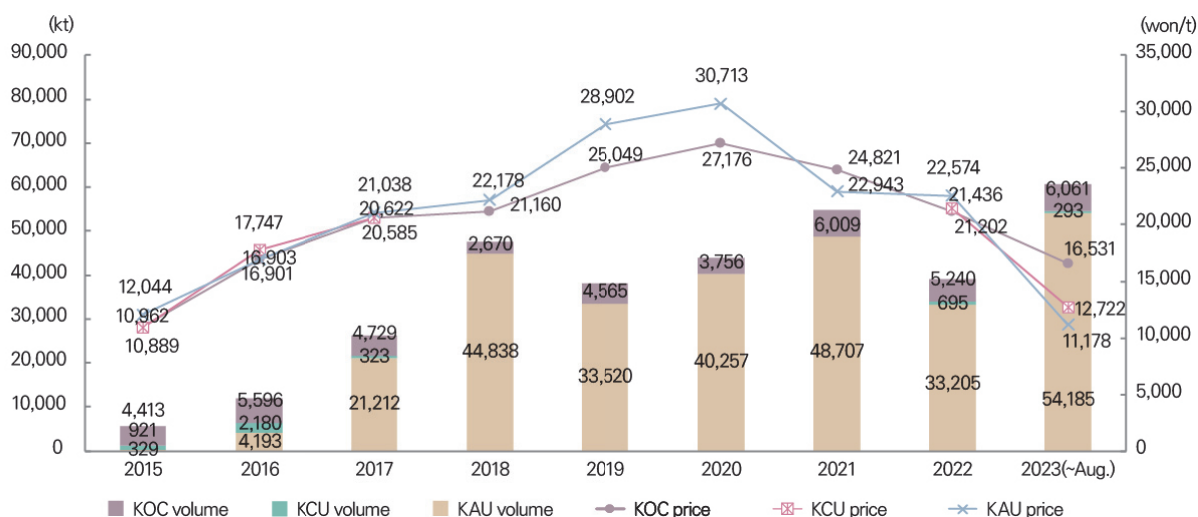
3 Analysis of Emissions Trading Market Performance

From Phase I to the end of the 2022 compliance year of Phase III (August 2023), a total of 327.9 Mt of emission permits were traded through the exchange and over-the-counter (OTC) markets, with total payments of 7,141.1 billion and an average trading price of 21,778 won per ton.

Of these permits, 280.4 Mt of KAUs (85.5%), 4.4 Mt of KCUs (1.3%), and 43.0 Mt of KOCs (13.1%) were traded. Broken down by market type, the trading volume was 179.1 Mt (54.6%) in the exchange market and 148.8 Mt (45.4%) in the OTC market. The yearly trading volume increased at an average annual rate of 103% from 5.7 Mt in 2015 to 47.5 Mt in 2018. Subsequently, it fluctuated, with 38.1 Mt in 2019, 44.0 Mt in 2020, 54.7 Mt in 2021, and 39.1 Mt in 2022. The trading volume grew to 60.5 Mt by August 2023, representing a significant increase (54.7%) compared to the previous year.

The average trading price for all emission permits per year increased significantly at an average annual rate of 22.5% from 11,013 won in 2015 to 30,411 won in 2020. Since then, due to the impact of COVID-19, lower production activity, and damage caused by Typhoon Hinnamno, it declined to 23,149 won in 2021, 22,370 won in 2022, and 11,721 won in 2023 (as of August).

The continuous increase in the trading volume and average trading price from 2015 led to an increase in total payments from 62.4 billion won in 2015 to 1,338.5 billion won in 2020. Subsequently, they continued to decline to 1,266.6 billion won in 2021, 875.6 billion won in 2022, and 709.6 billion won in 2023. The total payments for emission permits for 2023 were 19.0% lower than that for the previous year.



〈Trends in the Trading volume and Price by compliance year〉

The total volume of KAU22, KCU22, and KOCs traded during the period for which KAU22 was listed on the KRX (January 2021–August 2023) as the primary type of emission permit traded for the 2022 compliance year amounted to 86.8 Mt. Of this, 69.1 Mt (79.6%) of KAU22, 0.4 Mt of KCU22 (0.5%), and 17.3 Mt (19.9%) of KOCs were traded. Broken down by market type, of the total of 69.1 Mt of KAU22 traded, the trading volume was 60.8 Mt (87.9%) in the exchange market and 8.4 Mt (12.1%) in the OTC market. Specifically, the amount of KAU22 traded via real-time exchange trading was 47.9 Mt, which accounted for the highest proportion of the trading volume for KAU22, followed by the amount traded via auction (12.6 Mt), OTC trading (8.4 Mt), and block exchange trading (0.2 Mt). Of note was that the proportion of exchange trading for KAU22 has grown compared to KAU21 (69% for the exchange market and 31% for the OTC market) due to a sharp increase in real-time exchange trading.

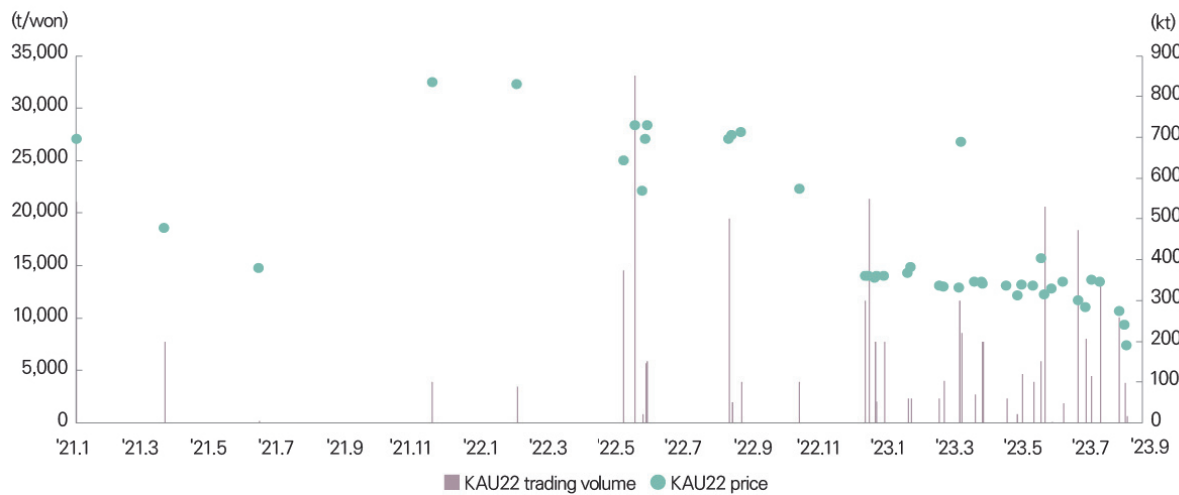
The average exchange trading price for KAU22 was 23,000 won on 4 January 2021, reaching 29,000 won in early August, which was a record high for KAU22. The monthly average trading price for KAU22 remained at 27,130 won in August and 25,894 won in September but declined thereafter to 22,438 won in October, 18,323 won in November, and 14,824 won in December. In 2023, it remained relatively stable in the range of 13,000 won to 14,000 won until April but dropped to 11,955 won and traded below 10,000 won in May. The average trading price on 25 July 2023 was 6,381 won, which marked the lowest average exchange trading price for KAU22, resulting in the implementation of a market stabilization measure as per Article 23 of the Act and Article 38 of its Enforcement Decree. The average price for July and August 2023 was 9,698 won and 7,495 won, respectively, and the average exchange trading price for KAU22 during the entire exchange trading period was 11,609 won.

The auction price for KAU22 was 24,000 won in July 2022 when the auctions began, reaching 27,300 won in August and 26,900 won in September. However, similar to the trend in the exchange trading price, it sharply fell to 22,250 won in October, 19,350 won in November, and 14,700 won in December, reaching 12,900 won in January 2023. The price remained between 12,700 won and 13,200 won between February and April. Auctions scheduled for May and June were canceled, and the average auction price for KAU22 during the entire auction period was 21,181 won.



〈Trends in Trading volume and Price for KAU22 in the Exchange market〉

OTC trading of KAU22 began on 18 January 2021. Until May 2022, trading occurred sporadically in the price range of 14,700 won to 32,400 won. The trading price of 32,400 won for December 2021 marked the highest OTC trading price for KAU22. Subsequently, the OTC trading price for KAU22 remained in the 20,000 won range until October 2022 but, similar to the trend in the exchange trading price, it sharply fell to the 10,000 won range from December 2022. Except for one transaction, KAU22 was traded in the price range between 12,000 won and 15,700 won until June 2023. Prices began to decline to the 11,000 won range in July and, in August, one transaction occurred at the lowest OTC trading price of 7,400 won before the end of the 2022 compliance year. Ultimately, the overall average OTC trading price for KAU22 was 18,665 won, which was 61% higher than its overall average exchange trading price.



〈Trends in Trading volume and Price for KAU22 in the Over-the-counter market〉

4 Analysis of a Survey of Covered Entities

A survey was conducted with covered entities that were able to meet their obligation to surrender emission permits for 2022 regarding their views of and response to the K-ETS, the GHG emission reduction efforts and performance, and directions for improving the K-ETS for Phase IV. The total number of responses was 259, with a response rate of 37.7%.

Continuing from the previous year, covered entities were generally supportive of the K-ETS (positive: 69.9%; negative: 8.1%) and considered it necessary to achieve Korea's NDC (positive: 74.2%; negative: 9.7%). In addition, the respondents reported that the K-ETS contributes to achieving GHG reduction targets in a cost-effective manner (positive: 57.1%; negative: 14.3%). The responding covered entities reported that they have actively attempted to participate in emissions trading (positive: 74.1%; negative: 5.0%) and secure a reduction in GHG emissions (positive: 52.2%; negative: 13.5%). It was found that, despite the management burden caused by reasons such as an increase in production costs for products/services, the covered entities have made efforts to respond to the K-ETS by increasing investment in the use of external consulting services and the application of low-carbon technologies.³⁾

However, it appears that these efforts have not yet led to a strengthening of corporate competitiveness or an increase in corporate profit. The proportion of negative responses was higher than that of positive responses regarding the following survey items: an increase in additional profits from emission permits trading, a reduction in operational and management costs through internal emission reduction efforts, the strengthening of corporate competitiveness at the domestic/international level through environmental business operations, and the strengthening of product/service competitiveness against other products/services in the same industry through internal innovation.⁴⁾

In the 2022 compliance year, the number of covered entities reporting that they were able to meet their obligation to surrender emission permits through allocated emission permits alone (57.1%) was higher than the number of covered entities reporting that they employed additional measures to meet

3) An increase in production costs for products/services due to the rise in prices of energy/raw materials (positive: 59.1%; negative: 11.2%); an increase in the costs of external consulting services to respond to the K-ETS (positive: 54.5%; negative: 20.5%); an increase in the costs of exploring and applying low-carbon technologies (positive: 38.6%; negative: 22.0%); increased investment in reduction technologies for management and process improvement (positive: 34.3%; negative: 29.0%); an increase in the costs of establishing a taskforce and securing manpower to respond to the K-ETS (positive: 28.5%; negative: 37.1%).

4) An increase in additional profits from emission permits trading (positive: 37.4%; negative: 41.7%); a reduction in operational and management costs through internal emission reduction efforts (positive: 27.1%; negative: 34.0%); the strengthening of corporate competitiveness at the domestic/international level through environmental business operations (positive: 25.0%; negative: 33.6%); the strengthening of product/service competitiveness against similar products/services in the same industry through internal innovation (positive: 18.5%; negative: 39.0%).

the obligation (42.9%). In terms of additional measures taken, similar to the previous year, the most common response was the purchase of emission permits (74.8%), followed by technological investment and internal reduction activities (29.7%) and a decrease in production (18.9%). The entities with surplus emission permits overwhelmingly preferred carrying them over to the next compliance year (81.3%) rather than selling them on the market (18.7%). The reasons for choosing to carry over the permits as the primary option included an expected increase in emissions due to the growth of the company and an increase in production, an expected increase in the price of emission permits due to a supply shortage of permits on the market, and the deferment of decision-making on selling due to uncertainty regarding the market and policy.

The covered entities reported that they have made efforts to reduce GHG emissions by participating in the K-ETS. They responded that their participation in the K-ETS has contributed to the establishment of mid-to long-term strategies for GHG reduction, improvement of internal processes for energy conservation, efforts to reduce indirect GHG emissions, and efforts to reduce direct GHG emissions. Moreover, investment to reduce GHG emissions, such as financial support for the introduction of low-carbon facilities or equipment and investment in low-carbon technology development, was also reported to have increased.

In terms of internal emission reduction activities in Phase III, 35.1% of the responding entities reported that they were currently implementing these activities, while 23.6% reported having plans to implement these activities and 41.3% reported that they have not implemented these activities. The most common internal reduction activity in progress or planned was the installation of high-efficiency equipment and the improvement of equipment performance, followed by power generation and self-consumption using the renewable energy, conversion to low-carbon fuels, and the recovery and utilization of unused thermal energy. On the other hand, in terms of external emission reduction activities, an overwhelming majority of the responding entities (80.7%) responded that they have not implemented these activities nor do they plan to. The most common external reduction activities in progress or planned were the use of new renewable energy and fuel conversion projects.

Regarding the factors affecting emission permit price fluctuations, the respondents primarily identified restrictions on the amount of emission permits eligible for banking or borrowing (69.1% and 42.9%, respectively) as significant. Expansion of third-party participation (23.2%), the strengthened role of market makers (18.9%), and the introduction of on-exchange futures trading (11.2%) were perceived as less influential. Regarding the improvement of banking, the most preferred strategy was

to abolish restrictions on banking (34.7%), which was followed by the revision of banking standards and relaxed restrictions on the amount of emission permits eligible for banking (23.6%), maintaining the existing banking standards and relaxed restrictions on the amount of emission permits eligible for banking (17.0%), and maintaining the existing banking restrictions (16.6%). The covered entities responded that, if banking restrictions were relaxed or abolished, they would secure as many emission permits as possible and carry them over to the next compliance year.

The responding entities' views on the methods of improving the selection of carbon leakage sub-sectors were also surveyed. It was found that there were more positive responses than negative ones for the use of more detailed KSIC codes (4 digits) when selecting carbon leakage sub-sectors, the selection of carbon leakage sub-sectors based on business establishment-level emissions instead of entity-level emissions, the establishment of supplementary criteria for borderline sub-sectors with emissions close to the selection threshold, and the differentiation of the proportion of free allocation based on the level of carbon leakage. However, regarding the exclusion of the average market price for emission permits when calculating the level of carbon leakage, the largest proportion of respondents stated that they were uncertain.

In terms of the possible modification of the scope of entities eligible for auctions, the option most preferred by the respondents was that auctions should be available for all covered entities (40.5%), followed by the response that auctions should be available only for entities eligible for auctions (37.1%) and that auctions should be available for all covered entities and third-parties (22.4%). Responses varied depending on whether the responding entity was eligible for auctions in Phase III. While the most preferred option for the entities currently eligible for auctions was the response that auctions should be available only for entities eligible for auctions (50.5%), followed by all covered entities (33.7%) and all covered entities and third-parties (15.8%), the most preferred option for the entities currently eligible for free allocation was the response that auctions should be available for all covered entities (44.9%), followed by entities eligible for auctions (28.5%) and all covered entities and third-parties (26.6%).

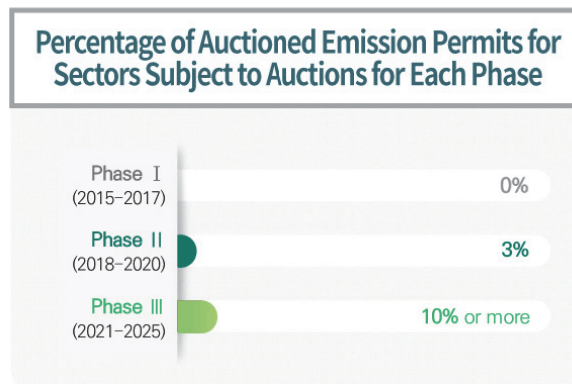
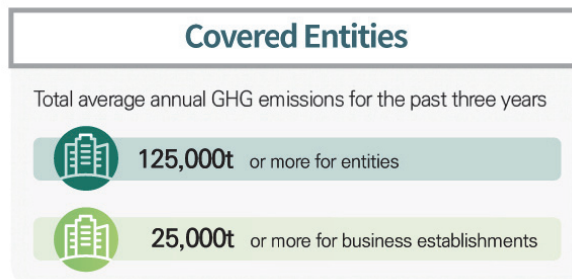
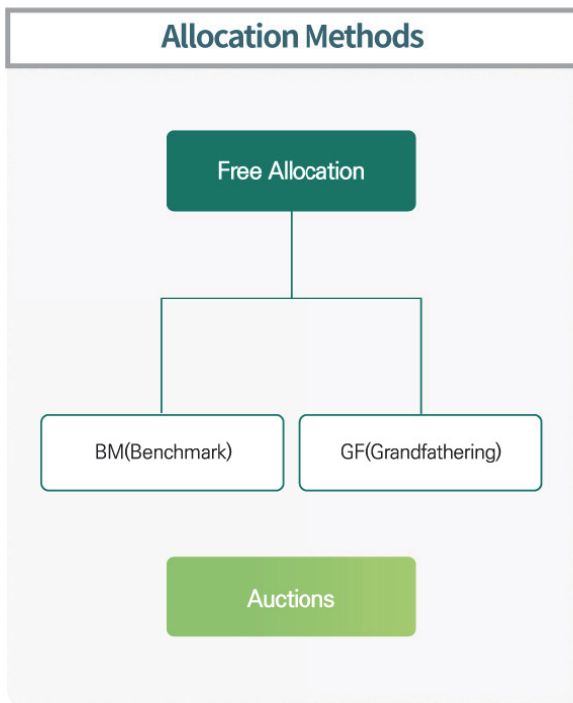
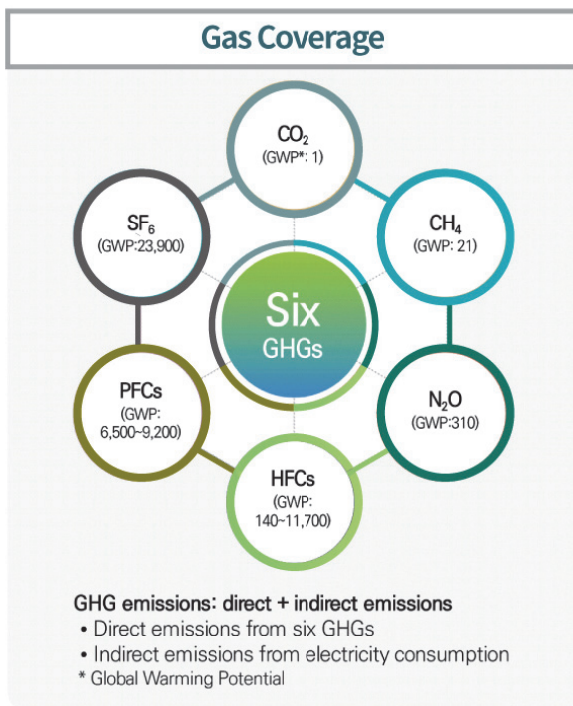
In terms of the use of the revenue generated from emission permit auctions, the responding entities stated that the revenue should be used to only support the covered entities under the K-ETS (42.1%), to provide a resource for the implementation of climate change response policies (34.7%), and to provide a resource for supporting the entities eligible for auctions (23.2%). The majority of the respondents (62.9%) stated that, in the event the revenue generated from emission permit auctions should be used to only support the covered entities under the K-ETS, the proportion of emission

allowances subject to auctions may be gradually increased.

In terms of the strategies necessary to improve the K-ETS for Phase IV, the majority of respondents emphasized the need to design an emissions trading system that reflects domestic circumstances, the provision of a clear and consistent institutional direction, restrictions on the introduction of changes to the K-ETS during a particular phase, and the establishment of a system through continuous communication with affected entities. In addition, the respondents requested the refinement of the K-ETS to reflect the characteristics of each sub-sector, including the elaboration of allocation methods for emission allowances, the specification and diversification of criteria for additional allocation of emission allowances, and the allocation of appropriate sub-sector classification codes tailored to the main products of the respective entities.

K-ETS at a Glance

1. K-ETS Overview



Reserve



Market Stabilization

Additional allocation to manage the market price and liquidity, which is deemed necessary when the price of emission permits suddenly fluctuates or the supply of emission permits falls noticeably short of demand, thus making trading between covered entities difficult, etc.

Market Making

A market maker such as a public financial institution suggests a standard price for emission permits and participates in the trading market to ensure market liquidity

Use for Other Purposes* (Power and Other)

Adjusting allocation, such as allocation to new entrants and voluntarily participating entities, additional allocation for the establishment and expansion of facilities, and additional allocation for reduction contributions

*This reserve is divided into "power" and "other" in order to ensure fairness between sectors

Flexibility Mechanisms



Offset

If a covered entity possesses or acquires GHG reduction credits generated outside the scope of business operations monitored by the K-ETS, it may convert all or part of them into emission permits, which can be used for trading or compliance

Banking

Surplus emission permits may be carried over to the next compliance year

Borrowing

If emission permits are insufficient to meet the surrender obligation, a portion of allocated emission permits may be borrowed from the next compliance year within a single phase

Calculation of the Cap

Step 1



• Calculate the average sectoral reduction targets for relevant phase

Step 2



• Calculate the sectoral emissions coverage* from the ETS for the base year

*ETS emissions coverage = average emissions of covered entities for the base year / average national emissions for the base year

Step 3



• Calculate the sectoral ETS cap* for the relevant phase

*sectoral ETS cap = average sectoral reduction targets for the relevant phase x ETS emissions coverage for the base year

Step 4



• Calculate the ETS cap for the relevant phase (i.e., summing the ETS cap for each sector)

2. K-ETS Operational Results

Number of Covered entities by Compliance year

Type	2015	2016	2017	2018	2019	2020	2021	2022
Pre-allocation & New entities	525	525	525	591	587	604	684	684
Final allocation entities	522	564	592	587	611	637	687	714
Certified entities	522	560	591	586	610	636	687	713

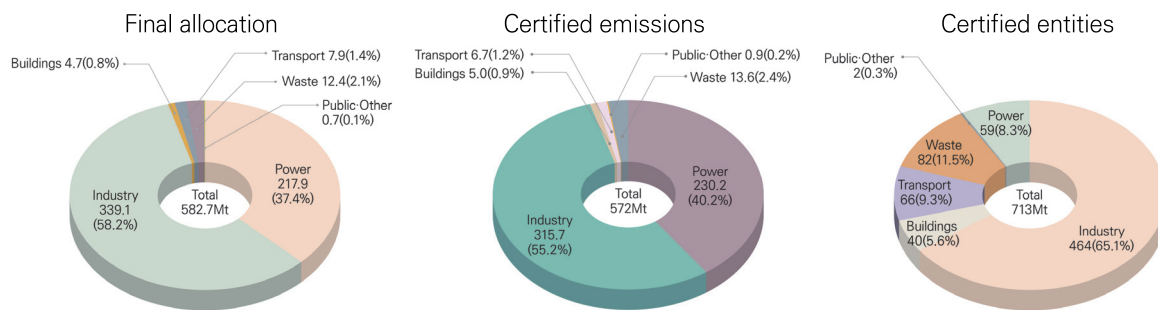
1) Pre-allocation and new entities: number of entities designated for pre-allocation and new entry allocation before the commencement of a compliance year

2) Final allocation entities*: number of entities after reflecting all changes that occur after pre-allocation and new entry allocation

3) Certified entities*: number of entities holding the obligation to surrender emission permits

* The designation of covered entities or the obligation to surrender emission permits can be canceled due to allocation revocation or mergers according to succession of rights and obligations during a compliance year

Distribution by Sector



Compliance Results

2015	2016	2017	2018	2019	2020	2021	2022
99.8%	100.0%	99.7%	99.8%	99.8%	99.8%	99.9%	100.0%
(521/522)	(560/560)	(589/591)	(585/586)	(609/610)	(635/636)	(686/687)	(713/713)

Trading Market Performance

Type	2015	2016	2017	2018	2019	2020	2021	2022
Trading volume (Mt)	5.7	12.0	26.3	47.5	38.1	44.0	54.7	39.1
Average price (KRW/t)	11,013	17,056	20,951	22,120	28,440	30,411	23,149	22,370
Payments (100 mil. KRW)	624	2,041	5,503	10,509	10,831	13,385	12,666	8,756

Contents

I . K-ETS Overview

1. Overview and Operational Direction of the K-ETS	30
--	----

2. Operation of the K-ETS	37
---------------------------	----

II . K-ETS Operational Results

1. Allocation and Emission Permits	46
------------------------------------	----

2. Certification and Surrender of Emissions Permits	59
---	----

III . Analysis of the Emissions Trading Market

1. Trading Records for 2015–2023	70
----------------------------------	----

2. Trading Records for the 2022 Compliance Year of Phase III	80
--	----

IV . Survey

1. Overview of the Survey	98
---------------------------	----

2. Views on and Response to the K-ETS	99
---------------------------------------	----

3. GHG Emission Reduction Efforts and Performance	117
---	-----

4. Improvement of the K-ETS for Phase IV	129
--	-----

Contents

List of Tables

〈Table I -1〉 Operational direction by Phase in the Master plan	31
〈Table I -2〉 National policies for GHG reductions and the K-ETS in Phase II and III	33
〈Table I -3〉 Guidelines for the K-ETS in Phase III	34
〈Table I -4〉 Total emission allowances for Phase III	38
〈Table I -5〉 Adjustment of the Deadlines for Banking, Borrowing, and Surrendering Emission Permits	40
〈Table I -6〉 Revision of the Standards for the Banking of KAU23-25	41
〈Table I -7〉 Legal grounds for the Proprietary trading in Phase III	42
〈Table I -8〉 Legal grounds and standards for the Market-Making system in Phase III	43
〈Table II -1〉 Final allocation and Entities by compliance year	46
〈Table II -2〉 Difference between Pre-allocation and final allocation for the 2022 compliance year	47
〈Table II -3〉 Number of Covered Entities under the K-ETS	49
〈Table II -4〉 Additional Allocation in the 2020-2022 Compliance Years by Sector	51
〈Table II -5〉 Allocation Revocation in the 2020-2022 Compliance Years by Sector	53
〈Table II -6〉 2022 Succession of Rights and Obligations and the Number of Relevant Entities by Sector	55
〈Table II -7〉 KAU22 Auction Volume	57
〈Table II -8〉 Final allocation by sector for the 2022 Compliance Year	58
〈Table II -9〉 Certified emissions and Entities by compliance year	59

Contents

List of Tables

〈Table II-10〉 Surrender results by sector in 2022 61

〈Table II-11〉 Projects and Certified reductions (Domestic) 63

〈Table II-12〉 Projects and Certified reductions (Overseas) 64

〈Table II-13〉 Legal grounds and standards for the Flexibility mechanisms in Phase III 67

〈Table III-1〉 Trends in trading records by trading type 72

〈Table III-2〉 Trends in trading volume by emission permit 73

〈Table III-3〉 Trends in average trading price by emission permit 74

〈Table III-4〉 Trends in payments by emission permit 75

Contents

List of Figures

〈Figure I -1〉 Schedule for the K-ETS	36
〈Figure I -2〉 Concept of total emission allowances	37
〈Figure I -3〉 Calculation for the cap for Phase III	38
〈Figure II -1〉 Final allocation by compliance year	46
〈Figure II -2〉 Free allocation and Auctions in 2022	47
〈Figure II -3〉 Final allocation by sector in 2022	47
〈Figure II -4〉 Additional Allocation and the Number of Entities Subject to Additional Allocation in the 2020-2022 Compliance Years	51
〈Figure II -5〉 Additional Allocation in the 2020-2022 Compliance Years by Sector	51
〈Figure II -6〉 Allocation Revocation and the Number of Entities Subject to Allocation Revocation in the 2020-2022 Compliance Years	53
〈Figure II -7〉 Allocation Revocation in the 2020-2022 Compliance Years by Sector	53
〈Figure II -8〉 Proportion of Emission Permits Transferred as a Result of the Succession of Rights and Obligations and the Number of Relevant Entities in the 2020-2022 Compliance Years	55
〈Figure II -9〉 2022 Succession of Rights and Obligations by Sector	55
〈Figure II -10〉 Certified emissions by compliance year	59
〈Figure II -11〉 Final allocation and Certified emissions by compliance year	60
〈Figure II -12〉 Certified emissions by sector in 2022	60
〈Figure II -13〉 Surrendered emission permits by compliance year	62

Contents

List of Figures

〈Figure II -14〉 Proportion of Certified reductions (Domestic)	63
〈Figure II -15〉 Proportion of Certified reductions (Overseas)	64
〈Figure II -16〉 KCUs converted and traded by compliance year	65
〈Figure II -17〉 Banking of emission permits by compliance year	66
〈Figure II -18〉 Borrowing of emission permits by compliance year	66
〈Figure III -1〉 Trends in the total trading volume and price by emission permits	72
〈Figure III -2〉 Total trading volume and Average trading price(KAU, KCU)	77
〈Figure III -3〉 Total trading volume and Average trading price(KOC)	78
〈Figure III -4〉 Trading price and Volume for KAU15-KAU22 in the Exchange market	79
〈Figure III -5〉 Quarterly trading volume by emission permit in the 2022 compliance year	81
〈Figure III -6〉 Quarterly trading volume of KAU22 by market type	83
〈Figure III -7〉 Number of trades and Average trading volume by market in the 2022 compliance year	84
〈Figure III -8〉 Trading volume and price for KAU22 in the Exchange market	86
〈Figure III -9〉 Trading volume and price for KAU22 in the Over-the-counter market	87
〈Figure III -10〉 Sales and Purchase Volume by Sector in the 2022 Compliance Year	88
〈Figure III -11〉 Sales and Purchases of the 10 Sub-Sectors with the Highest Certified Emissions in the 2022 Compliance Year	90
〈Figure III -12〉 Proportion of Sales and Purchases by Sub-Sector in the 2022 Compliance Year	90

List of Figures

〈Figure III-13〉 Trading volume of market makers for KAU22	92
〈Figure II-14〉 Proportion of market makers for KAU22 in the Exchange market	93
〈Figure III-15〉 Trading volume of securities companies for KAU22	95
〈Figure III-16〉 Proportion of securities companies for KAU22 in the Exchange market	95
〈Figure IV-1〉 Overall views on and response to the K-ETS	100
〈Figure IV-2〉 Impact of the K-ETS on the Business Operations of the Covered Entities	101
〈Figure IV-3〉 Performance of the Market-Making System	103
〈Figure IV-4〉 Performance of Third-Party Trading	104
〈figure IV-5〉 Expected Impact of an On-Exchange Futures Trading System	105
〈Figure IV-6〉 Forecasts for the Trading Price of Emission Permits	106
〈Figure IV-7〉 Strategies Preferred by Decision-Makers to Comply with the Obligation to Surrender Emission Permits	108
〈Figure IV-8〉 Methods for complying with the Surrender Obligation	110
〈Figure IV-9〉 Methods for Dealing with Surplus Emission Permits	112
〈Figure IV-10〉 Reasons for Choosing the Methods for Dealing with Surplus Emission Permits	113
〈Figure IV-11〉 Participation in Emissions Trading	115
〈Figure IV-12〉 Methods for Trading Emission Permits in Phase III	116
〈Figure IV-13〉 Impact of Participation in the K-ETS on GHG Emission Reduction Activities	118

List of Figures

〈Figure IV-14〉 Impact of Participation in the K-ETS on Investment in GHG Emission Reduction	120
〈Figure IV-15〉 Implementation of Internal Reduction Activities during Phase III	122
〈Figure IV-16〉 Types of internal Emission Reduction Activities in Progress/Planned for Phase III and Allocated Budget	123
〈Figure IV-17〉 Implementation of External Reduction Activities during Phase III	125
〈Figure IV-18〉 Categories of External Reduction Activities in Progress/Planned for Phase III and Reasons for Implementing them	126
〈Figure IV-19〉 Types of External Reduction Activities in Progress/Planned for phase III and Allocated Budget	127
〈Figure IV-20〉 Factors Hindering GHG Emission Reduction Activities	128
〈Figure IV-21〉 Structural Factors Affecting the Stabilization of Emission Permits Prices	129
〈Figure IV-22〉 Improvement of Market Stabilization Measures	131
〈Figure IV-23〉 Improvement of Banking and the Use of Emission Permits upon the Abolition(Relaxation) of Banking Restrictions	133
〈Figure IV-24〉 Improvement of the Selection of Carbon Leakage Sub-Sectors	134
〈Figure IV-25〉 Scope of Participation in Auctions	136
〈Figure IV-26〉 Utilization of the Revenue Generated from Auctions	138
〈Figure IV-27〉 view on the Gradual increase in the proportion of emission allowances subject to auctions	140

2023

KOREAN EMISSIONS TRADING SYSTEM REPORT

I

K-ETS Overview

1. Overview and Operational Direction of the K-ETS
2. Operation of the K-ETS

1.1 Overview

An emissions trading system is a market-based greenhouse gas (hereafter “GHG”) reduction scheme in which the government sets an emissions cap and allocates annual emission allowances to entities emitting more than a certain amount of GHGs so that they can emit GHGs up to the limit set by the emission allowances they hold. If a covered entity emits a lower amount of GHGs than the emission permits it secures, it can sell the surplus through market transactions. Conversely, if a covered entity emits a higher amount of GHGs than its emission permits allow, it can make up the deficit through auctions or market transactions. In this sense, the emissions trading system is more cost-effective than direct regulation in terms of reducing GHG emissions.

The Korean Emissions Trading System (hereafter “K-ETS”) was launched in 2015, with its legal basis established in 2012 through the enactment of the Act on the Allocation and Trading of Greenhouse-Gas Emission Permits (May 2012) (hereafter “the Act”) and the associated Enforcement Decree of the Act (November 2012) (hereafter “the Enforcement Decree”), followed by the establishment of the Master Plan for the Emissions Trading System (January 2014), the Allocation Plan for Phase I (2015–2017) (September 2014) and relevant guidelines, which stated the total emission allowances that were connected with Korea’s Nationally Determined Contribution (hereafter “NDC”) and provided details of the operation of the K-ETS.

► Summary of the K-ETS Operational Results for the First Compliance Year of Phase III (2021)

In 2021, which was the first compliance year of Phase III, a total of 584.8 Mt of emission allowances (570.1 Mt from free allocation and 14.7 Mt from auctioned allowances) were allocated to 687 entities from 69 sub-sectors. The final amount of certified emissions at the end of the 2021 compliance year was 591.0 Mt from 687 entities, which was 6.6% higher than the previous year (554.4 Mt from 636 entities). The total amount of KAU21 traded through the exchange and over-the-counter (hereafter “OTC”) markets, including auctions, from January 2021 to August 2022 was 36.4 Mt. The final amount of emission permits surrendered by covered entities to the government at the end of the 2021 compliance year was 591.0 Mt from 686 entities (583.1 Mt of KAUs and 7.9 Mt of KCUs). Penalties were imposed on one covered entity that failed to meet the obligation to surrender its emission permits (49 kt). In addition, after the surrender for 2021, 20.9 Mt of emission permits were carried over to the next compliance year (2022).

〈Table I -1〉 Operational direction by Phase in the Master plan

Type	Phase I (2015~2017)	Phase II (2018~2020)	Phase III (2021~2025)
Main Objectives	• Acquire experience and stabilize the K-ETS	• Substantially reduce GHG emissions	• Promote effective reductions
Operations	• Improve flexibility e.g., the ratio of offset credits, etc. • Establish necessary infrastructure for accurate Monitoring, Reporting, and Verification (MRV)	• Expand the applicable scope and raise the targets • Develop various standards, e.g., emissions reporting, verification, etc.	• Reinforce the cap based on the Roadmap • Expand market functions by strengthening the functions of market makers, introducing derivatives in the exchange, etc.
Allocation	• Allocate all emission permits free-of-charge • Apply lessons learned from the GHG and Energy Target Management System	• Introduce auctions • Develop allocation methods, e.g., benchmarking, etc.	• Improve the criteria for selecting sub-sectors eligible for free allocation and expand the ratio of auctions • Expand the use of benchmarking for allocation

For Phase II (2018–2020), the government expanded the scope of the K-ETS and adjusted specific emission reduction targets to be consistent with Korea’s NDC in order to raise emission reduction targets so that they were higher than the level achieved in Phase I and gradually increase the size of the reduction in GHG emissions by covered entities. To this end, in 2017, the government prepared the Master Plan for the Emissions Trading System for Phase II (January 2017) to establish the basic direction for the K-ETS during Phase II and the Allocation Plan for Phase II: Step 1 (2018–2020) (December 2017) to establish detailed regulations for the K-ETS, including the cap.

In 2018, an amendment to the Basic Roadmap for Achieving 2030 National GHG Reduction Targets (July 2018) (hereafter “the amended Roadmap”) was completed, and the government subsequently announced the Allocation Plan for Phase II: Step 2 (2018–2020) (July 2018), which reflected the amended Roadmap and added further detailed standards, such as total emission allowances (1,796.1 Mt) and standards for auctions and benchmark-based allocations.

An imbalance in the supply and demand for emission permits arose during Phase II as a result of surplus emission permits not being traded due to unrestricted permission for the banking of surplus emission permits. In order to solve this problem, in June 2019, the government amended the Allocation Plan for Phase II: Step 2 (2018–2020) and introduced new criteria for the banking of emission permits.

In December 2019, the government prepared the Master Plan for the Emissions Trading System for Phase III, which aimed to pave the way for the achievement of Korea's NDC. The Master Plan established strategies to further develop allocation methods, substantially reduce GHG emissions, and expand market functions in order to strengthen the efficacy of the K-ETS. In addition, the Allocation Plan for Phase III (2021–2025) (September 2020), which contained detailed standards such as total emission allowances (3,082.3 Mt), standards for free allocations and auctions, and benchmark-based allocations was established for the implementation of these strategies.

In October 2021, the government announced the updated NDC, under which the country has set an enhanced target of reducing its total national GHG emissions by 40% from the 2018 level by 2030, with the aim of achieving the goal of carbon neutrality.⁵⁾ The enhanced NDC was adopted in close consideration of the purpose of Korea's carbon neutrality policy and its role as a member of the international community.

Phase III of the K-ETS commenced in 2021. The K-ETS, which was developed with the goal of establishing a stable system in Phase I and reducing national GHG emissions significantly in Phase II, has played a pivotal role in achieving Korea's NDC. Institutional improvements, such as the revitalization of the emissions trading market, improvement of allocation methods, and adjustment of the emissions cap, are required to efficiently support the achievement of the enhanced NDC.

5) The Framework Act on Carbon Neutrality and Green Growth for Coping with Climate Crisis stipulates the government shall set the target of reducing national GHG emissions by a minimum of 35% from the 2018 level by 2030 (Art. 8(1)). The amount of GHG emissions in 2018 was 727.6 Mt, and the target amount of GHG emissions for 2030 is 436.6 Mt.

〈Table I -2〉 National policies for GHG reductions and the K-ETS in Phase II and III

Type		Phase II (2018~2020)	Phase III (2021~2025)
National policies for GHG reductions	Reduction target	• Reduction by 37% from BAU (Business-as-usual) levels in 2030 (Jun. 2015)	• Reduction by 40% of the total GHG emissions in 2018 by 2030 (Oct. 2021)
	Sectoral plan	• Basic roadmap for achieving 2030 national GHG reduction targets (Dec. 2016)	• Amendment to the basic roadmap for achieving 2030 national GHG reduction targets (Jul. 2018)
GHG Emissions Trading System	Master plan	• Master plan for the Emissions Trading System for Phase II (Jan. 2017)	• Master plan for the Emissions Trading System for Phase III (Dec. 2019)
	Allocation plan	• Allocation Plan for Phase II: – Step 1 (Dec. 2017) ¹⁾ – Step 2 (Jul. 2018) ²⁾ – Step 2 amended (Jun. 2019) ³⁾	• Allocation plan for Phase III (Sep. 2020) ⁴⁾ – Amended (Dec. 2023) ⁵⁾

1) Details on the allocation for Phase II, and the cap (538.5 Mt) for the first compliance year (2018) and reserve (14.0 Mt) are specified.

※ It was decided that the cap for Phase II would be determined in the Allocation Plan for Phase II: Step 2, taking into consideration the national policies including the amended Roadmap (2018). The amount of emissions allowances for 2018 (Allocation Plan Step 1) would be maintained and guaranteed after the amount of emissions allowances for the Allocation Plan Step 2 was determined, however, the emission permits for 2019 would be adjusted if those for '18 increased or decreased.

2) Details for Phase II, such as the cap (1,777.1 Mt), total emissions allowances (1,796.1 Mt), and standards for auctions and benchmark-based allocation were added and specified.

3) Standards for the banking of emission permits across compliance years within Phase II and etc. were revised.

4) Details on the allocations for Phase III and the cap (3,048 Mt) and reserve (34.0 Mt) were specified.

5) The cap for Phase III was adjusted (increased by 12.7 Mt) following the update of Korea's NDC, and the standards for the banking and offsetting of emission permits, etc. were revised for the revitalization of the emissions trading market.

〈Table I -3〉 Guidelines for the K-ETS in Phase III

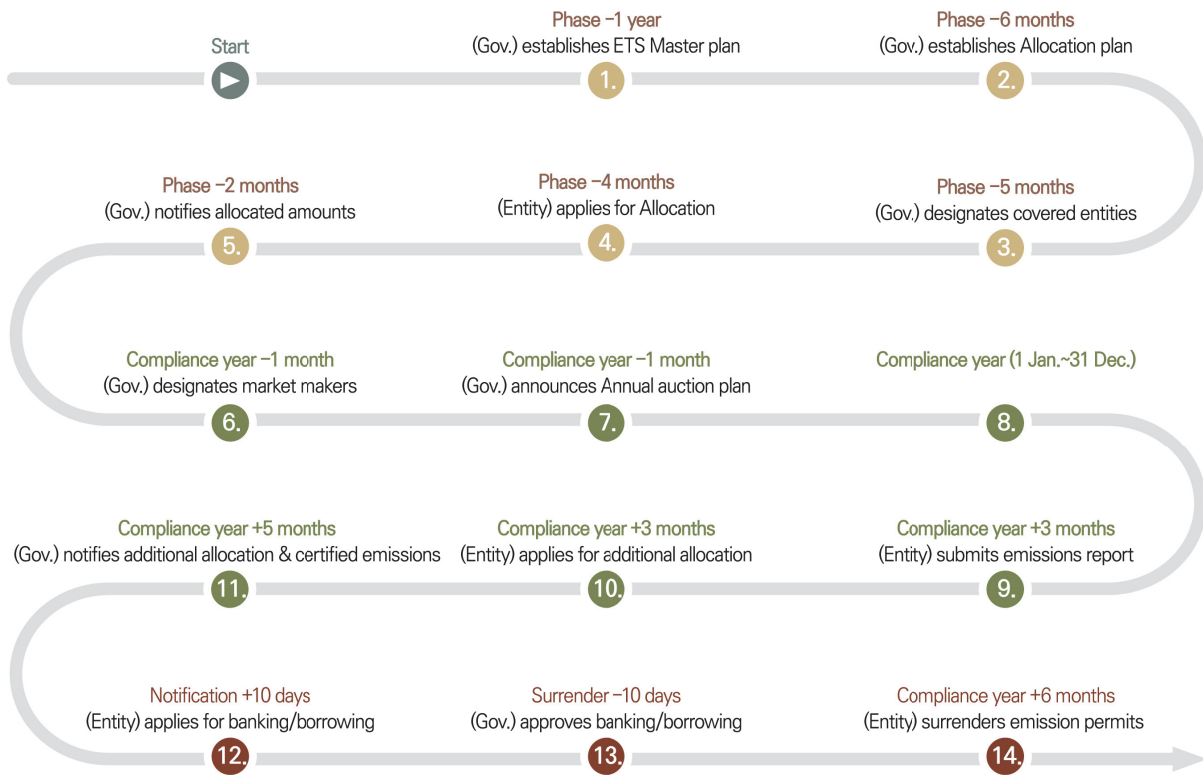
Type	Guidelines
Allocation· Revocation	• Guidelines for the Allocation and allocation revocation of GHG emission permits (Ministry of Environment, partially amended in January 2023)
Reporting· Certification	• Guidelines for the Reporting and certification of emissions under the GHG Emissions Trading System (Ministry of Environment, partially amended in September 2023)
Verification	• Guidelines for the Verification for the operations of the GHG Emissions Trading System (Ministry of Environment, partially amended in June 2021)
Emissions Trading	• Regulations for the Additional allocation of emission permits for auctions and market stabilization measures (Ministry of Environment, partially amended in March 2023) • Notification on GHG emission permits trading (Ministry of Environment, partially amended in May 2018) • Notification on Qualifications and evaluation standards for an emission permits exchange (Ministry of Environment, partially amended in May '18) • Notification on the Supervision of an emission permits exchange (Ministry of Environment, partially amended in May 2018) • Notification on the Designation and operations of market makers in the emission permits trading market (Ministry of Environment, partially amended January 2021) • Notification on Emissions trade brokerage companies (Ministry of Environment, newly enacted in October 2021)
Offset mechanisms	• Guidelines for the Feasibility Assessment of Offset Projects and the Certification of Reductions (Ministry of Environment, partially amended in November 2023)

1.2. Operating Process for the K-ETS

Covered entities that receive allocated emission allowances in accordance with the allocation plans must prepare a GHG Emissions and Energy Usage Report (hereafter “emissions report”) by compiling their GHG emission activities undertaken during the relevant compliance year (1 January–31 December). This report must be verified by an external verification institution and submitted to the government together with a verification report from the verification institution. The government then evaluates the amount of GHG emissions specified in the report and certifies the emissions.

Covered entities must surrender their emission permits to the government in an amount equivalent to the amount of certified emissions within eight months from the date of completion of each compliance year. In the event that the amount of emission permits held by a covered entity is insufficient, the covered entity may, before surrendering its emission permits, make up for the deficit by purchasing emission permits from the market or by using carried-over or borrowed emission permits, while, if the amount of emission permits exceeds the amount of certified emissions, they can sell the surplus. Covered entities from sub-sectors eligible for auctions can also participate in auctions. The law-based operating schedule for the K-ETS is presented in <Figure I-1>.⁶⁾

6) The amount of certified emissions, which serves as the basis for determining the amount of emission permits to be surrendered, is assessed for each compliance year (1 Jan.–31 Dec.). However, emission permits for free allocation are registered to the relevant entities’ account before the commencement of a compliance year, and these emission permits can be traded from the date of registration until the date of surrender (exchange trading is possible after the listing of tradable permits on the KRX).



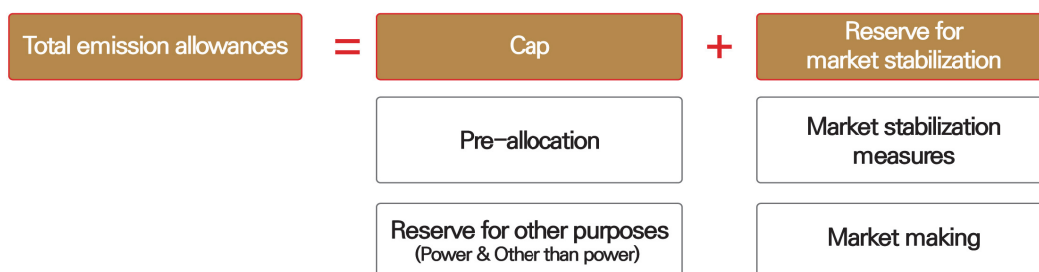
〈Figure I -1〉 Schedule for the K-ETS

2

Operation of the K-ETS

1.1 Cap

The cap is the total amount of GHG emissions that all covered entities are allowed to emit during a phase, and this is managed by the K-ETS as the emissions target. In addition to the cap, a separate reserve is established, and the sum of the two is the total emission allowances. The reserve is divided according to three purposes: (i) market stabilization measures, (ii) market-making and liquidity management, and (iii) other purposes (power and those other than power).⁷⁾ The reserve for market stabilization measures and the reserve for market-making and liquidity management operate separately from the cap, whereas the reserve for other purposes is included in the cap.



〈Figure I -2〉 Concept of total emission allowances

The cap is established based on the Basic Roadmap for Achieving National GHG Reduction Targets as provided under Article 5(1) of the Act. The method of calculation used to establish the cap for Phase III is illustrated in 〈Figure I-3〉.

7) Taking into consideration of factors such as the scale of GHG emissions and differences in the application criteria for the additional allocation of emission permits, the reserve allocated to other purposes is divided into those related to power and those that are non-power-related.

Step 1	Calculate the average sectoral GHG reduction targets (based on the Roadmap for the Updated NDC (2023)) for Phase III (2021~2025)
Step 2	Calculate the sectoral emissions coverage from the ETS* for the base years (2017~2019) * ETS emissions coverage = average emissions of the covered entities (2017~2019) / average national emissions (2017~2019)
Step 3	Calculate the sectoral ETS cap* for Phase III (2021~2025) * Sectoral ETS cap (2021~2025) = average sectoral reduction targets (2021~2025) × ETS emissions coverage (2017~2019)
Step 4	Calculate the overall ETS cap for Phase III (2021~2025) (i.e., summing the cap for each sector)

〈Figure I -3〉 Calculation for the cap for Phase III

〈Table I -4〉 Total emission allowances for Phase III

(Unit : Mt)

Type			2021	2022	2023	2024	2025	Total amount
Total emissions allowances			–	–	–	–	–	3,069.5
Reserve	Market stabilization measures ¹⁾		–	–	–	–	–	14.0
	Market making ²⁾		–	–	–	–	–	20.0
	Other purposes ³⁾	Power	–	–	–	–	–	69.8
		Other than power	–	–	–	–	–	63.6
Pre-allocation			589.3	589.3	589.3	567.1	567.1	2,902.1
Power sector ⁴⁾	Power in general		215.1	215.1	215.1	197.9	197.9	1,041.1
	Other power-related		5.0	5.0	5.0	4.7	4.7	24.6
	Integrated energy supply (Industrial)		14.9	14.9	14.9	14.3	14.3	73.3
Industry sector			328.5	328.5	328.5	325.4	325.4	1,636.3
Buildings sector			4.8	4.8	4.8	4.7	4.7	23.7
Transport sector			8.3	8.3	8.3	8.0	8.0	41.0
Waste sector			12.0	12.0	12.0	11.3	11.3	58.5
Public services/Other sectors			0.77	0.77	0.77	0.74	0.74	3.8

- 1) This reserve is utilized for the additional allocation of emission permits for the stabilization of prices, etc., in case of the following abnormalities in the emissions trading market (Art. 18, subpara. 3 and Art. 23(1) of the Act; Art. 38 of the Enforcement Decree):
- If the price of emission permits is, for six consecutive months, at least three times higher than the average price for the immediately preceding two years;
 - If the average trading volume in the previous month is at least twice as high as the monthly average trading volume in the same month in the immediately preceding two years, and the average emission permit price in the previous month is at least twice as high as the average price in the immediately preceding two years;
 - If the average price of emission permits in the previous month does not exceed 60% of the average price in the immediately preceding two years;
 - If the trading of emission permits between covered entities is impracticable because the supply of emission permits tradable in

the market is significantly short of the amount demanded due to reasons such as covered entities' not trading emission permits in their possession.

- 2) This reserve is utilized by market makers, such as public financial institutions, to revitalize the emissions trading market (Art. 18, subpara. 2 and Art. 22-2 of the Act).
- 3) This reserve is utilized for the additional allocation of emission permits in the case of increased GHG emissions due to the opening of new business establishments, the establishment or expansion of facilities within a business establishment, a covered entity's compliance with its obligations under other laws,* or the covered entity's engagement in activities contributing to the achievement of the NDC** (Art. 16(1) of the Act); for the allocation of emission permits to new entrants that are newly designated as covered entities during a phase (Art. 30, subpara. 1 of the Enforcement Decree); and for the processing of objections to pre-allocation, additional allocation, and the revocation of emission permits (Art. 18, subpara. 4 of the Act).

*Constrained-on generation under Article 45(2) of the Electric Utility Act, observance of the obligation to supply integrated energy under Article 16(1) of the Integrated Energy Supply Act, additional flight operations to observe the flight technology standards under Article 77 of the Aviation Safety Act, and facility construction to comply with stronger effluent water quality standards under Article 7 of the Sewerage Act.

**Observance of measures implemented for the expansion of public transportation and transport of large and heavy cargo, and the use of combustible waste instead of fossil fuel.

- 4) In principle, the cap is established for each sector but, in the power sector, sub-sector-specific (power in general, other power-related, and integrated energy supply(industrial)) caps were established as an exception for some sub-sectors/entities/business establishments* with different GHG emission characteristics.

*Entities belonging to the "electric power generation, transmission, and distribution" (KSIC Code: 351) that mainly use hydropower or nuclear power for power generation, or whose main business is power transmission/substation/distribution, or natural gas terminals; entities belonging to the "manufacture of gas and distribution of gaseous fuel through the mains" (KSIC Code: 352); and entities engaged in integrated energy supply (industrial/residential) belonging to the "steam, chilled, or hot water and air conditioning supply" (KSIC Code: 353).

* Source : Allocation Plan for Phase III (2021-2025) (December 2023)

With the finalization of the First National Master Plan for Carbon Neutrality and Green Growth (April 2023), which contains the sectoral and annual emissions reduction roadmap aimed at achieving the updated NDC, the government reviewed measures to adjust the cap so that it aligns with the updated NDC and the roadmap. According to the new reduction roadmap, the required adjustment amount for the cap was 12.7 Mt and, because there was a surplus in the reserve for other purposes, the government decided to use the reserve to adjust the cap and ensure its consistency with the updated NDC.

1.2. Revitalization of the Emissions Trading Market

In the 2022 compliance year, institutional improvements were made including the adjustment of the deadline for banking, borrowing, and surrendering emission permits, revision of the standards for the banking of emission permits, changes to the deadline for converting KOCs, and the expansion of market makers and securities companies.

1.2.1. Adjustment of the Deadlines for Banking, Borrowing, and Surrendering Emission Permits

Since the commencement of Phase III, companies with surplus emission permits tended to sell these emission permits intensively as the deadline to apply for banking emission permits approached, while companies intending to purchase emission permits tended to delay purchase until the deadline to surrender their emission permits was imminent. In response, the government unified the deadlines for banking, borrowing, and surrendering emission permits for the 2022 compliance year to 31 August to alleviate emission permit price volatility and promote smooth trading in the emissions trading market.

〈Table 1-5〉 Adjustment of the Deadlines for Banking, Borrowing, and Surrendering Emission Permits

Current Provisions	Draft Amendment
Banking and Borrowing (Art. 28 of the Act and Art. 46 of the Enforcement Decree)	
① Within 10 days from the date when the amount of certified emissions was notified ② Within 10 days from the date when the covered entity was notified of the results of the processing of the objection it has filed (applicable to covered entities that have filed an objection) ③ Within 10 days from the end of five months after the end of each compliance year (applicable to entities other than covered entities)	① Within eight months from the end of each compliance year (applicable to all market participants)
Surrender (Art. 27 of the Act and Art. 44 of the Enforcement Decree)	
① Within six months from the end of each compliance year ② Within 10 days from the date when the covered entity was notified of the results of the processing of the objection it has filed (applicable to covered entities that have filed an objection)	① Within eight months from the end of each compliance year (applicable to all covered entities)

1.2.2. Revision of the Standards for the Banking of Emission Permits and Conversion of KOCs

Restrictions on the banking of emission permits were introduced and continuously strengthened to address the issue of illiquidity and instability in the emissions trading market. However, as these restrictions have been identified as a factor exacerbating the price volatility of emission permits, the government decided to relax the banking standards to resolve the supply-demand imbalance in the emissions trading market and ensure flexibility for entities in emissions reduction.

〈Table I -6〉 Revision of the Standards for the Banking of KAU23-25

Current Provisions	Draft Amendment
Net Sellers	
KAU23 net sales x 1	KAU23 net sales x 3
KAU24 net sales x 1	KAU24 net sales x 3
KAU25 average annual net sales for Phase III x 1	KAU25 net sales x 3
Net Buyers	
Banking not allowed	Banking allowed – All unused emission permits (emission allowances allocated free-of-charge < amount of emissions) – To prevent circumvention of banking using swap trading, banking will not be allowed for swapped emission permits

※ Third-party participants such as emissions trade brokerage companies are allowed to carry over emission permits provided that the amount of emission permits carried over does not exceed the amount of emission permits they are allowed to hold.

In addition, starting from Phase III, the government introduced a mandatory deadline for the conversion of KOCs to KCUs (within two years from the date of certification of KOCs) to encourage conversion of KOCs to KCUs. However, obligating the conversion and trading of KOCs in such a short period of time was found to have exacerbated the supply-demand imbalance in the emissions trading market and hindered investment in emissions reduction. As a result, the government has revised the mandatory conversion deadline for KOCs to five years to encourage investment in GHG emissions reduction and minimize market disruption.

1.2.3. Expansion of Market Makers and Securities Companies

In accordance with Article 22-2 of the Act, the government introduced the market-making system in Phase II to revitalize emissions trading and ensure the stable operation of the emissions trading market. Under this system, market makers are obligated to engage in emissions trading in the exchange market using emission permits they borrow from the government, which lends emission permits from the reserve for market-making for the respective compliance year. In the 2022 compliance year, two additional financial institutions were designated as market makers, and accordingly, a total of seven market makers are currently participating in the emissions trading market. The maximum amount of emission permits provided for market makers has continuously increased and has reached 6 Mt.

One of the most significant changes in the K-ETS during Phase III is the introduction of third-party trading. To ensure the transparency and revitalization of the emissions trading market and stabilize emission permit prices, the government introduced proprietary trading by securities companies in September 2021. As of the 2022 compliance year, 21 securities companies were participating in the exchange market. The amount of emissions permits each securities company may hold has continuously increased since the launch of the system, and today, each securities company may hold a maximum of 1 Mt.⁸⁾

〈Table I -7〉 Legal grounds for the Proprietary trading in Phase III

Type	Legal grounds	Details
Definition	Art. 22 of the Act Art. 36 of the Enforcement Decree	• Matters necessary for emissions trade brokerage companies – A emissions trade brokerage company is an investment broker that simultaneously brokers transactions of emission permits for multiple parties through an information and communications network or an information processing system
Consultative body	Art. 3 of the Notification	• A consultative body in which emissions trade brokerage companies participate may be organized to consult on institutional improvements related to the brokerage of emissions trades and to discuss policy proposals, etc.
Facility criteria	Art. 2 and Annex of the Notification	• Facilities for data processing, communication, security, and etc. that brokerage companies must maintain are stipulated

Source: Act on the Allocation and Trading of Greenhouse-Gas Emission Permits and its Enforcement Decree (Ministry of Environment, Ministry of Economy and Finance, and Office for Government Policy Coordination; amended on 24 September 2021 and 12 December 2023, respectively due to the revision of another statute).
Notification on Emissions Trade Brokerage Companies (Ministry of Environment, enacted on 19 October 2021).

8) Enforcement Rules for the Regulations on the Emissions Trading Market Operation (amended on 27 Jun. 2023).

〈Table I -8〉 Legal grounds and standards for the Market-Making system in Phase III

Type	Legal Grounds	Methods and Standards
Purpose	Art. 22-2 of the Act Art. 37 of the Enforcement Decree	- The competent authority designates market makers to ensure the stable operation of the emissions trading market by revitalizing emissions trading, and the designated market makers engage in the following tasks: - Suggest asking and bidding prices for emission permits and trade emission permits.
Designation	Art. 3 of the Notification	- Any entity that intends to be designated as a market maker must submit an application to the Minister of Environment no later than three months before the commencement of each compliance year (or, if a market maker must be designated during a compliance year, no later than two months before the date set by the Minister of Environment on which the market-making tasks commence). - The effective period for the designation of a market maker must be one year from the date of designation. However, if a market maker is designated during a compliance year, the effective period may be extended until 31 December of the following compliance year.
Assessment	Art. 22-2 of the Act Art. 37 of the Enforcement Decree Arts. 5 and 6 of the Notification	- Market makers are required to deliver to the competent authority monthly reports on their performance and the competent authority evaluates these reports, which contain the following information: - The amount of emission permits retained and traded by emission type. - The number and volume of transactions undertaken at the asking and bidding prices, the time of submission for the asking and bidding prices, the price range between the asking and bidding prices, etc.
Lending and Return	Art. 7 of the Notification	- Market makers may rent all or part of the emission permits necessary for market-making from the reserve for market-making, and the competent authority may lend emission permits in different amounts taking into consideration the results of the performance assessment. - Market makers must return borrowed emission permits in the form of emission permits or equivalent cash at the end of the lending period.

Source: Act on the Allocation and Trading of Greenhouse-Gas Emission Permits and its Enforcement Decree (Ministry of Environment, Ministry of Economy and Finance, and Office for Government Policy Coordination; amended on 24 September 2021 and 12 December 2022, respectively due to the revision of another statute).
Notification on the Designation and Operations of Market Makers in the Emissions Trading Market (Ministry of Environment; partially amended on 15 January 2021).

II

K-ETS Operational Results

1. Allocation of Emission Permits
2. Certification and Surrender of Emissions Permits

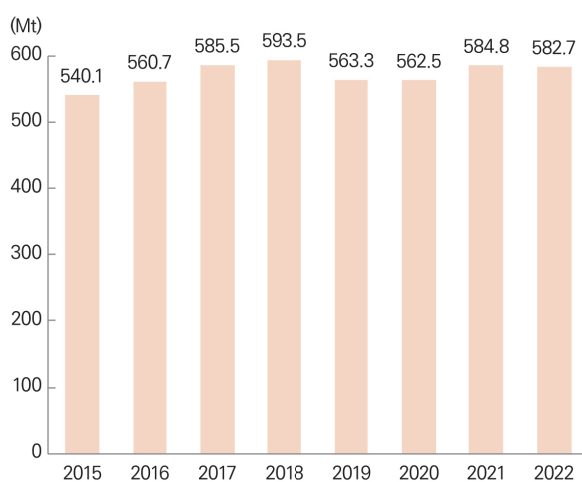
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Allocation of Emission Permits

When entities designated as covered entities submit their allocation application to the government four months prior to the commencement of a phase, the government issues a notification of the allocated amount, which is referred to as the pre-allocation amount. From 2021, with the commencement of Phase III, the proportion of auctionable allowances was raised, with 10% of the total allocation for covered entities eligible for auctions deducted and set aside for purchase through auctions in the emissions trading market.

In the 2022 compliance year, the amount of emission permits set for pre-allocation was 567.4 Mt, while the final allocation amount, which reflected a number of changes that occurred during the compliance year (e.g., additional allocation, allocation revocation, and the succession of rights and obligations), was 582.7 Mt (714 entities). In 2021, which was the first compliance year of Phase III, the final allocation amount increased by 4.0% compared to the previous year due to the expansion of covered entities and emission activities subject to management under the K-ETS. The final allocation amount for the 2022 compliance year decreased by 0.4% compared to the previous year, which was due to an increase in the amount of emission permits whose allocation was revoked, which led to a decrease in the amount of allocation changes after the pre-allocation of emission allowances.

〈Figure II-1〉 Final allocation by compliance year



〈Table II-1〉 Final allocation and Entities by compliance year

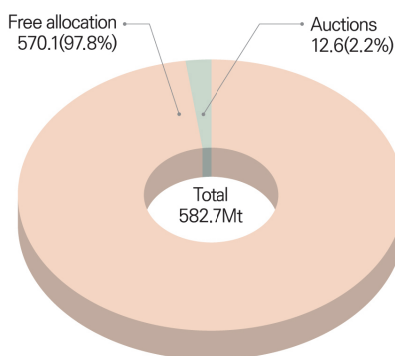
(Unit : Mt)

Phase	Year	Final allocation	Annual change	Entities
I	2015	540.1	–	522
	2016	560.7	3.8%	564
	2017	585.5	4.4%	592
II	2018	593.5	1.4%	587
	2019	563.3	–5.1%	611
	2020	562.5	–0.2%	637
III	2021	584.8	4.0%	687
	2022	582.7	–0.4%	714

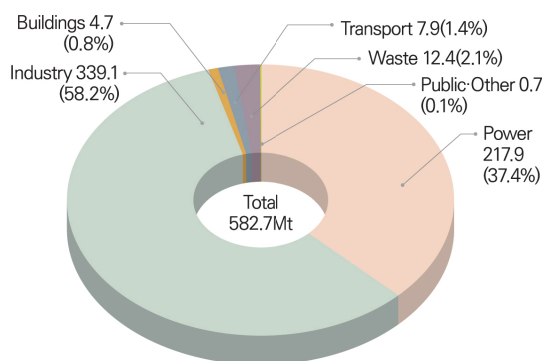
(Source) ETRS Database (as of Sep. 2023)

For the 2022 compliance year, as in the previous year, 567.4 Mt of emission allowances were originally pre-allocated to 684 entities, but the number of entities increased to 714 due to new entries and the succession of rights and obligations between existing covered entities (some businesses that took over the rights and obligations of existing covered entities as a result of, for example, the splitting of covered entities, were newly designated as covered entities). Broken down by sector, the final allocation was 339.1 Mt for industry (58.2%), 217.9 Mt for power (37.4%), 12.4 Mt for waste (2.1%), 7.9 Mt for transport (1.4%), 4.7 Mt for buildings (0.8%), and 0.7 Mt for public services/other (0.1%).

The difference between the final allocation and pre-allocation amount was higher for the buildings and waste sectors (6.7% and 3.7%, respectively) than for other sectors (3.1% for industry, 2.7% for transport, and 1.6% for power).



〈Figure II-2〉 Free allocation and Auctions in 2022



〈Figure II-3〉 Final allocation by sector in 2022

〈Table II-2〉 Difference between Pre-allocation and final allocation for the 2022 compliance year

(Unit : Mt)

Sector	Pre-allocation	Final allocation	Change
Total	567.4	584.8	3.1%
Power	214.4	224.7	4.8%
Industry	328.2	334.9	2.0%
Buildings	4.4	4.7	6.6%
Transport	7.7	7.6	-2.0%
Waste	12.0	12.2	1.6%
Public/Other	0.7	0.7	0.0%

1.1. Designation of Covered Entities

According to Article 8 of the Act, entities whose annual average amount of GHG emissions produced during the immediately preceding three years is no less than 125,000 t CO₂eq or entities with at least one business establishment whose annual average amount of GHG emissions produced during the immediately preceding three years is no less than 25,000 t CO₂eq are designated as covered entities. The number of covered entities for Phases I–III is as shown in <Table II–4>.

The government must, pursuant to Article 8 of the Act, designate covered entities by no later than five months prior to the commencement of each phase. In addition, the government designates entities that fall under the application of Article 8 during a phase as a result of the establishment, alteration, or expansion of their facilities as “new entrants,” evaluates their application for emission permit allocation, and notifies them of the pre-allocated amount.

The number of covered entities for each phase or compliance year may change when new covered entities are designated or designations are canceled following new entries, allocation revocation, or the succession of rights and obligations. In the 2022 compliance year, the number of entities subject to the pre-allocation of emission permits was 684, while the number of covered entities subject to final allocation was 714.

〈Table II-3〉 Number of Covered Entities under the K-ETS

Phase	Compliance year	Pre-allocation	New entry	Additional allocation	Allocation revocation	Succession of Rights and Obligations		Re-allocation ¹⁾	Free allocation	Auction ²⁾	Final allocation	Certified emissions ³⁾
						Transfer	Acquisition					
I	2015	525	–	63	211	23	24	–	522	–	522	522
	2016	525	44	161	249	35	36	–	564	–	564	560
	2017	525	78	337	269	56	54	434	592	–	592	591
II	2018	591	–	242	224	17	19	–	587	116	587	586
	2019	587	18	266	250	39	46	–	611	125	611	610
	2020	604	21	232	300	64	72	–	637	136	637	636
III	2021	684	–	220	166	33	34	–	687	192	687	687
	2022	684	22	253	225	52	54	–	714	204	714	713

1) Considering the reduction targets for 2030 and the means of reduction presented in the Basic Roadmap for Achieving 2030 National GHG Reduction Targets established in December 2016, the total emissions allowances were recalculated and reallocated for the 2017 compliance year

(Source: the draft amendment to the Allocation Plan for the Third Compliance Year of Phase I (January 2017))

2) Number of covered entities from sub-sectors eligible for auctions

3) Number of entities holding the obligation to surrender emission permits, excluding entities that merged due to the transfer of rights and obligations

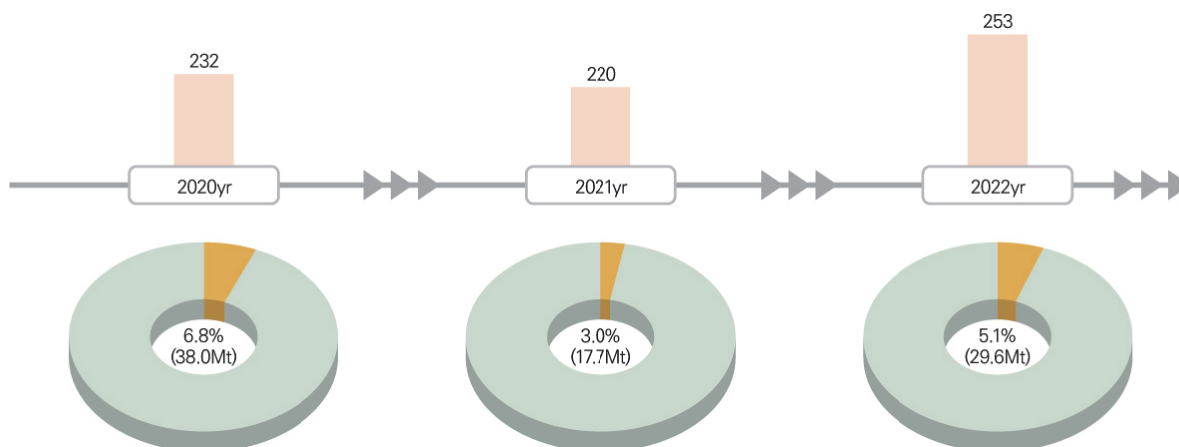
1.2. Additional Allocation

According to Article 16 of the Act, in the event that the amount of GHG emissions increases in a compliance year for reasons such as the opening of a business establishment or the establishment or expansion of facilities within a business establishment, or in the event the amount of GHG emissions of a covered entity increases due to the covered entity's compliance with obligations under other laws or engagement in activities contributing to the achievement of national GHG reduction targets during a phase, the government may additionally allocate emission allowances to the covered entity.

In the 2022 compliance year, additional allocation of 29.6 Mt was approved for 253 covered entities. Over the past three years, the proportion of additional allocation in relation to the final allocation has fluctuated (Figure II-4). During Phase III, it decreased in the 2021 compliance year by 3.8%p compared to the previous year and increased by 2.1%p in 2022. The two main reasons for this increase in additional allocation appear to be (i) the significant increase in additional allocation in the power and industry sectors compared to the previous year for reasons such as constrained-on generation and new facility construction, and (ii) the expansion of additional allocation for high GHG efficiency facilities following the adoption of the improvement plan for the K-ETS (November 2022).⁹⁾

The reasons for the covered entities applying for additional allocation were similar to those suggested in other compliance years, which included the establishment of new facilities (45.9%), the expansion of facilities (38.7%), an increase in the amount of constrained-on generation due to unexpected operation of the power system (5.8%), observance of the obligation to supply integrated energy (4.4%), and the use of combustible waste (3.7%). Other reasons included additional flight operations to ensure aviation safety, construction to improve public sewage treatment facilities, and expansion of public transportation services.

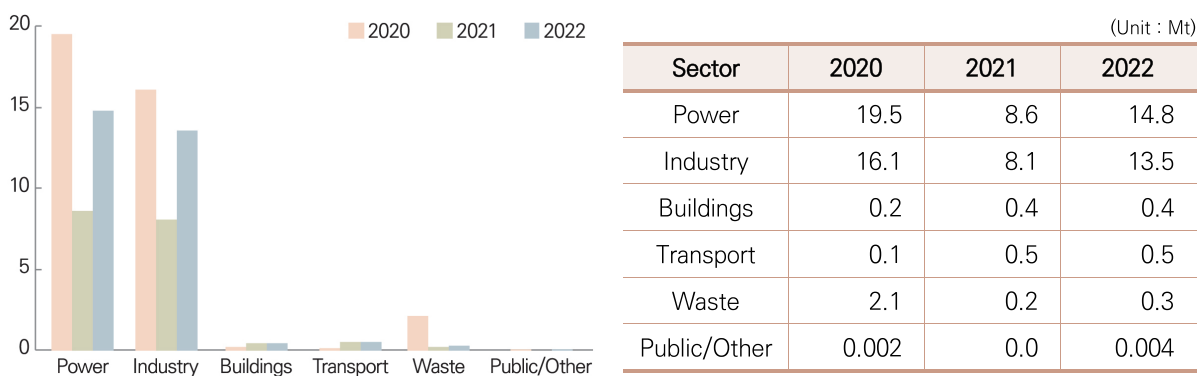
9) Emissions increased because of an increase in additional allocation for covered entities that have improved their emission efficiency by building or expanding more efficient facilities emitting less GHGs (with the best available techniques, top 10% in emission efficiency) or replacing old equipment.



〈Figure II-4〉 Additional Allocation and the Number of Entities Subject to Additional Allocation in the 2020–2022 Compliance Years

In the power sector, additional allocation decreased by 55.9% compared to the previous year in 2021 but rebounded by 72.1% compared to the previous year in 2022, with 30 entities receiving an additional allocation of 14.8 Mt of emission permits. Similarly, in the industry sector, additional allocation decreased by 49.7% compared to the previous year in 2021 but increased by 66.7% compared to the previous year in 2022, with 144 entities receiving an additional allocation of 13.5 Mt of emission permits for reasons such as the establishment of new facilities.

〈Figure II-5〉, 〈Table II-4〉 Additional Allocation in the 2020–2022 Compliance Years by Sector



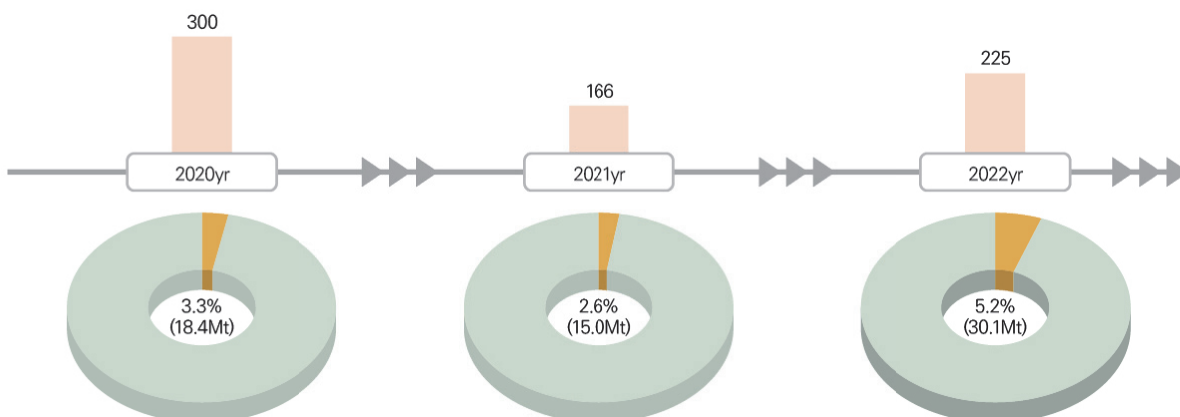
1.3. Allocation Revocation

According to Article 17 of the Act, in the event of a covered entity closing all or part of its business establishments, the amount of GHG emissions from the facilities of a covered entity's business establishment decreasing by more than a certain extent due to the suspension of their operation, or the discovery that emission allowances were applied for or allocated or additionally applied for or additionally allocated based on false information, the government may revoke all or part of the emission allowances allocated or additionally allocated free-of-charge to the covered entity.

In the 2022 compliance year, a total of 30.1 Mt of allocations were revoked for 225 entities. These revoked allocations accounted for approximately 5.2% of the final allocation and were 0.5 Mt higher than the amount additionally allocated. The most common reasons for allocation revocation were the closure of all or part of business establishments and the amount of the covered entity's GHG emissions in the compliance year being less than 50% of the allocated emission allowances.

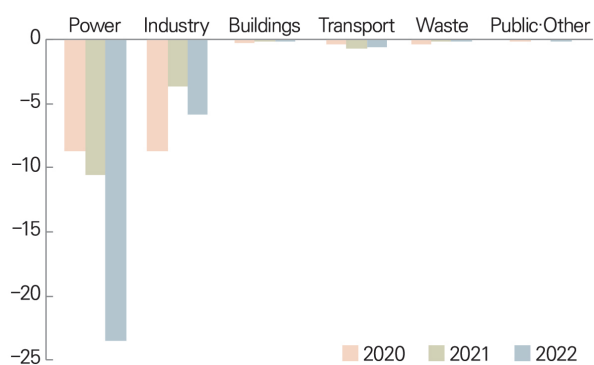
Broken down by sector, revoked emission permits amounted to 23.5 Mt for power (77.9%), 5.9 Mt for industry (19.5%), 0.5 Mt for transport (1.8%), 0.14 Mt for buildings (0.5%), and 0.12 Mt for waste sectors (0.4%), indicating that the power and industry sectors experienced the highest allocation revocation. In the public services/other sector, 85 t of allocated emission permits were revoked for one entity.

The amount of revoked allocations for the power sector increased by 12.9 Mt (121.5%) compared to the previous year. The reasons for this increase included temporary and intermittent suspension of facility operations in business establishments. In the industry sector, the amount of revoked allocations for the entire sector increased by 2.2 Mt (59.6%) compared to the 2021 compliance year. This increase was led mainly by the semiconductor, oil refining, petrochemicals, and steel sub-sectors.



〈Figure II-6〉 Allocation Revocation and the Number of Entities Subject to Allocation Revocation in the 2020-2022 Compliance Years

〈Figure II-7〉, 〈Table II-5〉 Allocation Revocation in the 2020-2022 Compliance Years by Sector



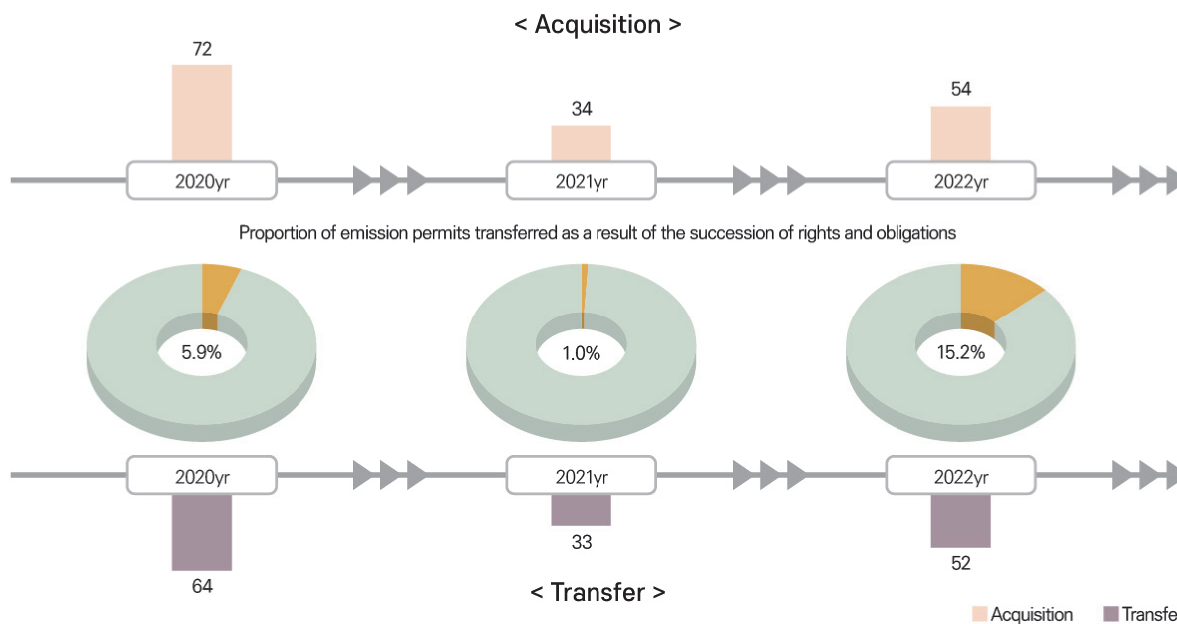
(Unit : entities, Mt)

Sector	2020	2021	2022
Power	-8.7	-10.6	-23.5
Industry	-8.6	-3.7	-5.9
Buildings	-0.3	-0.1	-0.14
Transport	-0.4	-0.6	-0.5
Waste	-0.3	-0.05	-0.12
Public/Other	-0.001	-	-0.0001

1.4. Succession of Rights and Obligations

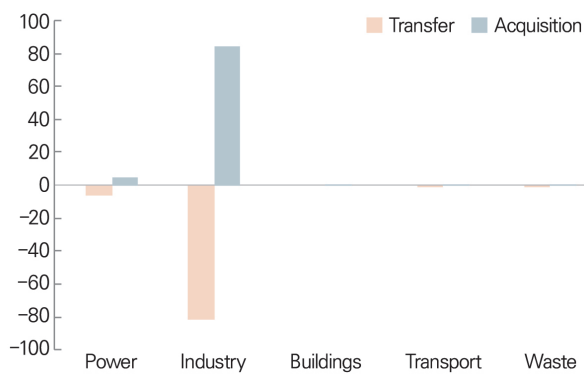
According to Article 8-2 of the Act and Article 11 of the Enforcement Decree, in the event of a covered entity merging with another entity or splitting or transferring part of its business establishment or facilities to another entity, the rights and obligations of the covered entity are transferred. If the entity that succeeds the rights and obligations from a covered entity is not a covered entity, it will be deemed as having been designated as a covered entity at the time the rights and obligations were succeeded.

In the 2022 compliance year, a total of 52 covered entities (4 entities from the power sector, 39 entities from industry, 7 entities from transport, and 2 entities from waste) transferred 88.9 Mt of KAU22, and, as a result, a total of 54 covered entities (3 entities from the power sector, 40 entities from industry, 2 entities from buildings, 7 entities from transport, and 2 entities from waste) took over the rights and obligations. Emission permits transferred as a result of the succession of rights and obligations for the industry and power sectors accounted for 92.1% and 7.4%, respectively. Unlike the previous year, a vast majority of successions occurred in the industry sector and the amount of emission permits transferred reached a record high. This was due to the transfer of a large amount of allocated emission permits through mergers between affiliates of covered entities and splits and establishments of covered entities.



〈Figure II-8〉 Proportion of Emission Permits Transferred as a Result of the Succession of Rights and Obligations and the Number of Relevant Entities in the 2020-2022 Compliance Years

〈Figure II-9〉 2022 Succession of Rights and Obligations by Sector



〈Table II-6〉 2022 Succession of Rights and Obligations and the Number of Relevant Entities by Sector

(Unit : entities, Mt)

Sector	Transfer		Acquisition	
	No. of Entities	No. of Emission Permits	No. of Entities	No. of Emission Permits
Power	4	-6.6	3	4.3
Industry	39	-81.8	40	84.1
Buildings	-	-	2	0.001
Transport	7	-0.2	7	0.2
Waste	2	-0.3	2	0.3

1.5. Final Allocation

1.5.1. Free Allocation

The sub-sectors subject to free allocation in Phase III were determined by categorizing them based on the groups listed under the Korea Standard Industrial Classification (KSIC) and selecting entities from these sub-sectors whose production cost incurrence rate¹⁰⁾ multiplied by their trade intensity¹¹⁾ was no less than 0.002 (0.2%). In Phase III, 28 out of 69 sub-sectors were designated as sub-sectors subject to free allocation.

The amount of free allocation is calculated by first determining the pre-allocation amount and then reflecting changes (e.g., new entry, additional allocation, allocation revocation, the succession of rights and obligations) in the allocated amount for each covered entity that occur during the relevant compliance year.

The amount of free allocation in the 2022 compliance year was 570.1 Mt, including a pre-allocation amount of 567.4 Mt and allocation changes of 2.7 Mt. Allocation changes were the result of the succession of rights and obligations (88.9 Mt, transferred by 52 entities and acquired by 54 entities), allocation revocation (30.1 Mt, 225 entities), and additional allocation (29.6 Mt, 253 entities). Broken down by sector, the amount for free allocation was 339.0 Mt for industry, 205.3 Mt for power, 12.4 Mt for waste, 7.9 Mt for transport, 4.7 Mt for buildings, and 0.7 Mt for public services/other.

1.5.2. Auctions

In accordance with the Allocation Plan for Phase III, covered entities¹²⁾ from a total of 41 sub-sectors were categorized as covered entities subject to auctions, and 10% of the total emission allowances (82.0 Mt) were deducted for these auctions. Subsequently, 3.2 Mt of emission allowances¹³⁾ were added after reflecting factors such as additional allocations and allocation revocations. In turn, a total of 85.2 Mt of emission allowances were transferred to the auction account.¹⁴⁾

10) $[\text{Annual average GHG emissions from the relevant sub-sector for the base period (tCO}_2\text{-eq/year)} \times \text{average market price for emission permits for the base period (won/tCO}_2\text{-eq)}] / \text{annual average value-added production volume of the relevant sub-sector for the base period (won/year)}$.

11) $[\text{Annual average exports of the relevant sub-sector for the base period (won/year)} + \text{annual average imports of the relevant sub-sector for the base period (won/year)}] / [\text{annual average sales of the relevant sub-sector for the base period (won/year)} + \text{annual average imports of the relevant sub-sector for the base period (won/year)}]$.

12) For the 2022 compliance year, a total of 200 covered entities were selected for auctions, including 22 entities from the power sector, 131 entities from industry, 1 entity from waste, 20 entities from buildings, 24 entities from transport, and 2 entities from public services/other sectors.

13) With respect to those covered entities belonging to the sub-sectors subject to auctions, even in the case of additional allocation, 10% of the additionally allocated emission allowances are deducted and transferred to the auction account.

In the Auction Plan for the 2022 compliance year, the government planned the auction volume to be 21.9 Mt. The first auction for KAU22 took place in July 2022. A total of 10 auctions were conducted as auctions were not held in May and June 2023 pursuant to Article 7 of the Regulations for the Additional Allocation of Emission Permits for Auctions and Market Stabilization Measures. The bidding dates and sizes of bids are presented in <Table II-8>. Emission allowances not sold at an auction may be added to the subsequent auction as remaining allowances.¹⁵⁾ The total amount of emission allowances auctioned in the 2022 compliance year was 12.6 Mt (20 entities), which accounted for 2.5% of the final allocation amount (582.7 Mt).¹⁶⁾

<Table II-7> KAU22 Auction Volume

Year	Auction Date	Bid Size ¹⁾		Valid Bids	
		Implementation	Amount Registered	Size of Valid Bids	No. of Valid Bids
2022	13 Jul. (Wed)	2,550,000t	2,300,000t	2,300,000t	9
	10 Aug. (Wed)	2,550,000t	2,300,000t	2,225,000t	9
	14 Sep. (Wed)	2,550,000t	2,375,000t	2,014,000t	8
	12 Oct. (Wed)	2,550,000t	2,661,000t	1,341,200t	5
	9 Nov. (Wed)	2,550,000t	2,300,000t	567,600t	7
	14 Dec. (Wed)	2,550,000t	2,300,000t	1,380,000t	4
2023	11 Jan. (Wed)	1,000,000t	1,000,000t	643,000t	6
	8 Feb. (Wed)	1,000,000t	1,000,000t	642,000t	5
	8 Mar. (Wed)	1,000,000t	1,000,000t	694,400t	7
	12 Apr. (Wed)	1,000,000t	1,000,000t	806,500t	9
Total	10 ²⁾	19,300,000t	18,236,000t	12,613,700t	69

1) Revised Notice on the 2022 Auction Plan for Emission Allowances (Ministry of Environment Notice No. 2021-831, 17 December 2021), Notice on the 2022 Auction Plan for Emission Allowances (Ministry of Environment Notice No. 2022-266, 2 May 2022), Notice on the 2023 Auction Plan for Emission Allowances (Ministry of Environment Notice No. 2022-714, 16 December 2022), and Revised Notice on the 2023 Auction Plan for Emission Allowances (Ministry of Environment Notice No. 2023-284, 26 April 2023)

2) Auctions were not held in May and June 2023 pursuant to Article 7 of the Regulations for the Additional Allocation of Emission Permits for Auctions and Market Stabilization Measures.

14) An auction account registered in the Emissions Trading Registry in accordance with the Notification on GHG Emission Permits Trading (Ministry of Environment, partially amended in 2018) is the emissions trading account specified in Article 32 of the Enforcement Decree and is used as an intermediary account until the auctioned emission permits are transferred to the relevant entity account pursuant to Article 12(3) of the Act.

15) If the total volume of valid bids is lower than the total volume of bids made at an auction, the amount of remaining bids may be added to the subsequent auction (Art. 6 of the Regulations for the Additional Allocation of Emission Permits for Auctions and Market Stabilization Measures).

16) In terms of the revenue generated from the auctions, the total payments for emission permits, excluding transaction fees for the KRX, are returned to the government.

1.5.3. Final Allocation

Information on the sector-specific final allocation of emission allowances for the 2022 compliance year is provided in <Table II-9>. The final allocation amount (582.7 Mt) consisted of 570.1 Mt of free allocation (97.8%) and 12.6 Mt of auctioned allowances (2.2%). The amount provided for free allocation included a pre-allocation amount of 567.4 Mt (97.4%) and allocation changes of 2.7 Mt (0.5%), which resulted from additional allocation, allocation revocation, and the succession of rights and obligations.

The overall rate of change between the pre-allocation and final allocation amount for all covered entities was 2.7%. Broken down by sector, the rate of change was 6.7% for buildings, 3.7% for waste, 3.3% for industry, 2.7% for transport, 1.6% for power, and 0.6% for public services/other.

<Table II-8> Final allocation by sector for the 2022 Compliance Year

(Unit: Mt, entities)

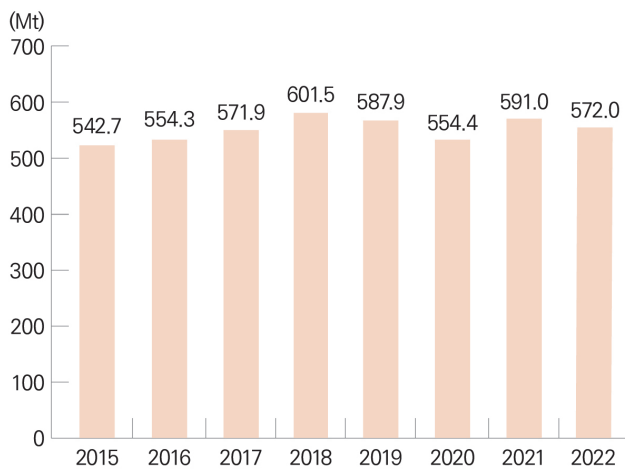
Sector	Final allocation (E=C+D)									Change (E-A)/A	
	Free allocation (C=A+B)							Auctions(D)			
	Pre- allocation (A)	Allocation changes (B)									
		New entry	Additional	Revocation	Succession of Rights & Obligations						
					Transfer	Acquisition					
Industry	339.1	339.0	328.2	10.8	0.9	13.5	-5.9	-81.8	84.1	0.1	3.3%
Power	217.9	205.3	214.4	-9.0	1.9	14.8	-23.5	-6.6	4.3	12.6	1.6%
Buildings	4.7	4.7	4.4	0.3	0.03	0.4	-0.1	-	0.001	0.01	6.7%
Transport	7.9	7.9	7.7	0.2	0.2	0.5	-0.5	-0.2	0.2	-	2.7%
Waste	12.4	12.4	12.0	0.4	0.3	0.3	-0.1	-0.3	0.3	-	3.7%
Public /Other	0.7	0.7	0.7	0.004	-	0.004	-0.0001	-	-	-	0.6%
Total	582.7	570.1	567.4	2.7	3.3	29.6	-30.1	-88.9	88.9	12.6	2.7%
Entities	714	714	684	606	22	253	225	52	54	20	4.4%

1) Pre-allocation allowances were allocated to 684 covered entities, but the number of covered entities at the time of final allocation increased to 714 due to changes (e.g., allocation revocation, succession of rights and obligations) that occurred during the compliance year (Source: ETRS Database, as of September 2023)

2.1. Certification of Emissions

According to the results of the government's verification of emissions reports submitted by 714 entities to which emission permits were finally allocated in the 2022 compliance year, the certified emissions amounted to 572.0 Mt, which was 3.2% (19 Mt) lower than the previous year. This decrease was a result of a reduction in certified emissions compared to the previous year in the power and industry sectors.

〈Figure II-10〉 Certified emissions by compliance year



〈Table II-9〉 Certified emissions and Entities by compliance year

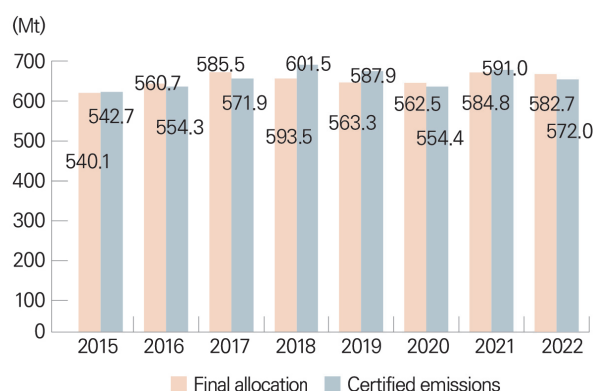
(Unit: Mt, entities)

Phase	Year	Certified emissions	Annual change	No. of Entities
I	2015	542.7	–	522
	2016	554.3	2.2%	560
	2017	571.9	3.2%	591
II	2018	601.5	5.2%	586
	2019	587.9	–2.3%	610
	2020	554.4	–5.7%	636
III	2021	591.0	6.6%	687
	2022	572.0	–3.2%	713

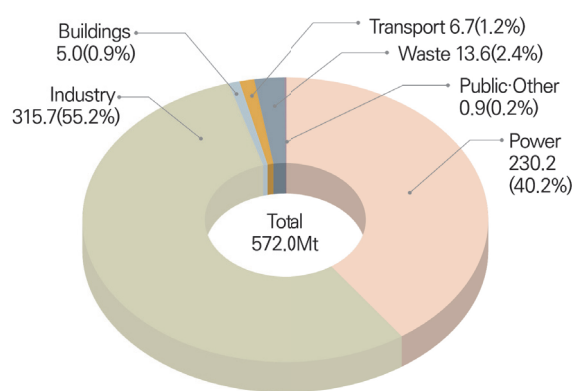
(Source) ETRS Database (as of Sep. 2023)

〈Figure II-10〉 shows the results of the comparison between the final allocation amount and the amount of certified emissions for each compliance year. In the 2021 compliance year, the certified emissions exceeded the final allocation by 6.2 Mt. This was due to the certified emissions from the sub-sectors that were newly designated as covered sub-sectors following the expansion of the scope of K-ETS for Phase III (freight, railway, passenger, and marine transport and construction) as well as the certified emissions from hydrogen production and catalyst regeneration processes in the oil refining sub-sector. Unlike the previous year, in the 2022 compliance year, the amount of certified emissions was 10.7 Mt lower than the final allocation amount.

Broken down by sector, the amount of certified emissions for the 2022 compliance year from the industry sector was 315.7 Mt (55.2%), compared to 230.2 Mt (40.2%) from the power sector, 13.6 Mt (2.4%) from waste, 6.7 Mt (1.2%) from transport, 5.0 Mt (0.9%) from buildings, and 0.9 Mt (0.2%) from public services/other.



〈Figure II-11〉 Final allocation and Certified emissions by compliance year



〈Figure II-12〉 Certified emissions by sector in 2022

2.2. Surrender of Emission Permits

Covered entities must surrender emission permits to the government in an amount equivalent to the amount of certified emissions within six months from the date of completion of each compliance year. Emission permits can be surrendered using the KAUs allocated for the relevant compliance year, KCUs converted from KOCs, and other permits either banked from the previous compliance year (KAUs and KCUs) or borrowed from the next compliance year (KAUs). These surrender methods ensure flexibility so that covered entities can surrender emission permits through various methods other than emissions trading. In addition, the government has introduced market-maker trading and proprietary trading by securities companies to ensure the liquidity of the emissions trading market. Consequently, covered entities are able to secure additional emission permits by not only exchange trading but also OTC trading, including swap or repo trading.

For the 2022 compliance year, a total of 572.0 Mt of emissions produced by a total of 713 entities were certified. Broken down by the type of emission permits surrendered, KAUs accounted for 563.7 Mt (98.5%) and KCUs for 7.6 Mt (1.3%), which indicates that most of the permits surrendered were KAUs. The amount of KCUs surrendered was similar to the amount surrendered in the previous year

(7.9 Mt, 1.3%). In addition, 20.9 Mt (513 entities) of the emission permits banked from the 2021 compliance year were used in the trading and surrender and, after the surrender, 39.3 Mt (509 entities) of the permits were carried over to the following compliance year. Additionally, 0.7 Mt (38 entities) of the permits borrowed from the 2023 compliance year were used for the surrender.

In the 2022 compliance year, ultimately a total of 713 entities surrendered emission permits because one covered entity went bankrupt and failed to meet its obligation to surrender emission permits. Surplus emission permits for nine entities amounting to 5 kt (the amount not carried over¹⁷⁾) expired.

〈Table II-10〉 Surrender results by sector in 2022

(Unit : Mt)

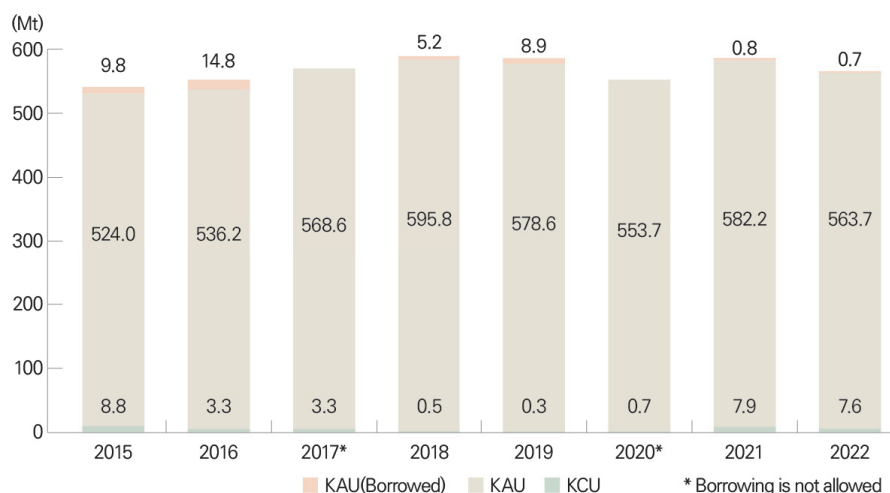
Sector	Certified		Banking (21→22)	KOC → KCU	KAU Traded ¹⁾		Surrendered				Not Surrendered	Not Banked	Banking(22→23)		
	Emission	Entity			Sold	Purchased	Total	KAU	KAU (Borrowed)	KCU			Total	KAU	KCU
Industry	315.7	464	13.1	3.5	-186	3.4	315.7	312.4	0.2	3.1	-	0.004	23.9	23.5	0.4
Power	230.2	59	2.9	4.4	-4.9	14.2	230.2	225.3	0.4	4.5	-	-	4.8	4.7	0.1
Buildings	5.0	40	0.2	0.02	-0.1	0.2	5.0	4.9	0.0002	0.04	-	0.0001	0.1	0.1	0.002
Transport	6.7	66	0.8	-	-0.7	0.1	6.7	6.7	0.004	-	-	0.001	1.3	1.3	-
Waste	13.6	82	0.3	0.1	-0.3	1.5	13.6	13.5	0.02	0.1	-	-	0.4	0.4	0.01
Public/ Other	0.9	2	-	-	-	0.2	0.9	0.9	-	-	-	-	-	-	-
Market maker	-	7	3.0	-	-6.7	9.6	-	-	-	-	-	-	6.3	6.3	-
Securities	-	21	0.5	-	-0.5	2.6	-	-	-	-	-	-	2.5	2.5	-
Total	572.0	713	20.9	8.1	-31.7	31.7	572.0	563.7	0.7	7.6	-	0.005	39.3	38.9	0.5
Entities	713	-	513	64	498	286	713	713	38	64	-	-	509	505	14

1) The entries are based on the trading volume registered in the ETRS, which might be different from the trading volume specified under Part III (based on KRX data)

2) Market makers and securities companies are not counted as covered entities.

Source: ETRS Database (as of Sep. 2023)

17) The amount of emission permits not carried over to the next compliance year by covered entities after meeting their obligation to surrender or the amount remaining after the emission permits are carried over to the next compliance year to the fullest possible extent.



〈Figure II-13〉 Surrendered emission permits by compliance year

2.3. Flexibility Mechanisms

Flexibility mechanisms are a means to ensure flexibility in the surrender of emission permits by covered entities that minimize the cost of reducing GHG emissions. These flexibility mechanisms allowed by the government for the surrender of emission permits include the use of KCUs obtained from the conversion of KOCs and the banking (KAUs and KCUs) and borrowing (KAUs) of emission permits.

2.3.1. Use of KOCs and KCUs

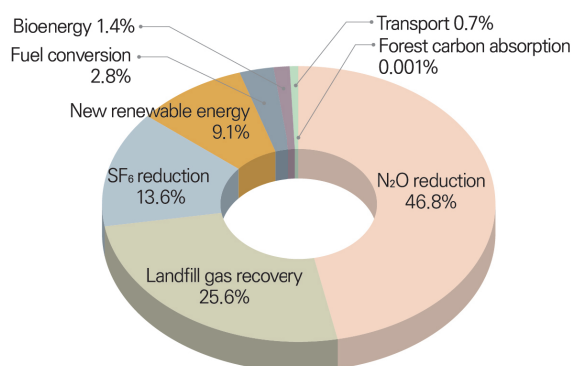
From 2015 to August 2023, a total of 49.6 Mt¹⁸⁾ of KOCs obtained from domestic (37.3 Mt, 75.1%) and overseas (12.3 Mt, 24.9%) offset projects were registered. For the 2022 compliance year, a total of 8.5 Mt of KOCs were registered, with 2.6 Mt from domestic and 5.9 Mt from overseas offset projects, which was similar to the amount registered in the previous year (8.4 Mt). While KOCs issued from domestic offset projects decreased, KOCs issued from overseas offset projects increased, and this amount has continuously increased since their introduction in the 2020 compliance year (1.0 → 5.4 → 5.9 Mt).

18) 49.6 Mt = 22.5 Mt from Phase I (1 Jan. 2015–9 Aug. 2018) + 10.3 Mt from Phase II (10 Aug. 2018–9 Aug. 2021) + 16.9 Mt from Phase III (10 Aug. 2021–31 Aug. 2023).

A total of 1,275 projects have been approved as external offset projects, of which 729 are domestic and 546 are overseas. In terms of domestic projects, the largest amount of certified reductions was achieved via projects related to technologies used to reduce N₂O emissions in the process of manufacturing petrochemical products, followed by those obtained from projects related to landfill gas recovery technologies (the waste sector), technologies used to reduce SF₆ emissions in the process of manufacturing semiconductors, and projects related to new renewable energy generation, such as tidal and wind power. In terms of overseas projects, certified reductions were achieved primarily from fuel conversion projects, including those related to the distribution of high-efficiency cookstoves, followed by those obtained from CH₄ leakage reduction projects focusing on the prevention of gas pipe leakages and projects related to new renewable energy generation, such as hydro and solar power.

Project type	No. of Projects	Certified reductions (Mt)
Total	729	37.3
N ₂ O reduction	180	17.4
Landfill gas recovery	71	9.6
SF ₆ reduction	49	5.1
New renewable energy	152	3.4
Fuel conversion	222	1.0
Bioenergy	50	0.5
Transport	4	0.3
Forest carbon absorption	1	0.0002

〈Table II-11〉 Projects and Certified reductions
(Domestic)

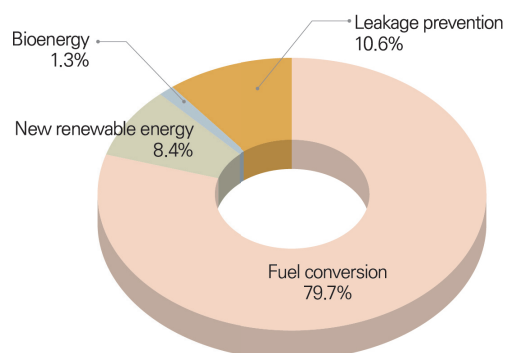


〈Figure II-14〉 Proportion of Certified reductions
(Domestic)

〈Table II-12〉 Projects and Certified reductions
(Overseas)

Project type	No. of Projects	Certified (Mt)
Total	546	12.3
Fuel conversion	516	9.8
Leakage prevention	8	1.3
New renewable energy	16	1.0
Bioenergy	6	0.2

〈Figure II-15〉 Proportion of Certified reductions
(Overseas)

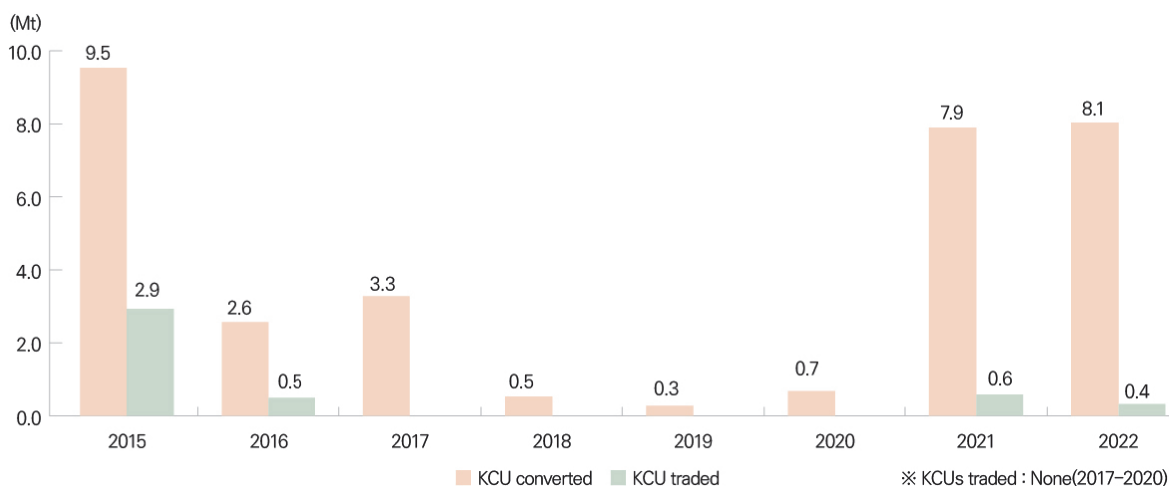


A total of 32.9 Mt¹⁹⁾ has been converted from KOCs into KCUs to date by the covered entities to be used in the surrender of emission permits. The amount converted into KCUs in the 2022 compliance year was 8.1 Mt (7.4 Mt from domestic projects, 0.7 Mt from overseas projects), which was similar to the amount converted in the 2021 compliance year (7.9 Mt; 7.1 Mt from domestic projects, 0.8 Mt from overseas projects). While the amount of KCUs converted from KOCs obtained from domestic projects increased, the amount of KCUs converted from KOCs obtained from overseas projects decreased. The amount of KCUs converted from KOCs, which had been less than 1 Mt during Phase II, increased sharply to more than 7 Mt in Phase II. This appears to be due to the increase in the volume of KOCs converted into KCUs following the imposition of restrictions on the KOC conversion and trading period, which was implemented after the amendment²⁰⁾ of the guidelines for GHG offset projects.

Of the 8.1 Mt of KOCs converted into KCU22, 7.6 Mt was used by 65 entities in the surrender of emission permits (accounting for 1.3% of all permits surrendered). The remaining 0.5 Mt was carried over to the 2023 compliance year. After the 2022 compliance year, 16.5 Mt of KOCs remained unconverted into KCUs as of November 2023.

19) 32.9 Mt = 15.4 Mt from Phase I + 1.5 Mt from Phase II + 16.0 Mt from Phase III.

20) Guidelines for the Feasibility Assessment of Offset Projects and the Certification of Reductions (partially amended and entered into force on 22 Jan. 2021).



〈Figure II-16〉 KCUs converted and traded by compliance year

2.3.2. Banking of Emission Permits

In total, 20.9 Mt of emission permits were carried over from the 2021 compliance year to the 2022 compliance year and used for either trading or surrender. After the surrender for 2022, 39.3 Mt (509 entities)²¹⁾ of emission permits, 88.0% higher than the previous year, were carried over to the 2023 compliance year. While more than 30 Mt of emission permits had been banked annually during the period between 2016 and 2018, the amount fell by half in 2019 and has increased thereafter. In the 2022 compliance year, 11 securities companies banked 2.5 Mt of emission permits after proprietary trading, and seven market makers banked 6.3 Mt of emission permits.

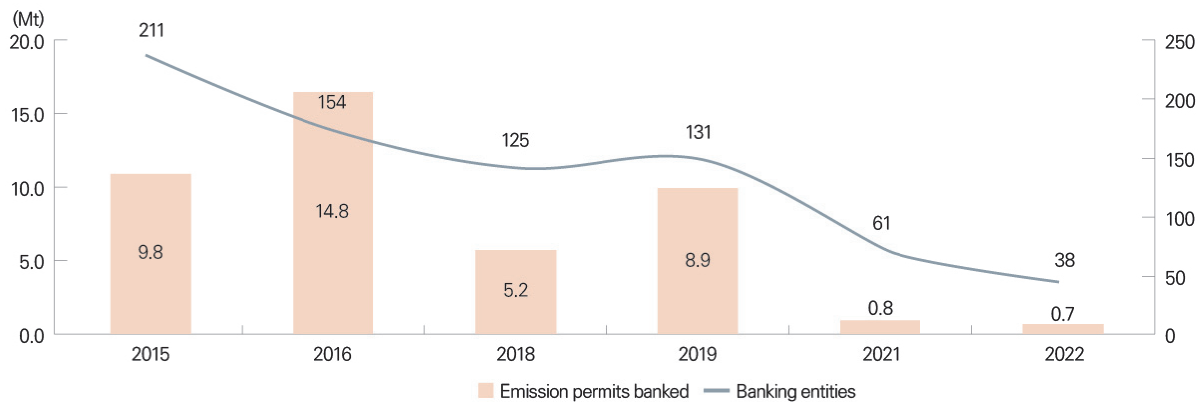
21) Of the emission permits carried over, 38.88 Mt were KAUs and 0.46 Mt were KCUs.



〈Figure II-17〉 Banking of emission permits by compliance year

2.3.3. Borrowing of Emission Permits

The emission permits borrowed from the 2023 compliance year for the 2022 compliance year amounted to 0.7 Mt (38 entities), representing 0.1% of the total amount of emission permits surrendered. While the amount of emission permits borrowed for the 2022 compliance year was similar to the previous year, the number of entities that borrowed emission permits decreased by 37.7% compared to the previous year (61 entities). It appears that covered entities have primarily utilized flexibility mechanisms, such as banking from the previous compliance year and the conversion of KOCs to KCUs, and auctions to prepare for a possible supply shortage of emission permits in the future.



〈Figure II-18〉 Borrowing of emission permits by compliance year

〈Table II-13〉 Legal grounds and standards for the Flexibility mechanisms in Phase III

Type	Legal grounds	Methods and Standards
Use of KCUs	Art. 29 of the Act Art. 47 of the Enforcement Decree	• If a covered entity possesses or acquires GHG reduction credits generated outside the scope of business operations monitored by the K-ETS in a manner consistent with international standards, it may convert them into KCUs for trading and surrendering of emission permits, etc. • Use of KCUs is allowed up to 5% of the total amount of emission permits surrendered.
Borrowing	Art. 28 of the Act Art. 45 of the Enforcement Decree	• When the amount of emission permits held by a covered entity is less than the amount it must surrender, a portion of allocated emission permits from a different compliance year within a single phase may be borrowed. 〈Borrowing limits in Phase III〉 – 1st compliance year: no more than 15% of the emission permits to be surrendered. – 2nd–4th compliance years: (no more than) emission permits to be surrendered x {borrowing limit in the immediately preceding compliance year – (ratio of borrowed emission permits in the immediately preceding compliance year × 0.5)} – 5th compliance year: borrowing from the subsequent phase is not allowed.
Banking	Art. 28 of the Act Art. 37 of the Enforcement Decree Allocation Plan	• A covered entity may carry over emission permits in its possession to the next compliance year within the same phase or to the first compliance year in the subsequent phase, provided that it banks KAUs and KCUs of less than 100 t regardless of the standards specified below. 〈Banking within a single Phase〉 Banking is allowed in the following amounts: – 1st–3rd compliance years: twice the net amount of KAUs/KCUs sold* by a covered entity in each (first and second) compliance year. * Amount of KAUs/KCUs sold – amount of KAUs/KCUs purchased until the day before a covered entity applied for banking to the next compliance year, excluding the amount exchanged (KAU, KCU ↔ KAU, KCU, KOC) and auctioned – 3rd–5th compliance years: the net amount of KAUs/KCUs sold* by a covered entity in each (third and fourth) compliance year * Amount of KAUs/KCUs sold – amount of KAUs/KCUs purchased until the day before a covered entity applied for banking to the next compliance year, excluding the amount exchanged (KAU/KCU ↔ KAU/KCU/KOC) and auctioned 〈Banking across Phases〉 Only banking to the first compliance year of Phase IV is allowed in the following amounts: – Annual average net amount of KAUs/KCUs sold* by a covered entity in Phase III * Amount of KAUs/KCUs sold – amount of KAUs/KCUs purchased until the day before a covered entity applied for banking for Phase IV, which is divided by the number of compliance years in Phase III applicable to the covered entity, excluding the amount exchanged (KAU21–25/KCU21–25 ↔ KAU/KCU/KOC from another phase) and auctioned • Emission permit holders other than covered entities may carry over permits to the next compliance year within the same phase or to the first compliance year in the subsequent phase 〈Banking within a single Phase〉 Banking is allowed in the following amounts: – Proprietary trading by emissions trade brokerage companies: a maximum 200 kt of KAUs/KCUs

Type	Legal grounds	Methods and Standards
		– Market makers: all KAUs/KCUs in their possession 〈Banking Across Phases〉 Only banking to the first compliance year of Phase IV is allowed in the following amounts: – Proprietary trading by emissions trade brokerage companies: a maximum 200 kt of KAU25/KCU25 – Market makers: all KAU25/KCU25 in their possession

* Source : Act on the Allocation and Trading of Greenhouse-Gas Emission Permits and its Enforcement Decree (Ministry of Environment, Ministry of Economy and Finance, and Office for Government Policy Coordination; amended on 25 March 2022 due to the revision of another statute)
 Enforcement Decree of the Act on the Allocation and Trading of Greenhouse-Gas Emission Permits (Ministry of Environment, Ministry of Economy and Finance, and Office for Government Policy Coordination; amended on 12 December 2023 due to the revision of another statute)
 Allocation Plan for Phase III (2021–2025) (Ministry of Environment, December 2023)

2023 Korean Emissions Trading System Report

III

Analysis of the Emissions Trading Market

1. Trading Records for 2015–2023
2. Trading Records for the 2022
Compliance Year of Phase III

Emission permits can be traded through the exchange and OTC markets. The tradable permits are KAUs, KCUs, and KOCs. Exchange trading commences with the listing of tradable permits on the emission permit exchange²²⁾ and ends with the delisting of these emission permits; accordingly, different trading periods are applied to each type of permit in exchange trades. On the other hand, for OTC trading, emission permits are traded based on contracts directly entered into between covered entities.

In Part III, trading records for KAUs (KAU15–KAU25), KCUs (KCU15–KCU22), and KOCs (KOC20–22–KOC23–25) traded during Phases I, II, and III (January 2015–August 2023) are analyzed. The analysis of KAUs is based on records of exchange and OTC transactions and auction results, while the analysis of KCUs and KOCs is based on records of exchange and OTC transactions.

1.1. Trading Volume and Price Trends by Year²³⁾

From the commencement of Phase I to the end of the 2022 compliance year in Phase III (August 2023), the total trading volume for all types of emission permit (KAUs, KCUs, and KOCs) was 327.9 Mt, the total payments were 7,141.1 billion won, and the average trading price was 21,778 won per ton. The yearly trading volume increased at an average annual rate of 103% from 5.7 Mt in 2015 to 12.0 Mt in 2016, 26.3 Mt in 2017, and 47.5 Mt in 2018. Subsequently, it fluctuated, with 38.1 Mt in 2019, 44.0 Mt in 2020, 54.7 Mt in 2021, and 39.1 Mt in 2022. The trading volume grew to 60.5 Mt by August 2023, representing a significant increase (54.7%) compared to the previous year.

Broken down by market type, the trading volume was 179.1 Mt (54.6%) in the exchange market and 148.8 Mt (45.4%) in the OTC market. In terms of the type of emission permit, the total trading volume for KAUs was 280.4 Mt, which accounted for 85.5% of the total trading volume for emission permits,

22) In accordance with Article 22 of the Act and Article 34 of the Enforcement Decree, the KRX was designated as an emission permit exchange (Jan. 2014) and has been in operation since the introduction and implementation of the K-ETS (since Jan. 2015).

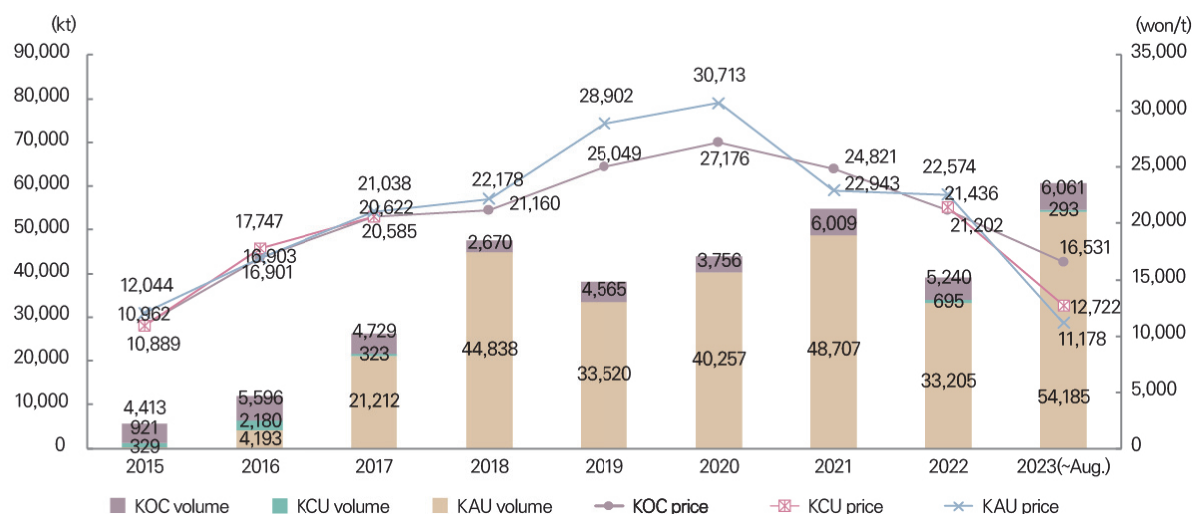
23) The amount of emission permits that must be surrendered is determined based on the amount of certified emissions for each compliance year (1 Jan.–31 Dec.), but emission permits can be traded from the date of the listing of emission permits on the KRX (exchange trading) or the date of the allocation of emission permits (OTC trading) until the date of the surrender of those emission permits (e.g., KAU22 was traded between 4 Jan. 2021 and 31 Aug. 2023).

indicating that most of the emission permits traded were KAUs. The total trading volume for KCUs was 4.4 Mt and that for KOCs was 43.0 Mt, accounting for 1.3% and 13.1% of the total trading volume, respectively.

The average trading price for all emission permits per year increased significantly at an average annual rate of 22.5% from 11,013 won in 2015 to 30,411 won in 2020. Since then, due to the impact of COVID-19, lower production activity, and damage caused by Typhoon Hinnamno, it declined to 23,149 won in 2021, 22,370 won in 2022, and 11,721 won in 2023 (as of August). The average trading price for Phases I, II, and III (until August 2023) was 21,778 won.

Broken down by the type of emission permit, the average trading price was 22,084 won for KAUs, 20,299 won for KOCs, and 16,774 won for KCUs. The average trading price for KAUs, which accounted for more than 85% of the total trading volume for emission permits, rose from 12,044 won in 2015 to 30,713 won in 2020 and fell to 22,943 won in 2021 and 22,574 won in 2022. As of August 2023, the average 2023 trading price for KAUs was 11,178 won, which was 50.5% lower than the previous year. The average trading price for KOCs, the second-most traded emission permit, exhibited a similar trend of fluctuations as KAUs. It rose from 10,962 won in 2015 to 27,176 won in 2020 and fell to 24,821 won in 2021 and 21,202 won in 2022. It fell to 16,531 won in 2023, which was 22.0% lower than the previous year. The average trading price for KCUs was 10,889 won in 2015, 17,747 won in 2016, and 20,622 won in 2017, but there was no record of the trading of KCUs between 2018 and 2021. The trading of KCUs resumed in 2022 with an average trading price of 21,436 won. The average trading price for KCUs was 12,722 won in 2023.

The continuous increase in the trading volume and average trading price from 2015 led to an increase in total payments from 62.4 billion won in 2015 to 1,338.5 billion won in 2020. Subsequently, they continued to decline to 1,266.6 billion won in 2021, 875.6 billion won in 2022, and 709.6 billion won in 2023. The total payments for emission permits for 2023 were 19.0% lower than that for the previous year.



〈Figure III-1〉 Trends in the total trading volume and price by emission permits

〈Table III-1〉 Trends in trading records by trading type

Type			2015	2016	2017	2018	2019	2020	2021	2022	2023*
Trading volume (kt)	Exchange	Real-time	51	2,062	4,640	4,814	4,636	8,263	13,574	11,174	45,056
		Block	1,191	2,771	10,094	8,351	4,373	4,520	1,119	1,120	1,014
		Auction	-	274**	-	4,665**	7,950	8,171	11,177	13,642	4,379
	OTC		4,421	6,861	11,530	29,677	21,125	23,059	28,846	13,205	10,091
	Total		5,663	11,969	26,264	47,507	38,084	44,013	54,716	39,140	60,540
Trading Price (won/t)	Exchange	Real-time	12,208	17,953	21,315	22,271	29,414	28,785	20,981	20,711	10,796
		Block	11,140	17,728	21,064	22,127	28,254	29,802	23,011	20,431	12,303
		Auction	-	16,221**	-	22,500**	29,238	30,385	26,373	23,243	11,564
	OTC		10,965	16,549	20,706	22,034	27,965	31,122	22,926	23,037	15,862
	Total		11,013	17,056	20,951	22,120	28,440	30,411	23,149	22,370	11,721
Payments (100 million won)	Exchange	Real-time	6	370	989	1,072	1,364	2,378	2,848	2,314	4,864
		Block	133	491	2,126	1,848	1,236	1,347	257	229	125
		Auction	-	44**	-	1,050**	2,324	2,483	2,948	3,171	506
	OTC		485	1,135	2,387	6,539	5,908	7,176	6,613	3,042	1,601
	Total		624	2,041	5,503	10,509	10,831	13,385	12,666	8,756	7,096

* Trading records until August 2023

** The amount auctioned from the reserve for market stabilization measures to address the imbalance in the supply and demand for emission permits in the 2015 and 2017 compliance years, not the amount allocated for auctions that were introduced in Phase II

〈Table III-2〉 Trends in trading volume by emission permit

(Unit : kt)

Type			2015	2016	2017	2018	2019	2020	2021	2022	2023*
KAU	Exch-ange	Real-time	13	918	3,641	4,588	4,485	8,073	12,101	11,025	44,484
		Block	308	1,370	10,067	8,278	3,343	4,490	641	484	92
		Auction	–	274**	–	4,665**	7,950	8,171	11,177	13,642	4,379
	OTC		8	1,631	7,504	27,307	17,742	19,523	24,787	8,055	5,230
	Total		329	4,193	21,212	44,838	33,520	40,257	48,707	33,205	54,185
KCU	Exch-ange	Real-time	38	482	296	–	–	–	–	5	7
		Block	883	1,401	27	–	–	–	–	585	266
	OTC		–	296	–	–	–	–	–	105	20
	Total		921	2,180	323	–	–	–	–	695	293
KOC	Exch-ange	Real-time	–	662	703	226	151	190	1,473	144	564
		Block	–	–	–	73	1,030	30	477	51	656
	OTC		4,413	4,934	4,026	2,370	3,383	3,536	4,059	5,044	4,841
	Total		4,413	5,596	4,729	2,670	4,565	3,756	6,009	5,240	6,061

* Trading records until August 2023

** The amount auctioned from the reserve for market stabilization measures to address the imbalance in the supply and demand for emission permits in the 2015 and 2017 compliance years, not the amount allocated for auctions that were introduced in Phase II

〈Table III-3〉 Trends in average trading price by emission permit

(Unit : won/t)

Type			2015	2016	2017	2018	2019	2020	2021	2022	2023*
KAU	Exch-ange	Real-time	10,998	17,712	21,314	22,208	29,384	28,633	19,887	20,639	10,801
		Block	12,073	17,366	21,065	22,105	28,780	29,733	16,339	20,495	10,875
		Auction	-	16,221**	-	22,500**	29,238	30,385	26,373	23,243	11,564
	OTC		12,700	16,169	20,867	22,139	28,653	31,935	23,059	24,215	14,068
	Total		12,044	16,901	21,038	22,178	28,902	30,713	22,943	22,574	11,178
KCU	Exch-ange	Real-time	12,637	18,173	20,605	-	-	-	-	14,000	7,938
		Block	10,815	18,082	20,813	-	-	-	-	20,501	12,971
	OTC		-	15,471	-	-	-	-	-	27,000	11,105
	Total		10,889	17,747	20,622	-	-	-	-	21,436	12,722
KOC	Exch-ange	Real-time	-	18,127	21,617	23,530	30,302	35,266	29,962	26,457	10,480
		Block	-	-	-	24,636	26,549	40,013	31,979	19,014	12,233
	OTC		10,962	16,739	20,405	20,826	24,358	26,633	22,114	21,074	17,819
	Total		10,962	16,903	20,585	21,160	25,049	27,176	24,821	21,202	16,531

* Trading records until August 2023

** The amount auctioned from the reserve for market stabilization measures to address the imbalance in the supply and demand for emission permits in the 2015 and 2017 compliance years, not the amount allocated for auctions that were introduced in Phase II

〈Table III-4〉 Trends in payments by emission permit

(Unit : 100 million won)

Type			2015	2016	2017	2018	2019	2020	2021	2022	2023*
KAU	Exch-a nge	Real- time	1	163	776	1,019	1,318	2,311	2,407	2,275	4,805
		Block	37	238	2,121	1,830	962	1,335	105	99	10
		Auction	-	44**	-	1,050**	2,324	2,483	2,948	3,171	506
	OTC		1	264	1,566	6,046	5,083	6,235	5,716	1,951	736
	Total		40	709	4,463	9,944	9,688	12,364	11,175	7,496	6,057
KCU	Exch-a nge	Real- time	5	88	61	-	-	-	-	1	1
		Block	95	253	6	-	-	-	-	120	35
	OTC		-	46	-	-	-	-	-	28	2
	Total		100	387	67	-	-	-	-	149	37
KOC	Exch-a nge	Real- time	-	120	152	53	46	67	441	38	59
		Block	-	-	-	18	273	12	153	10	80
	OTC		484	826	821	494	824	942	898	1,063	863
	Total		484	946	973	565	1,143	1,021	1,491	1,111	1,002

* Trading records until August 2023

** The amount auctioned from the reserve for market stabilization measures to address the imbalance in the supply and demand for emission permits in the 2015 and 2017 compliance years, not the amount allocated for auctions that were introduced in Phase II

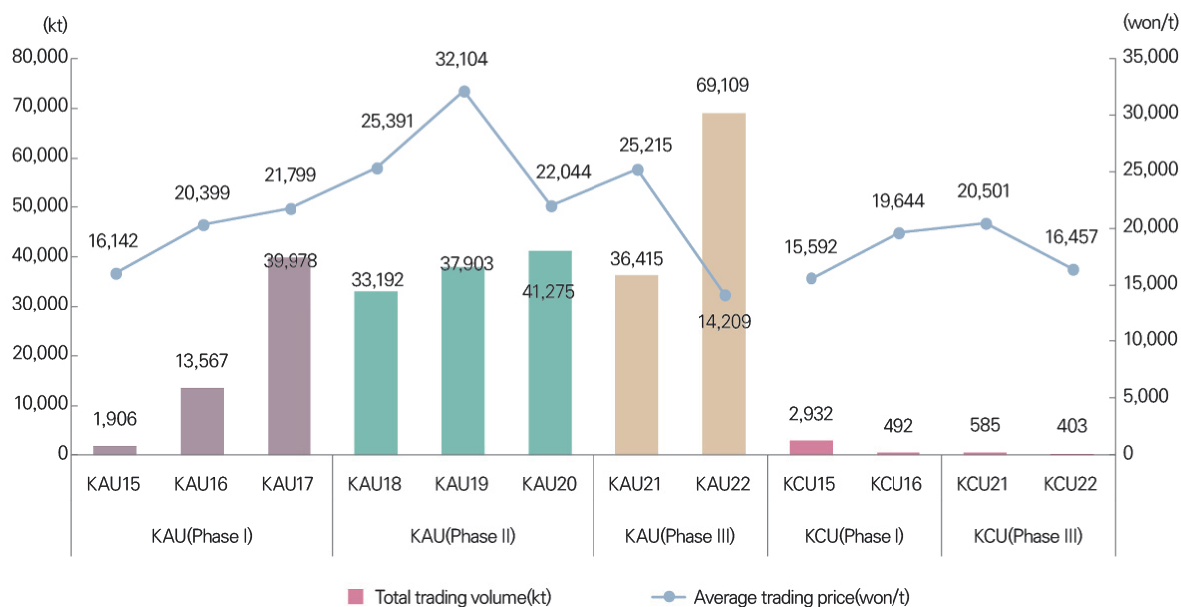
1.2 Trading Volume and Price Trends by Type of Emission Permit

In this section, the trading volume and price for each type of emission permit (KAU, KOC, and KCU) are analyzed for each compliance year. The results of the analysis in this section differ from the results of the analysis of the yearly trading volume in the previous section because different trading periods apply to each compliance year.²⁴⁾

During Phase I, the trading volume for KAUs rose sharply at an average annual rate of 350% to 1.9 Mt (KAU15), 13.6 Mt (KAU16), and 40.0 Mt (KAU17). The trading volume for KAUs also increased during Phase II from 33.2 Mt (KAU18) to 37.9 Mt (KAU19) and 41.3 Mt (KAU20). During Phase III, the trading volume for KAU21 slightly decreased to 36.4 Mt, but that for KAU22 increased to 69.1 Mt, which was approximately 90% higher than the previous year. The average trading price for KAUs continuously rose from 16,142 won (KAU15) to 32,104 won (KAU19). Subsequently, it sharply declined due to the impact of COVID-19 and rose again to 22,044 won (KAU20) and 25,215 won (KAU21). Due to lower production activity and damage caused by Typhoon Hinnamno that occurred in the second half of 2022, KAU22 was traded at an average price of 14,209 won, which was 43.6% lower than the previous year.

During Phase I, 2.9 Mt of KCU15 and 0.5 Mt of KCU16 were traded. There was no record of the trading of KCUs during Phase II. The trading of KCUs resumed in Phase III, during which 0.6 Mt of KCU21 and 0.4 Mt of KCU22 were traded. The highest average trading price for KCUs was 20,501 won for KCU21, while the average trading price for KCU22 was 16,457 won, which was 19.7% lower than the previous year.

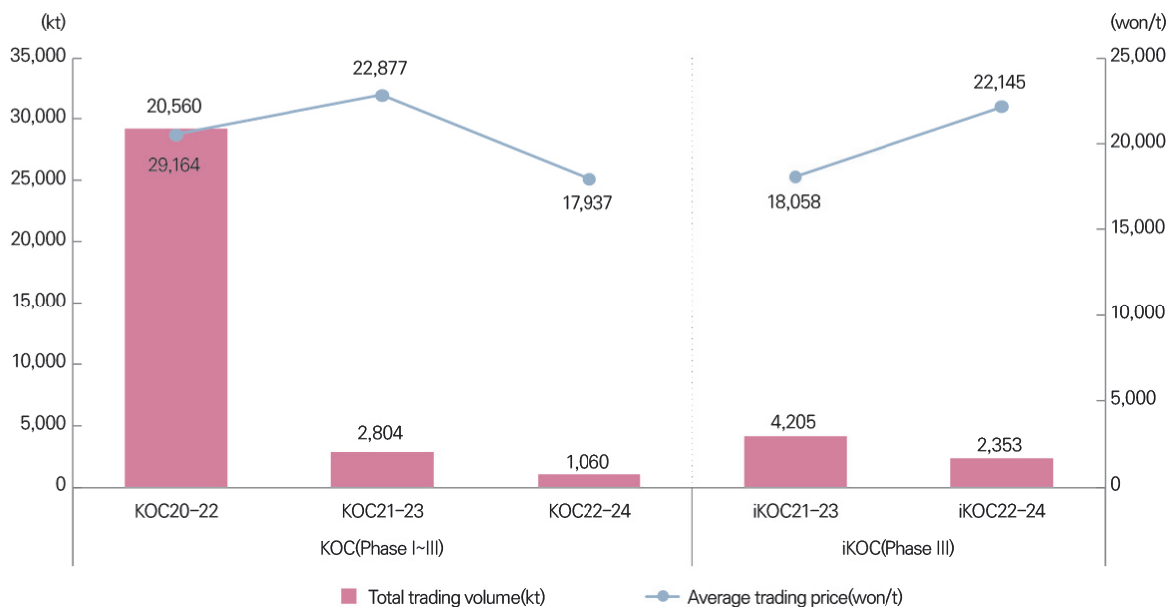
24) KAU22 refers to KAUs allocated for the 2022 compliance year, and, in the exchange market, they can be traded from the date of their listing on the KRX until the date of their surrender. Accordingly, KAU22 was traded from 4 January 2021 to 31 August 2023.



〈Figure III-2〉 Total trading volume and Average trading price(KAU, KCU)

Unlike KAUs and KCUs, KOCs are not used for the surrender of emission permits and can be traded by entities other than covered entities. Trends in the trading of KOCs could not be determined because, since June 2021, KOCs have been renamed²⁵⁾ so their trades are subject to fixed trading periods. Nevertheless, of note is that the trading volume for iKOCs (certified reductions from overseas offset projects) often exceeds the trading volume for KOCs (certified reductions from domestic offset projects) and that the average trading price for iKOCs and KOCs tend to show opposite trajectories for the same trading period.

25) KOCs issued prior to the revision of the guidelines for KOC certification were renamed KOC20-22.



〈Figure III-3〉 Total trading volume and Average trading price(KOC)

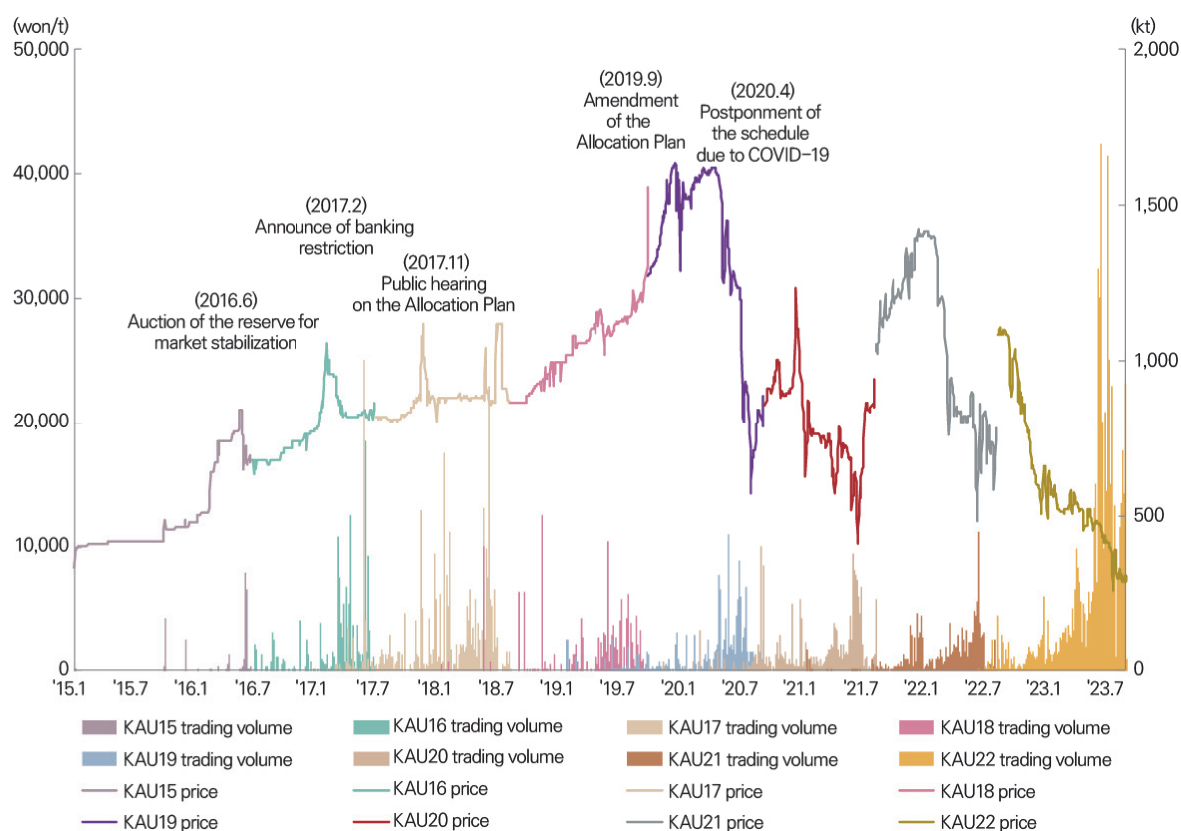
1.3. Changes in the Trading Records for Each Phase

In the K-ETS, the operational procedures and schedule often tend to serve as an incentive for the trading of emission permits. Covered entities determine the amount of their GHG emissions by submitting emissions reports to the government by the end of March every year. It has been observed that covered entities tend to commence emission permit trading from this point on and trade emission permits most actively during a period of one to three months before completion of the surrender of emission permits. In addition, trading volumes and prices have tended to fluctuate in response to policy changes. In this section, factors contributing to changes in the exchange trading records for KAUs for each phase are analyzed.

The price for KAUs, which was 8,640 won on the first trading day of Phase I, exhibited an overall upward trajectory. It fluctuated sharply around the time emission permits from the reserve for market stabilization measures were auctioned (May 2016) and restrictions on the banking of emission permits were announced (February 2017) but stabilized thereafter. Ultimately, the price rose to reach 21,600 won on the last trading day (9 August 2018), representing a 2.5-fold increase compared to the price on the first trading day.

During Phase II, the trading volume and trading price for KAUs rose until the first quarter of 2020 due to increased demand for emission permits. The price temporarily declined after sub-sector meetings were held (May 2019) and the Allocation Plan was amended (September 2019) to reflect the amended Roadmap specifying the updated NDC. However, the price for KAUs continued to rise steadily until April 2020 to reach the 40,500 won range. Subsequently, it sharply decreased due to the impact of COVID-19, reaching 22,500 won on the last trading day of Phase II (11 August 2021).

At the beginning of Phase III, the price rose again to reach the 35,000 won range in early 2022. However, it steadily declined thereafter to reach 19,500 won on the last trading day of the 2021 compliance year (11 August 2022).



Note: For convenience, only the price and trading volume of the index emission permits for the corresponding periods are used. For example, although the trading of KAU21 began in 2020, the above graph is based the amount of KAU21 traded only in the 2021

〈Figure III-4〉 Trading price and Volume for KAU15-KAU22 in the Exchange market

During the period in which KAU22 was listed on the KRX (January 2021–August 2023),²⁶⁾ KAU20–25, KCU21–22, and KOCs were traded in the exchange and OTC markets. In this section, trading records for KAU22, KCU22, and KOCs²⁷⁾ used for the surrender of emission permits for the 2022 compliance year are analyzed, for which the total trading volume was 86.8 Mt.

2.1. Analysis of the Trading Volume

In the 2022 compliance year, the trading volume was 69.1 Mt for KAU22, 0.4 Mt for KCU22, and 17.3 Mt for KOCs, accounting for 79.6%, 0.5%, and 19.9% of the total trading volume, respectively.

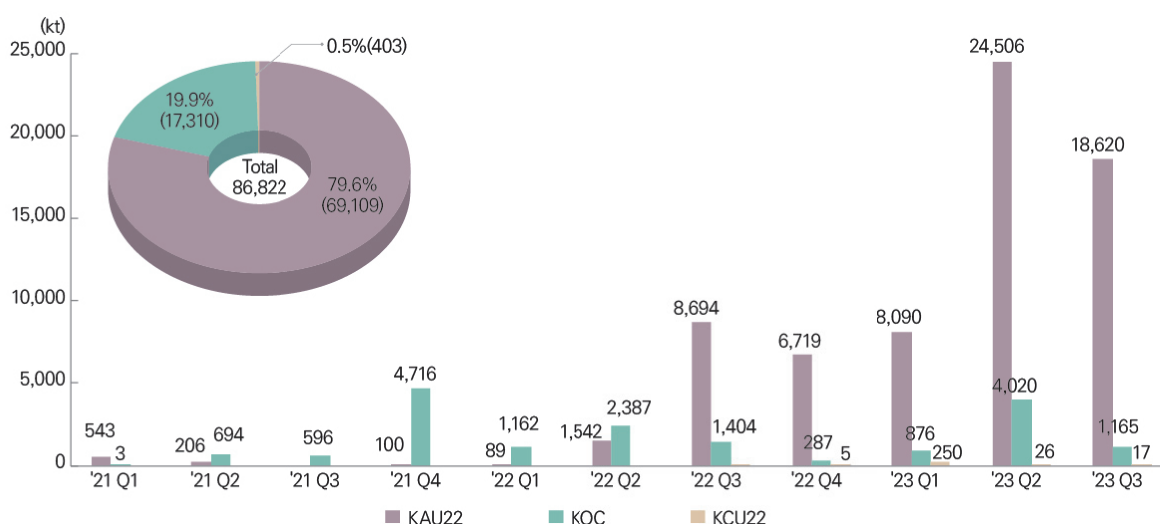
The trading of KAU22 began in January 2021 but, until the first quarter of 2022, KAU22 was sporadically traded only in the OTC market without demonstrating any notable trends. In the second quarter of 2022, 1.5 Mt was traded, and full-scale trading of KAU22 commenced after the trading of KAU21 ended. The trading volume for KAU22 was 8.7 Mt in the third quarter of 2022, 6.7 Mt in the fourth quarter of 2022, and 8.1 Mt in the first quarter of 2023. The trading volume increased sharply in the second quarter of 2023, reaching a peak of 24.5 Mt, which accounted for 35.5% of the total trading volume for KAU22. This trend continued in the third quarter of 2023, with the trading volume reaching 18.6 Mt before the 2022 compliance year ended on 31 August 2023, which was equivalent to 26.9% of the total trading volume for KAU22. This sharp increase in the trading volume during the second and third quarters of 2023 appears to be the result of two factors: the increase in the trading of KAU22 by covered entities to comply with the obligation to surrender emission permits with the end of the 2022 compliance year approaching, and the increase in the maximum number of emission permits market makers and securities companies may hold to 6 Mt (from the previous 3 Mt) and 1 Mt (from the previous 0.5 Mt), respectively, as of June 2023.

The trading of KCU22 began in the third quarter of 2022. The trading volume for KCU22 increased from 0.1 Mt in the third quarter of 2022 to 0.3 Mt in the first quarter of 2023, which was the highest quarterly trading volume. The trading volume for the other quarters remained low, ranging from 5 kt to 25 kt.

26) KAU22 and KCU22 were traded from 4 January 2021 to 31 August 2023 and 30 March 2022 to 31 August 2023, respectively.

27) KOCs include KOC20–22, KOC21–23, KOC22–24, KOC23–25, iKOC21–23, iKOC22–24, and iKOC23–25.

The trading volume for KOCs did not demonstrate any notable trends because KOCs consist of emission permits from different trading periods. The trading volume for KOCs reached a quarterly record of 4.7 Mt in the fourth quarter of 2021, which accounted for 27.2% of the total trading volume for KOCs. From the first to third quarters of 2022, it remained in the range of 1.2 Mt to 2.4 Mt. The trading volume for KOCs fell dramatically to 1.0 Mt in the fourth quarter of 2022 and the first quarter of 2023 and increased to 4.0 Mt in the second quarter and 1.2 Mt in the third quarter of 2023.



Note: The third quarter of 2023 includes the trading volume until August.

〈Figure III-5〉 Quarterly trading volume by emission permit in the 2022 compliance year

The emissions trading market is largely divided into the exchange market and the OTC market. On the exchange market, emission permits are traded via real-time trading and block trading,²⁸⁾ which can be used by all covered entities, or via auctions.

28) Regulations on the Emissions Trading Market Operation Article 44 (Real-Time Trading as a Principle) (1) In the emissions trading market, emission permits shall be traded independently through competitive real-time trading, which can be divided into real-time trading with a single price and real-time trading with multiple prices.

(2) The priority of asking and bidding prices in real-time trading shall be as follows:

1. Selling orders with a lower asking price shall take precedence over selling orders with a higher asking price, and buying orders with a higher bidding price shall take precedence over buying orders with a lower bidding price;

2. Regarding orders with the same prices, the order that was submitted earlier shall take precedence over the order that was submitted later.

Article 47 (Block Trading) (1) Notwithstanding the provisions of Articles 44 to 46, the Exchange may allow general members and external members who are GHG reduction specialists to trade emission permits based on the conditions they have agreed on with other parties in terms of their type, price, and quantity.

(2) The price at which the trading under paragraph 1 may be conducted shall not exceed the upper or lower price limits of the day the trading is to be conducted.

(3) The time of submission of the order, the quantity of the order, and other necessary matters pertaining to block trading shall be provided for in the detailed rules.

Of the total 69.1 Mt of KAU22 traded, 60.8 Mt was traded in the exchange market and 8.4 Mt was traded in the OTC market, accounting for 87.9% and 12.1%, respectively. Specifically, the amount of KAU22 traded via real-time exchange trading was 47.9 Mt, which accounted for the highest proportion of the trading volume for KAU22, followed by the amount traded via auction (12.6 Mt), OTC trading (8.4 Mt), and block exchange trading (0.2 Mt). Of note was that the proportion of exchange trading for KAU22 has grown compared to KAU21 (69% for the exchange market and 31% for the OTC market) due to a sharp increase in real-time exchange trading.

Full-scale real-time trading of KAU22 began in the third quarter of 2022 and continued to increase thereafter. The real-time trading volume for KAU22 was 1.4 Mt in the third quarter of 2022, 2.5 Mt in the fourth quarter of 2022, and 4.9 Mt in the first quarter of 2023, and reached a quarterly record of 22.1 Mt in the second quarter of 2023. The real-time trading volume was 17.1 Mt in the third quarter of 2023 (as of August).

Auctions for KAU22, which began in July 2022, exhibited a trend opposite to that observed for the real-time trading of KAU22. The volume of valid bids was 6.5 Mt in the third quarter of 2022 but fell sharply starting in the fourth quarter of 2022. The volume of valid bids decreased from 3.3 Mt in the fourth quarter of 2022 to 2.0 Mt in the first quarter of 2023, reaching 0.8 Mt in April. Auctions scheduled for May and June were canceled following the adjustment of bids pursuant to Article 7²⁹⁾ of the Regulations for the Additional Allocation of Emission Permits for Auctions and Market Stabilization Measures. Ultimately, while the total volume of bids made for KAU22 was 17.8 Mt, the total volume of valid bids was 12.6 Mt, representing 70.9% of the total volume of bids made.

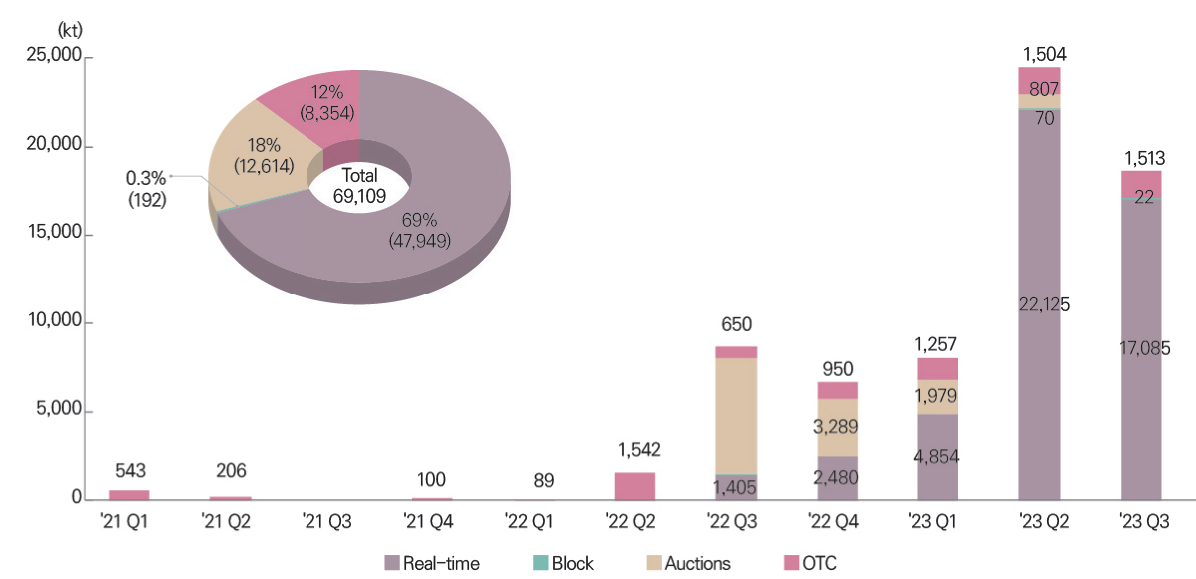
The OTC trading volume for KAU22 remained below 0.6 Mt until the first quarter of 2022 without any particular trend. It reached a quarterly record of 1.5 Mt in the second quarter of 2022, leading KAU22 trades before the commencement of exchange trading. The OTC trading volume remained below 1.0 Mt in the third and fourth quarters of 2022 but rebounded in 2023 to reach 1.3 Mt in the first quarter and 1.5 Mt in the second and third quarters.

The trading volume for KOCs was 13.9 Mt (80.6%) in OTC trading, 2.2 Mt (12.6%) in real-time exchange trading, and 1.2 Mt (6.8%) in block exchange trading, which indicates that most KOCs were

29) Article 7 (Adjustment or Cancellation of Bids) The Minister of Environment may adjust or cancel bids in any of the following cases:
1. When the bidding rate is significantly low;
2. When the bid price is excessively high or low;
3. When it is difficult to form a fair auction price;
4. When it is deemed difficult to conduct normal bidding due to reasons such as market conditions, etc.

traded in the OTC market. The trend in the OTC trading of KOCs was the same as the trend in the overall KOC trades.

Trading of KCU22 occurred only sporadically, and the total trading volume for KCU22 was 0.4 Mt, which was the lowest among all types of emission permits. Of this 0.4 Mt, 0.3 Mt was traded via block exchange trading, 0.1 Mt via OTC trading, and 0.01 Mt via real-time exchange trading, which indicates that the trading volume in the block exchange trading accounted for the highest proportion of the trading volume for KAU22.



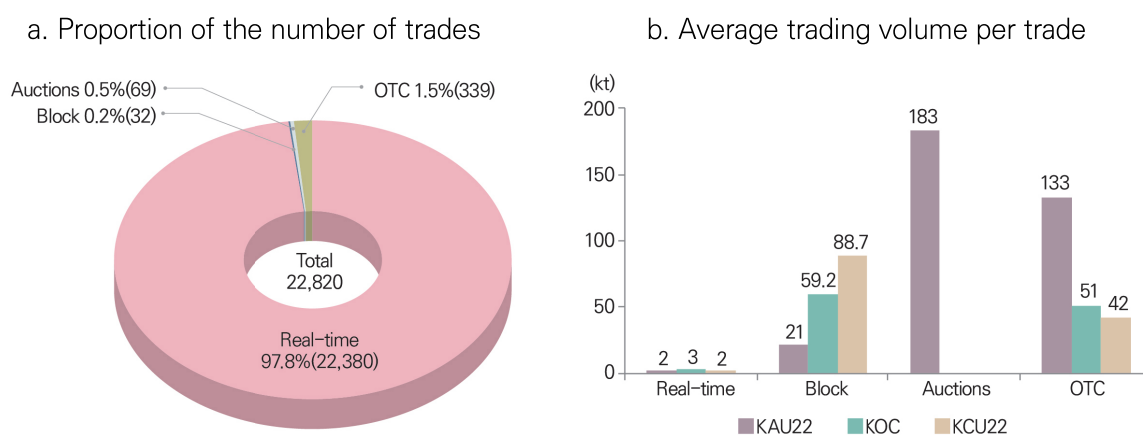
Note: The third quarter of 2023 includes the trading volume until August.

〈Figure III-6〉 Quarterly trading volume of KAU22 by market type

Generally, many small trades occur in the exchange market while fewer, larger trades occur in the OTC market. In particular, real-time exchange trading involves trades by an unspecified number of entities including covered entities, market makers, and securities companies. Therefore, the number of emission permit trades conducted via real-time exchange trading tends to far exceed the number of block exchange and OTC trades, which involve one-on-one trades between specific entities, or auctions, which can only be used by covered entities from sub-sectors eligible for auctions, while the average trading volume per trade is the lowest in real-time exchange trading.

Accordingly, a total of 22,820 trades were conducted in the exchange and OTC markets, including 22,481 trades in the exchange market and 339 trades in the OTC market. In the exchange market, 22,380 trades were made via real-time trading, 32 were via block trading, and 69 were via auction. Broken down by the type of emission permit, there were 21,867 trades for KAU22, 13 trades for KCU22, and 940 trades for KOCs. In the second and third quarters of 2023, a sharp increase in the exchange trading volume for KAU22 led to an increase in the number of KAU22 trades.

The average trading volume for KAU22 per trade was 182.8 kt in auctions, 132.6 kt in OTC trading, 21.4 kt in block exchange trading, and 2.2 kt in real-time exchange trading. Compared to KAU21, the average trading volume per trade has decreased in OTC trading and increased in auctions. The average trading volume for KCU22 and KOCs per trade was highest for block exchange trading, followed by OTC trading and real-time exchange trading.



〈Figure III-7〉 Number of trades and Average trading volume by market in the 2022 compliance year

2.2. Analysis of the Trading Prices for KAUs

The average exchange trading price for KAU22 was 23,000 won on the first trading day (4 January 2021), but actual trading began in July 2022. It reached 29,000 won in early August, which was the highest trading price for KAU22 during the exchange trading period (4 January 2021–31 August 2023). The monthly average trading price for KAU22 remained at 27,130 won in August and 25,894 won in September but fell dramatically thereafter to 22,438 won in October, 18,323 won in November, and 14,824 won in December.

In 2023, the average exchange trading price for KAU22 remained relatively stable in the range of 13,000 won to 14,000 won until April but dropped to 11,955 won and traded below 10,000 won in May. The average trading price on 25 July 2023 was 6,381 won, which represented the lowest average exchange trading price for KAU22 during the exchange trading period. In response, market stabilization measures were implemented pursuant to Article 23 of the Act and Article 38 of its Enforcement Decree,³⁰⁾ which led the government to set the lowest trading price for KAU22 at 7,800 won from 26 July to 1 August. During this period, the daily average price recovered to the 9,600 won range, but there was no further rise in the exchange trading price for KAU22, with the exchange trading price for KAU22 reaching 7,632 won on the last trading day of the 2022 compliance year. The average price for July and August 2023 was 9,698 won and 7,495 won, respectively, and the average exchange trading price for KAU22 during the entire exchange trading period was 11,609 won.

The auction price for KAU22 was 24,000 won in July 2022 when the auctions began, reaching 27,300 won in August and 26,900 won in September. However, similar to the trend in the exchange trading price, it sharply fell to 22,250 won in October, 19,350 won in November, and 14,700 won in December, reaching 12,900 won in January 2023. The price remained between 12,700 won and 13,200 won between February and April. Auctions scheduled for May and June were canceled, and the final average auction price for KAU22 was 21,181 won.

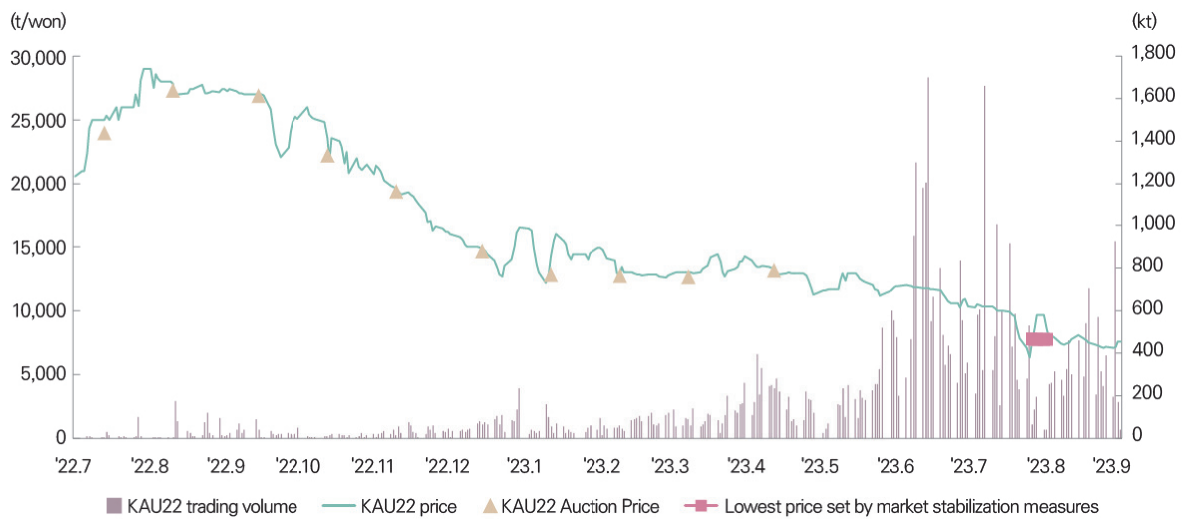
30) **Article 23 of the Act (Stabilization of the Emissions Trading Market)** (1) If any of the following events occurs or is highly likely to occur, the competent authority may take measures to stabilize the emissions trading market through deliberation by the Allocation Committee, as prescribed by Presidential Decree, to facilitate the stable setting of a price for emission permits:

[...]

3. If it is deemed necessary to take market stabilization measures for a cause or event prescribed by Presidential Decree in order to maintain order in the emissions trading market or protect the public interest.

* **Article 38 of the Enforcement Decree (Standards for Market Stabilization Measures)** (1) "Cause or event prescribed by Presidential Decree" as specified in subparagraph 3 of Article 23(1) of the Act refers to any of the following cases:

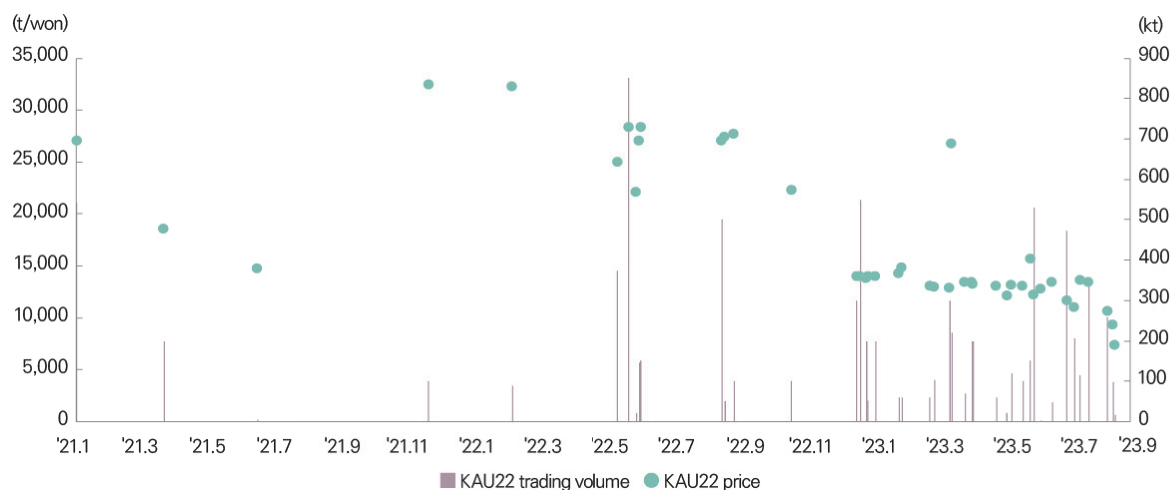
1. If the average price for emission permits for the previous month is less than 60% of the average price for emission permits in the immediately preceding two years [...].



Note: The KAU22 price is weighted average on each trading day. In the absence of trading, the KRX closing price on the trading day was applied.

〈Figure III-8〉 Trading volume and price for KAU22 in the Exchange market

OTC trading of KAU22 began on 18 January 2021. Until May 2022, trading occurred sporadically in a price range of 14,700 won to 32,400 won. The trading price of 32,400 won in December 2021 was the highest OTC trading price for KAU22. Subsequently, the OTC trading price for KAU22 remained in the 20,000 won range until October 2022 but, similar to the trend in the exchange trading price, it sharply fell to the 10,000 won range from December 2022. Except for one transaction, KAU22 was traded in a price range between 12,000 won and 15,700 won until June 2023. Prices began to decline to the 11,000 won range in July and, in August, one transaction occurred at the lowest OTC trading price of 7,400 won before the end of the 2022 compliance year. Ultimately, the overall average OTC trading price for KAU22 was 18,665 won, which was 61% higher than its overall average exchange trading price.



Note: The KAU22 price is weighted average on each trading day when trading was occurred in the OTC market.

〈Figure III-9〉 Trading volume and price for KAU22 in the Over-the-counter market

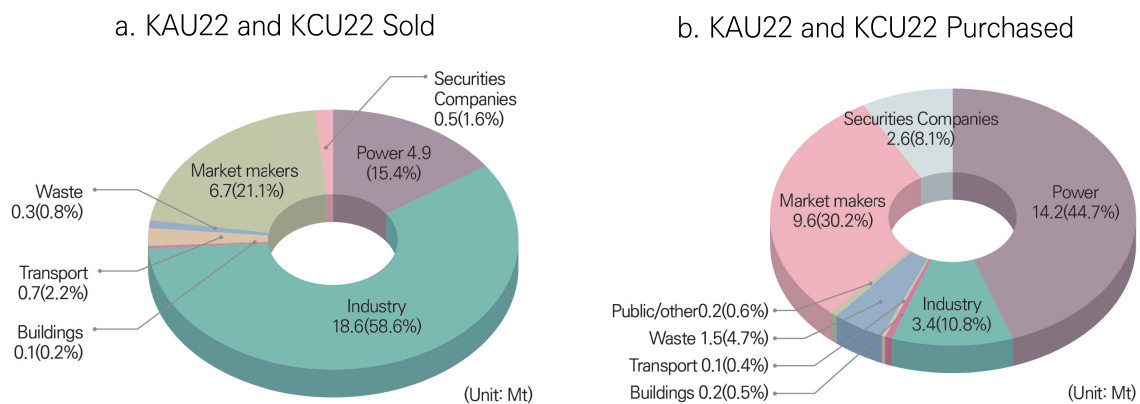
2.3. Analysis of Trading Records by Sector³¹⁾

In this section, KAU22 and KCU22 traded in the exchange and OTC markets (excluding the amount auctioned) are analyzed for each sector. Of the total trading volume of 31.7 Mt (31.3 Mt of KAU22 and 0.4 Mt of KCU22), 23.0 Mt was traded in the exchange market and 8.4 Mt was traded in the OTC market, accounting for 73.3% and 26.7% of the total trading volume, respectively. Broken down by sector, the proportion of emission permits sold was highest in the industry sector and the proportion of emission permits purchased was highest in the power sector, and the proportion of market-maker trades was second highest for both sales and purchases.

Specifically, 18.6 Mt (58.6%) of KAU22 and KCU22 was sold by the industry sector, 6.7 Mt (21.1%) by market makers, 4.9 Mt (15.4%) by power, 0.7 Mt (2.2%) by transport, 0.5 Mt (1.6%) by securities companies, 0.3 Mt (0.8%) by waste, and 0.1 Mt (0.2%) by buildings. In addition, 14.2 Mt (44.7%) of KAU22 and KCU22 was purchased by the power sector, 9.6 Mt (30.2%) by market makers, 3.4 Mt (10.8%) by industry, 2.6 Mt (8.1%) by securities companies, 1.5 Mt (4.7%) by waste, 0.2 Mt (0.6%) by public services/other, 0.2 Mt (0.5%) by buildings, and 0.1 Mt (0.4%) by transport.

31) This analysis was conducted based on the trading volume registered in the ETRS because the KRX does not provide data specific to each sector. The trading records provided in this section may thus be different from those provided in “2.1. Analysis of the Trading Volume.”

Compared to previous compliance years, in the power sector, the amount of KAU22 and KCU22 purchased for the 2022 compliance year was 20.9% higher compared to the amount purchased for the 2021 compliance year (11.7 Mt), but the proportion of KAU22 and KCU22 purchased in the power sector from the total trading volume for KAU22 and KCU22 decreased (55.1% → 44.7%). The sales volume and proportion for KAU22 and KCU22 in the power sector decreased (14.5 Mt in 2020 → 5.7 Mt in 2021 → 4.9 Mt in 2022). Conversely, in the industry sector, the amount of KAU22 and KCU22 sold for the 2022 compliance year was 39.8% higher compared to the amount sold for the 2021 compliance year (13.3 Mt), but the proportion of KAU22 and KCU22 sold in the industry sector from the total trading volume for KAU22 and KCU22 slightly decreased (62.4% → 58.6%). The purchase volume and proportion for KAU22 and KCU22 in the industry sector decreased (15.1 Mt in 2020 → 5.6 Mt in 2021 → 3.4 Mt in 2022). The amount of KAU22 and KCU22 sold and purchased by market makers and securities companies increased significantly compared to the 2021 compliance year, resulting in a decrease in the sales and purchase volume and proportion for KAU22 and KCU22 in other sectors. The trading records for market makers and securities companies are analyzed separately in Sections 2.5 and 2.6, respectively.



〈Figure III-10〉 Sales and Purchase Volume by Sector in the 2022 Compliance Year

2.4 Analysis of Trading Records by Sub-Sector³²⁾

In this section, KAU22 and KCU22 traded in the exchange and OTC markets (excluding the amount auctioned) are analyzed for each sub-sector.³³⁾ Of the total trading volume of 31.7 Mt, 6.7 Mt was sold by market makers, which accounted for the highest proportion (21.1%) of the total sales volume for KAU22 and KCU22, followed by 4.8 Mt sold by the cement sub-sector (15.0%), 3.9 Mt by steel (12.2%), 3.3 Mt (10.4%) by petrochemicals, 2.9 Mt by power generation/energy (9.1%), and 2.0 Mt by integrated energy (6.3%).

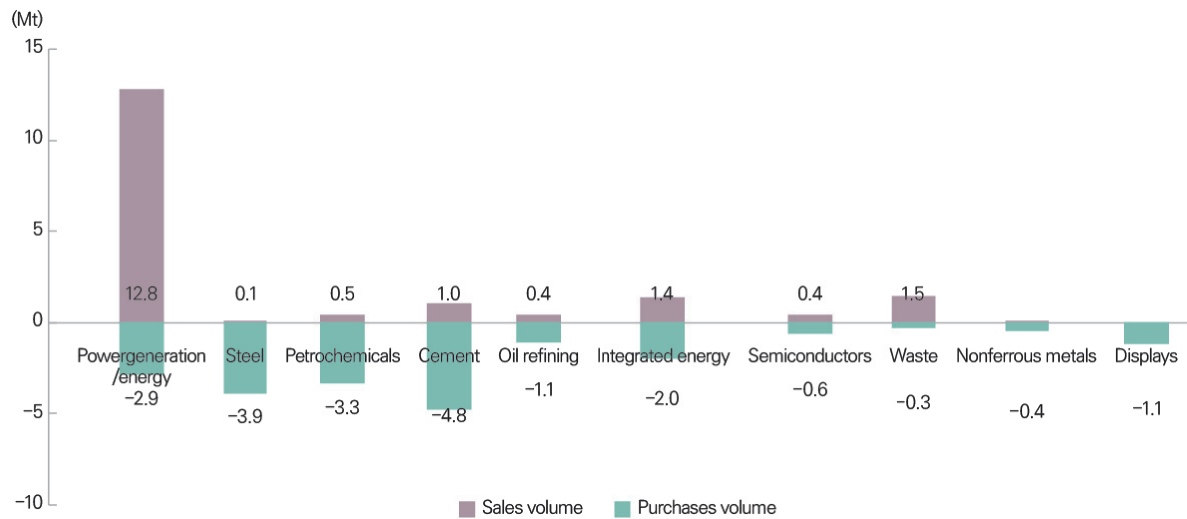
The amount of KAU22 and KCU22 purchased by the power generation/energy sub-sector was 12.8 Mt, which accounted for the highest proportion (40.4%) of the total purchase volume for KAU22 and KCU22, followed by 9.6 Mt purchased by market makers (30.2%), 2.6 Mt by securities companies (8.1%), 1.5 Mt by waste (4.7%), 1.4 Mt by integrated energy (4.3%), and 1.0 Mt by cement (3.3%).

According to the analysis of the trading volume for 10 sub-sectors³⁴⁾ with the highest certified emissions in the 2022 compliance year, the amount of emission permits sold exceeded the amount of those purchased in eight sub-sectors, excluding the power generation/energy and waste sub-sectors. The net purchase of the power generation/energy and waste sub-sectors was 10.0 Mt and 1.2 Mt, respectively; the covered entities in these sub-sectors purchased emission permits to make up for a deficit in their emission permits caused by excess certified emissions and thus comply with their obligation to surrender emission permits. In the steel, petrochemical, cement, and oil refining sub-sectors, which ranked second to fifth, respectively, in terms of certified emissions, the amount of emission permits sold exceeded the amount of those purchased by 3.7 Mt, 2.8 Mt, 3.7 Mt, and 0.7 Mt, respectively. It appears that the covered entities in all of these sub-sectors had surplus emission permits to sell. In the semiconductor sub-sector, although the amount of certified emissions exceeded the amount of allocated emission allowances, the amount of emission permits sold exceeded the amount of those purchased. It was observed that the covered entities in this sub-sector complied with their obligation to surrender emission permits by submitting KCUs instead of purchasing emission permits to make in the power generation/energy sub-sector, followed by steel, petrochemicals, cement, oil refining, integrated energy, semiconductor up for a deficit.

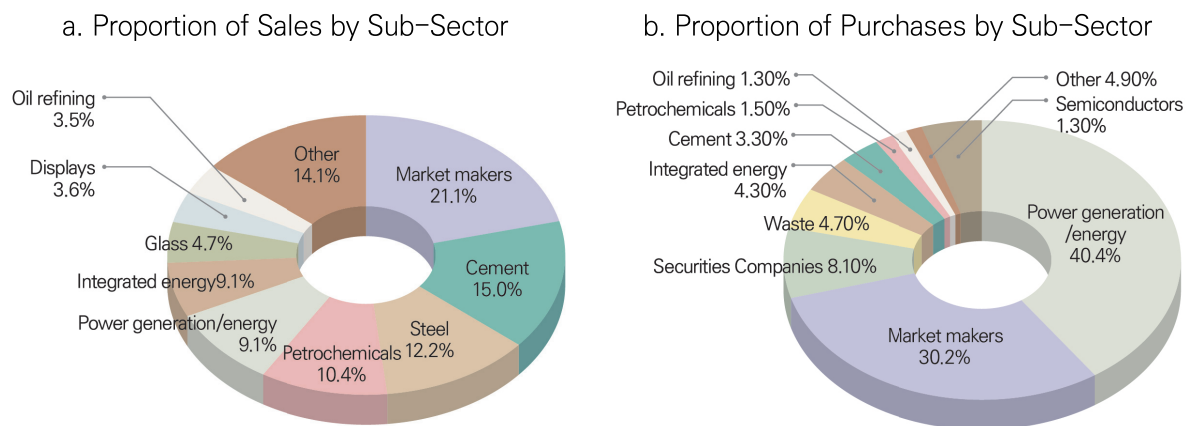
32) This analysis was conducted based on the trading volume registered in the ETRS because the KRX does not provide data specific to sub-sector trades. The trading records provided in this section may thus be different from those provided in "2.1. Analysis of the Trading Volume."

33) A total of 30 sub-sectors, market makers, and securities companies.

34) The amount of certified emissions was the highest in sectors, waste, nonferrous metals, and displays.



〈Figure III-11〉 Sales and Purchases of the 10 Sub-Sectors with the Highest Certified Emissions in the 2022 Compliance Year



〈Figure III-12〉 Proportion of Sales and Purchases by Sub-Sector in the 2022 Compliance Year

2.5. Analysis of the Trading Records for Market Makers³⁵⁾

In accordance with Article 22-2 of the Act, the government introduced the market-making system in Phase II to revitalize emissions trading and ensure the stable operation of the emissions trading market. Under this system, the government lends emission permits to market makers every month from the reserve for market-making, and market makers are required to suggest the asking or bidding price for emission permits and participate in emission permit transactions. In the 2018 and 2019 compliance years, the early stages of the introduction of the market-making system, two financial institutions were designated as market makers. The number of market makers participating in the system then increased to five in the 2020 compliance year and seven in the 2022 compliance year.³⁶⁾

Market makers sold 6.7 Mt and purchased 9.6 Mt of KAU22. Similar to previous compliance years, the amount of KAUs purchased by market makers exceeded the amount of KAUs that they sold. Both the amount of KAU22 sold and purchased by market makers increased significantly compared to that of KAU21 (1.3 Mt was sold and 2.4 Mt was purchased). This appears to be due to the designation of additional market makers and the increase in the maximum number of emission permits market makers may hold (0.5 Mt → 1 Mt).

Between September 2022 and August 2023, during which KAU22 was traded as the primary type of emission permit, the proportion of market-maker trades from the total exchange trading volume for KAU22 (excluding the amount auctioned) was 28.2% for sales and 43.1% for purchases. Considering that the proportion of market-maker trades from the total KAU21 trading volume during the period when KAU21 was traded as the primary type of emission permit (August 2021–August 2022) was 13.7% for sales and 25.1% for purchases, the proportion of market-maker trading in the exchange market has increased significantly.

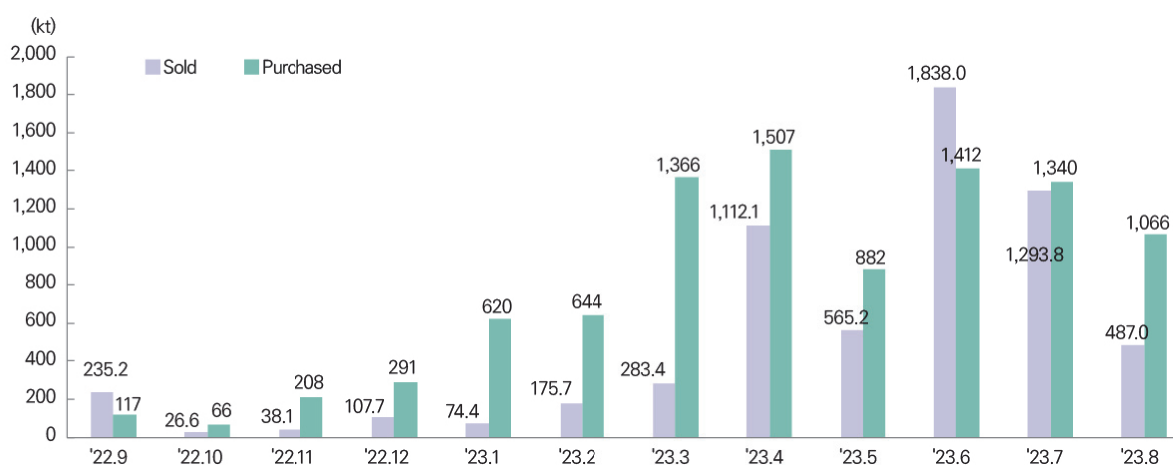
In terms of the monthly trading volume for sales, the amount of KAU22 sold by market makers in the exchange market in September 2022 was 235.2 kt, which accounted for 49.4% of the total exchange trading volume for KAU22. This was the highest proportion obtained during the period subject to analysis, which indicates that market makers have played a role in supplying emission permits to the

35) This analysis was conducted based on the trading volume registered in the ETRS. The trading records provided in this section may thus be different from those provided in “2.1. Analysis of the Trading Volume.”

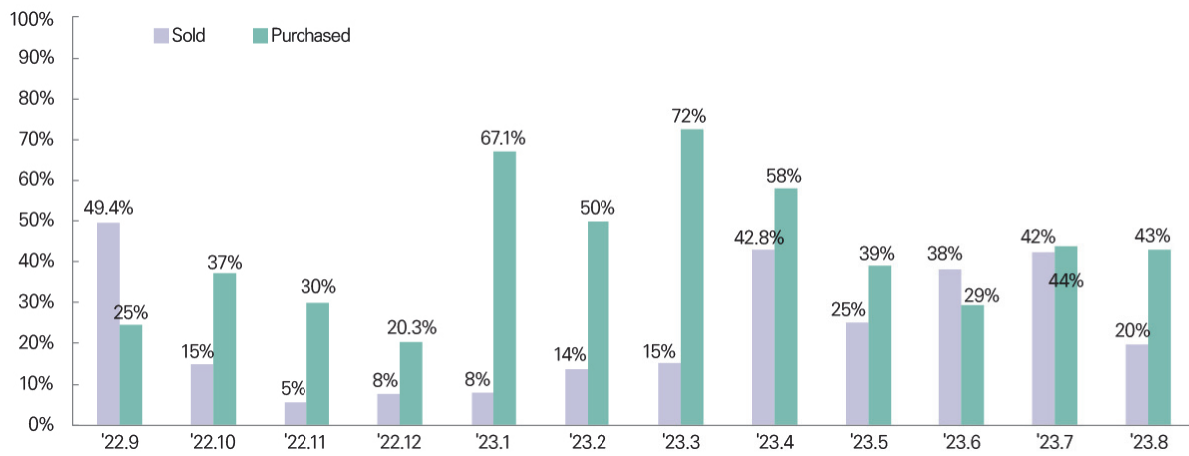
36) Before the 2022 compliance year, the designated market makers included the Korea Development Bank, the Industrial Bank of Korea, Hana Financial Investment, the Korea Investment & Securities, and SK Securities. In the 2022 compliance year, KB Securities and Shinhan Securities were also designated as market makers.

exchange market at the onset of KAU22 trades. The proportion of KAU22 sold by market makers remained below 15% until March 2023 but increased to 42.8% in April and remained above 20% until August. The sales volume for KAU22 also increased to 1.1 Mt from April 2023, reaching a peak of 1.8 Mt in June.

The proportion of KAU22 purchased by market makers in the exchange market was 20.3% in December 2022, which was the lowest proportion obtained during the period subject to analysis. However, it increased sharply in the following month, reaching a particularly high level from January to April 2023. The purchase volume for KAU22 continued to increase to 1.5 Mt in April 2023 and remained in the range of 0.9 Mt to 1.4 Mt until August. It is believed that market makers purchased surplus emission permits sold by covered entities after their submission of emissions reports at the end of March, a practice which continued until the covered entities surrendered the emission permits.



〈Figure III-13〉 Trading volume of market makers for KAU22



〈Figure II-14〉 Proportion of market makers for KAU22 in the Exchange market

2.6. Analysis of Proprietary Trading by Securities Companies³⁷⁾

After the enactment and enforcement of the relevant notification³⁸⁾ in October 2021, 20 securities companies began to participate in the emissions trading market from December 2021. In the 2022 compliance year, a total of 21 securities companies participated, selling 0.5 Mt and purchasing 2.5 Mt of KAU22. Although the absolute volume of KAU22 trades by these securities companies was smaller than that by market makers, the trend was similar, with a significant increase in the trading volume for KAU22 compared to KAU21 (0.1 Mt was sold and 0.6 Mt was purchased) and the amount of KAU22 purchased exceeding the amount of KAU22 sold.

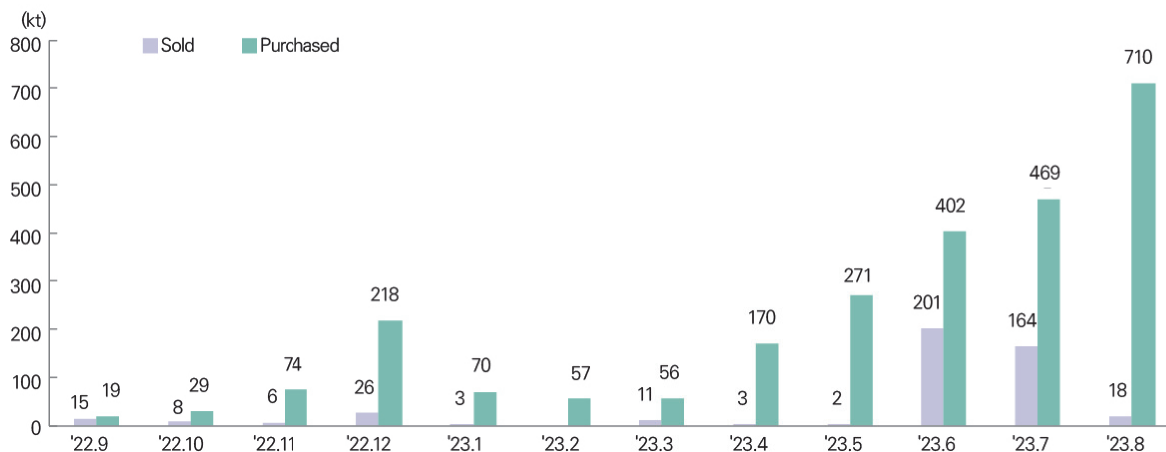
Between September 2022 and August 2023, during which KAU22 was traded as the primary type of emission permit, the proportion of securities company trades from the total exchange trading volume for KAU22 (excluding the amount auctioned) was 2.1% for sales and 11.5% for purchases. Considering that the proportion of securities company trades from the total KAU21 trading volume during the period when KAU21 was traded as the primary type of emission permit (August 2021–August 2022) was 1.1% for sales and 5.9% for purchases, the proportion of securities company trading in the exchange market increased.

In terms of the monthly trading volume for sales, the amount of KAU22 sold by securities companies in the exchange market between September 2022 and May 2023 remained low at less than 26 kt, and the proportion of KAU22 sold by securities companies from the total sales volume for KAU22 was also low at less than 5%. The amount of KAU22 sold by securities companies reached a record high of 201.3 kt and 163.7 kt in June and July, respectively, but their proportion of the total sales volume for KAU22 was low at 4.2% and 5.4%, respectively.

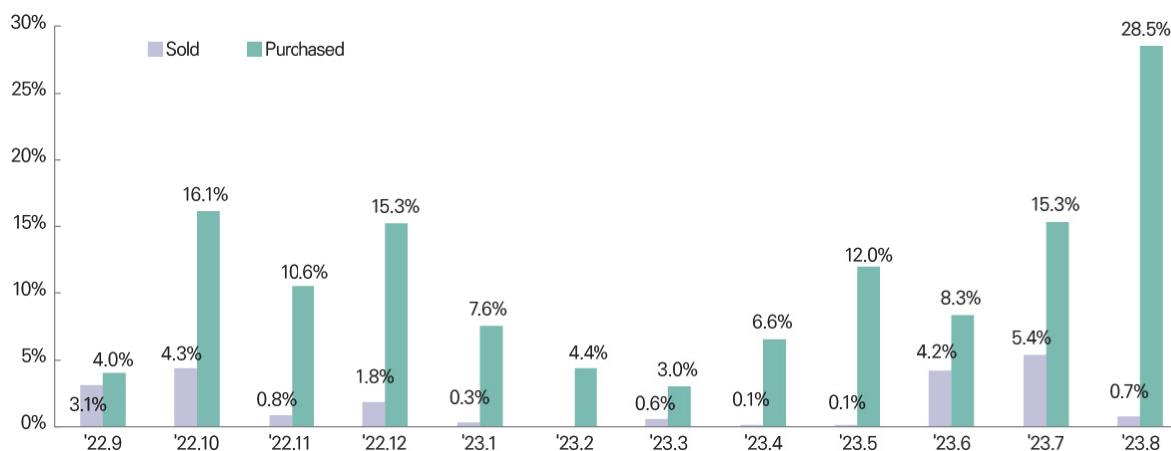
The amount of KAU22 purchased by securities companies continued to increase until December 2022 to 218.4 kt, and the proportion of KAU22 purchased by securities companies from the total purchase volume for KAU22 also continued to increase to 15.3%. The amount remained below 70 kt and the proportion was maintained at a level below 8% until March 2023. The two began to increase after April 2023. The amount of KAU22 purchased by securities companies was highest in August (709.6 kt), which accounted for 28.5% of the total purchase volume for KAU22.

37) This analysis was conducted based on the trading volume registered in the ETRS. The trading records provided in this section may thus be different from those provided in “2.1. Analysis of the Trading Volume.”

38) Notification on Emissions Trade Brokerage Companies (Ministry of Environment Notification No. 2021–203, enacted and entered into force on 19 October 2021).



〈Figure III-15〉 Trading volume of securities companies for KAU22



〈Figure III-16〉 Proportion of securities companies for KAU22 in the Exchange market

2023

KOREAN EMISSIONS TRADING SYSTEM REPORT

IV

Phase III
2023 Korean Emissions Trading System Report

Survey

1. Overview of the Survey
2. Views on and Response to the K-ETS
3. GHG Emission Reduction Efforts and Performance
4. Improvement of the K-ETS for Phase IV

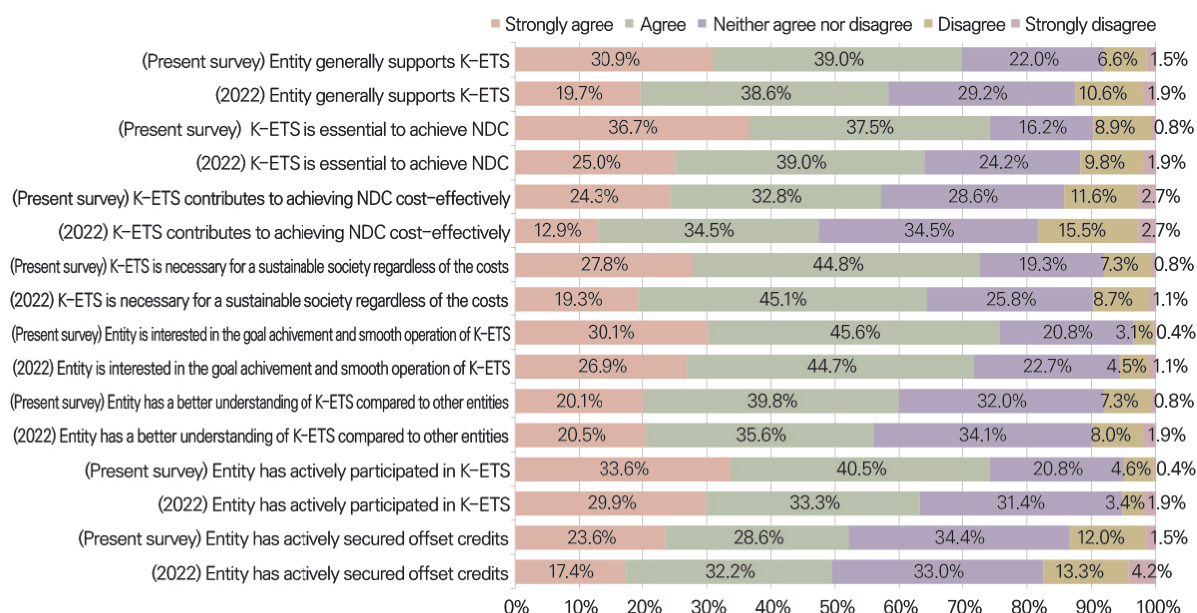
A survey was conducted with covered entities participating in the K-ETS regarding their views of the K-ETS and emissions trading market, the implementation of the K-ETS, the GHG emission reduction efforts and performance, and directions for improving the K-ETS for Phase IV. The survey was conducted for approximately three weeks from 25 September to 17 October 2023 by selecting³⁹⁾ covered entities that were able to meet their obligation to surrender emission permits for 2022. The total number of responses, excluding duplicates, was 259, with a response rate of 37.7%.

³⁹⁾ In the 2022 compliance year, a total of 713 entities surrendered emission permits. The survey was distributed to 688 of these entities, with the other 25 entities excluded because accurate contact information was not available.

2.1. Views on the K-ETS

Covered entities' views on the K-ETS were analyzed. The survey results showed that covered entities were generally supportive of the K-ETS (positive: 69.9%; negative: 8.1%). The proportion of responding entities saying that the K-ETS is necessary to achieve Korea's NDC (positive: 74.2%; negative: 9.7%) and that the K-ETS is necessary for the transition to a sustainable society regardless of the costs of responding to it (positive: 72.6%; negative: 8.1%) was high.

In addition, many respondents reported that the K-ETS contributes to achieving GHG reduction targets in a cost-effective manner (positive: 57.1%; negative: 14.3%). The proportion of responding entities saying that they are interested in the successful achievement of the goals and smooth operation of the K-ETS (75.7%) was significantly higher than the proportion of entities who claimed otherwise (3.5%). The responding entities also reported that they have actively participated in emissions trading (positive: 74.1%; negative: 5.0%) and actively attempted to secure a reduction in GHG emissions (positive: 52.2%; negative: 13.5%). Of note was that the proportion of respondents responding positively about their participation in emissions trading was higher than the proportion of respondents responding positively about their attempts to secure a reduction in GHG emissions. These results corresponded closely with the results of the previous survey, with an overall increase in the proportion of positive responses and a decrease in the proportion of negative responses. For all survey items, the rate of positive responses exceeded 50%.

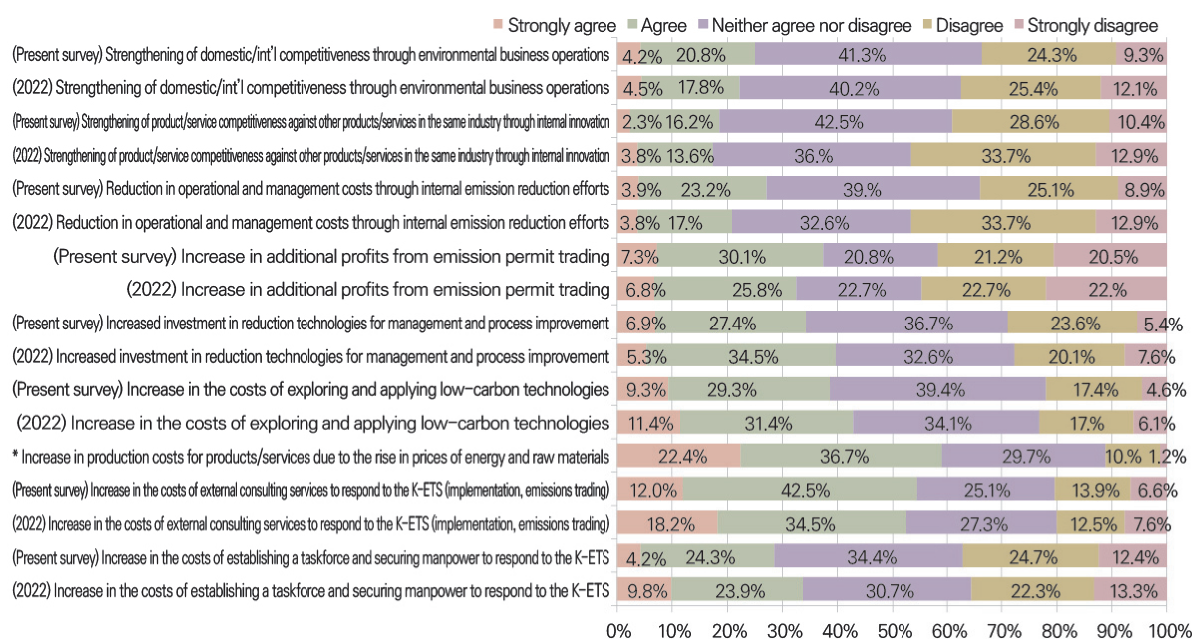


〈Figure IV-1〉 Overall views on and response to the K-ETS

In order to determine the impact of the K-ETS on the business operations of the covered entities, the extent of their investment in and the costs incurred by their participation in the K-ETS were analyzed. The survey results showed that the proportion of positive responses was higher for an increase in production costs for products/services due to the rise in prices of energy and raw materials (positive: 59.1%, 153 responses; negative: 11.2%, 29 responses), an increase in the costs of external consulting services to respond to the K-ETS (positive: 54.5%, 141 responses; negative: 20.5%, 53 responses), an increase in the costs of exploring and applying low-carbon technologies (positive: 38.6%, 100 responses; negative: 22.0%, 57 responses), increased investment in reduction technologies for management and process improvement (positive: 34.3%, 89 responses; negative: 29.0%, 75 responses), and an increase in the costs of establishing a taskforce and securing manpower to respond to the K-ETS (positive: 28.5%, 74 responses; negative: 37.1%, 96 responses). These results suggest that, despite the management burden caused by reasons such as an increase in production costs for products/services, the covered entities have made efforts to respond to the K-ETS with the application of low-carbon technologies and achieving a reduction in GHG emissions.

However, it appears that efforts to respond to the K-ETS and reduce GHG emissions have not yet led to a strengthening of corporate competitiveness or an increase in corporate profit. The proportion of negative responses was somewhat higher than that of positive responses regarding all of the following

survey items: an increase in additional profits from emission permit trading (positive: 37.4%, 97 responses; negative: 41.7%, 108 responses), a reduction in operational and management costs through internal emission reduction efforts (positive: 27.1%, 70 responses; negative: 34.0%, 88 responses), the strengthening of corporate competitiveness at the domestic/international level through environmental business operations (positive: 25.0%, 65 responses; negative: 33.6%, 87 responses), and the strengthening of product/service competitiveness against other products/services in the same industry through internal innovation (positive: 18.5%, 48 responses; negative: 39.0%, 101 responses). Nevertheless, the slight increase in the positive response rates and decrease in the negative response rates compared to the previous year is a positive development.



* Note : Survey items marked with * have been newly introduced in the present survey

<Figure IV-2> Impact of the K-ETS on the Business Operations of the Covered Entities

The views of the covered entities on the performance of the market-making system and third-party participation in emissions trading⁴⁰⁾ introduced as measures to enhance the liquidity of the emissions trading market and expand market predictability were examined. A high proportion of neutral responses for all survey items indicates that covered entities did not have clear views on the performance of these measures. Nevertheless, the responding entities' views on the measures were analyzed focusing on positive (strongly agree and agree) and negative (strongly disagree and disagree) responses.

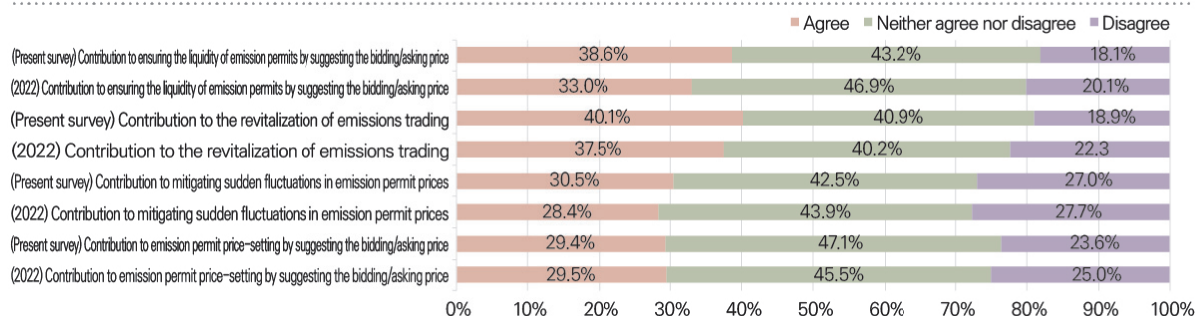
Regarding the market-making system, the proportion of positive responses was higher to a certain extent than that of negative responses for all survey items. Specifically, the entities responded positively regarding the market-making system's contribution to ensuring the liquidity of emission permits (positive: 38.6%, 100 responses; negative: 18.1%, 47 responses), revitalizing emissions trading (positive: 40.2%, 104 responses; negative: 18.9%, 49 responses), mitigating sudden fluctuations in emission permit prices (positive: 30.5%, 79 responses; negative: 27.0%, 70 responses), and establishing prices by suggesting the bidding or asking price (positive: 29.3%, 76 responses; negative: 23.6%, 61 responses). In particular, the proportion of positive responses was highest for the system's contribution to the revitalization of emissions trading, while the proportion of negative responses was highest for its contribution in mitigating sudden fluctuations in emission permit prices. Compared to the results of the previous year's survey, the proportion of positive responses has increased and the proportion of negative responses has decreased for most survey items.

Views on the market-making system's contributions were analyzed based on the entity size and the results were converted into a 100-point scale.⁴¹⁾ The results showed that entities of all sizes believed market makers have had a more positive impact on ensuring the liquidity of emission permits and revitalizing emissions trading than on mitigating sudden fluctuations in emission permit prices or establishing emission permit prices. In general, mid-sized companies gave lower scores (contribution in ensuring the liquidity of emission permits: 54.1 points; revitalizing emissions trading: 52.5 points; mitigating sudden fluctuations in emission permit prices: 49.3 points; establishing prices by suggesting the bidding or asking price: 48.9 points), while other entities (public institutions) gave higher scores (contribution in ensuring the liquidity of emission permits: 58.1 points; revitalizing emissions trading: 61.3 points; mitigating sudden fluctuations in emission permit prices: 54.8 points; establishing prices by suggesting the bidding or asking price: 57.3 points).

40) A system that allows participation in the emissions trading market by entities other than covered entities and market makers (i.e., public financial institutions), such as emissions trade brokerage companies.

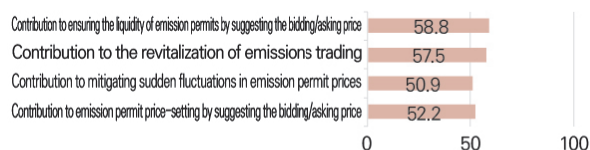
41) A 5-point Likert scale (ranging from strongly agree to strongly disagree) was used in the survey, and the results were converted into a 100-point scale for analysis, with 100 points representing "strongly agree," 75 points representing "agree," 50 points representing "neither agree nor disagree," 25 points representing "disagree," and 0 points representing "strongly disagree."

All respondents

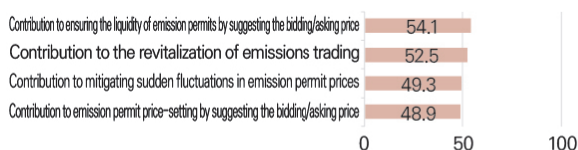


By entity size (on a 100-point scale)

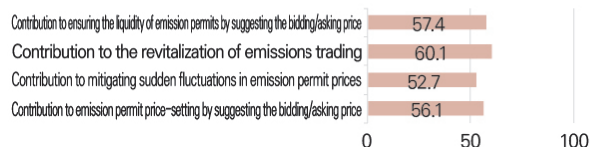
Large companies (80 responses)



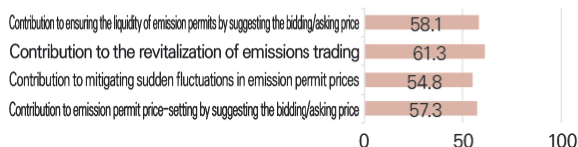
Mid-sized companies (111 responses)



Small-sized companies (37 responses)



Other entities(Public institutions(31 responses)

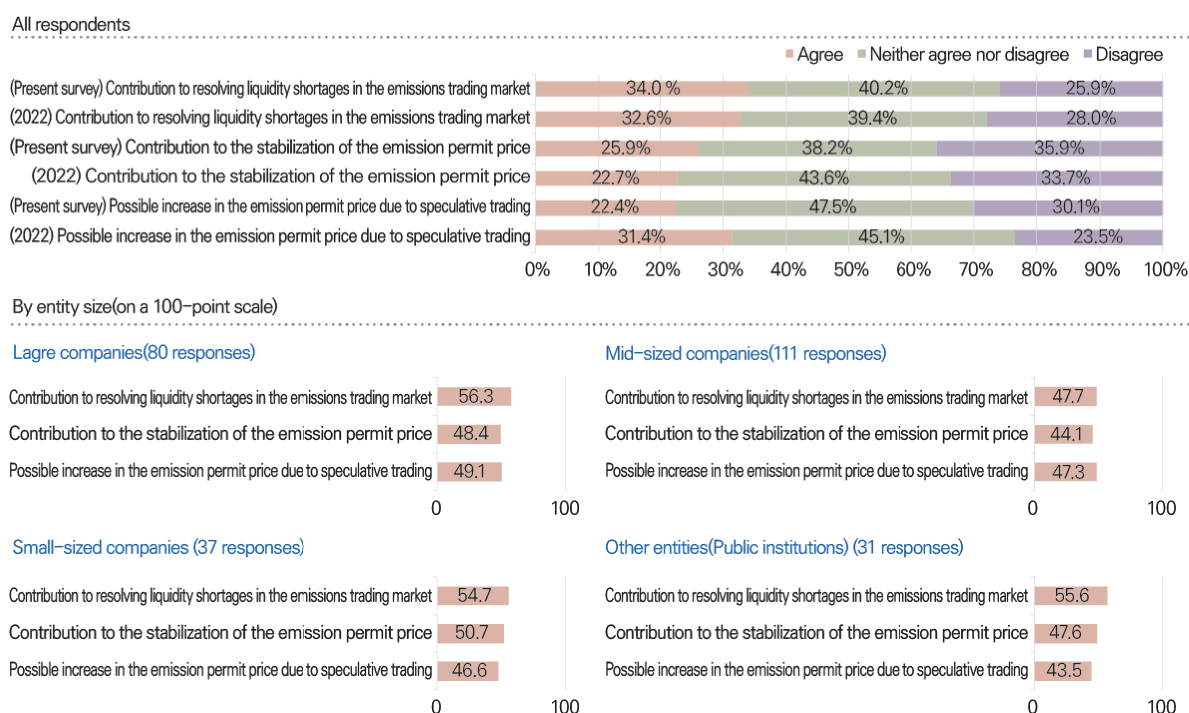


〈Figure IV-3〉 Performance of the Market-Making System

With regard to the impact of third-party trading in terms of improving the liquidity of the market, the proportion of positive responses (34.0%, 88 responses) was slightly higher than that of negative responses (25.9%, 67 responses). However, regarding its contribution to stabilizing the emission permit price, the proportion of positive responses (25.9%, 67 responses) was lower than that of negative responses (35.9%, 93 responses). Compared to the results of the previous year's survey, the positive response rate has increased for all survey items; of note was that, for the contribution of third-party trading in stabilizing the emission permit price, the negative response rate has also increased. In addition, the proportion of entities saying that the emission permit price would increase due to speculative trading by third-party participants (22.4%, 58 responses) was lower than the proportion of entities that expected the opposite (30.1%, 78 responses). This contrasted with the finding of the previous year's survey that covered entities were somewhat concerned about the rise in the emission permit price caused by third-party trading.

Views on the contribution of third-party trading were analyzed based on the entity size, with the results converted to a 100-point scale. The results showed that entities of all sizes believed third-party

trading had a more positive impact on resolving the problem of liquidity shortages in the emissions trading market than stabilizing the emission permit price. For the measure's contribution to resolving liquidity shortages in the emissions trading market, large companies gave the highest score (56.3 points), while mid-sized companies gave the lowest score (47.7 points). In terms of the contribution to stabilizing the emission permit price, small-sized companies gave the highest score (50.7 points) while mid-sized companies gave the lowest score (44.1 points).



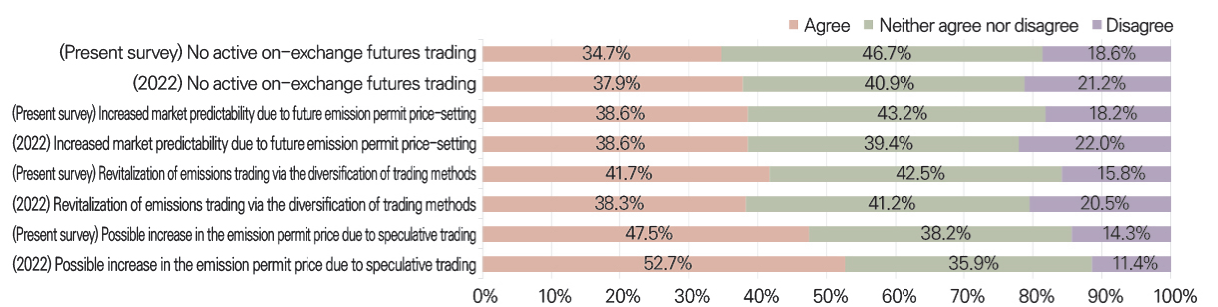
〈Figure IV-4〉 Performance of Third-Party Trading

In addition, covered entities' views on on-exchange futures trading were surveyed. The survey results showed that the proportion of respondents who claimed that, even if an on-exchange futures trading system⁴²⁾ is introduced during Phase III, this trading will not be actively undertaken (34.7%, 90 responses) was higher than the proportion of respondents who claimed the opposite (18.6%, 48 responses). With regard to the impact of a fully established futures trading system on the emissions trading market, the number of respondents saying that it will contribute to an increase in market

42) In futures trading of emission permits, an agreement is concluded to buy or sell emission permits at a predetermined price at a future date. During Phase II, only spot trading was allowed for emission permit trades in the exchange market. However, on-exchange futures trading is planned to be introduced in Phase III (2021–2025).

predictability (positive: 38.6%, 100 responses; negative: 18.2%, 47 responses) and to the revitalization of emissions trading (positive: 41.7%, 108 responses; negative: 15.8%, 41 responses) was higher than the number of respondents who claimed otherwise. On the other hand, it was found that the level of concern about an increase in the emission permit price due to the possibility of speculative trading was also high (positive: 47.5%, 123 responses; negative: 14.3%, 37 responses).

Compared to the results of the previous year’s survey, both the number of respondents saying that futures trading will not be actively undertaken and those claiming the opposite have decreased, which indicates that the proportion of entities opting to defer their judgment has increased. A similar trend was observed for other survey items. When comparing the positive and negative response rates, the negative response rate for the contribution of a futures trading system to an increase in market predictability and revitalizing emissions trading has decreased, while the negative response rate for a possible increase in the emission permit price has increased (and the positive response rate for this survey item has decreased).

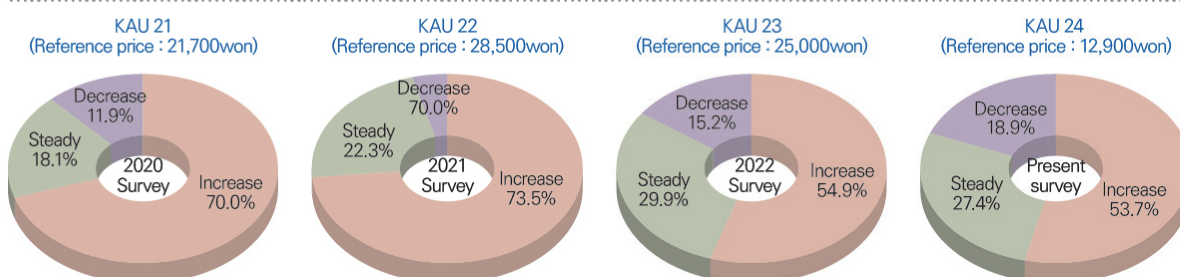


〈figure IV-5〉 Expected Impact of an On-Exchange Futures Trading System

In terms of forecasting the price for KAUs in 2024, with reference to the closing price for KAU23 on 22 September 2023 (12,900 won), 53.7% of the responding entities expected an increase (139 responses), 27.4% expected a steady price (71 responses), and 18.9% expected a decrease (49 responses). This result corresponds closely with the results of the previous survey. However, of note is that the number of entities anticipating an increase has declined while the number of entities anticipating a decrease has increased from the previous year. Considering that the reference price used for each survey gradually decreased from 28,500 won in 2021 (KAU22) to 25,000 won in 2022 (KAU23) and to 12,900 won in this survey (KAU24), the entities’ perception that the price of emission permits will increase has eased.

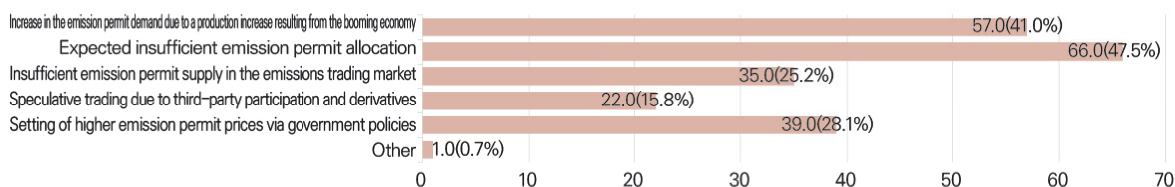
The main reasons for expecting an increase in emission permit prices were an expected insufficient emission permit allocation (47.5%, 66 responses) and an increase in the demand for emission permits due to an increase in production resulting from the booming economy (41.0%, 57 responses). The reasons for expecting steady emission permit prices were a stagnant economy (54.9%, 39 responses) and a steady emission permit allocation (40.8%, 29 responses). In addition, the reasons for expecting a decrease in emission permit prices were a decrease in the demand for emission permits due to a decrease in production as a result of an economic downturn (79.6%, 39 responses), which accounted for the highest proportion of responses, followed by an increase in the supply of emission permits in the market due to the inflow of KCUs, etc. (26.5%, 13 responses).

Forecasts for emission permit prices(up to two responses allowed)

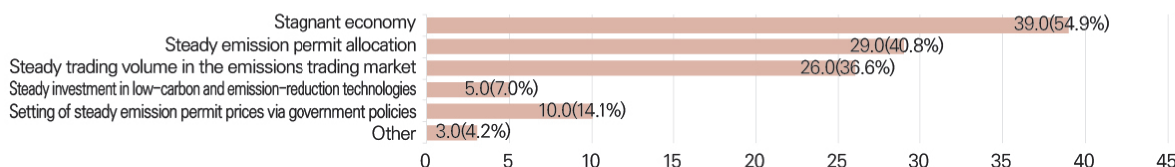


Reasons for price forecasts(up to two responses allowed)

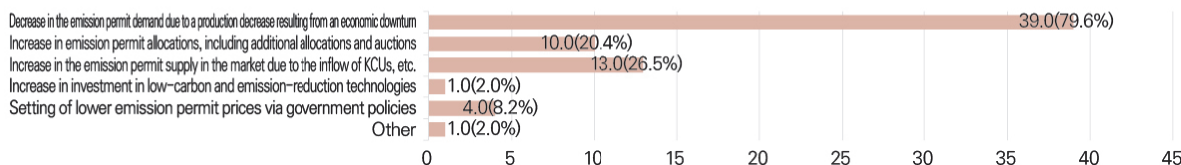
Reasons for expecting a price increase (139 respondents, 220 responses)



Reasons for expecting a steady price(71 respondents, 112 responses)



Reasons for expecting a price decrease(49 respondents, 68 responses)



〈Figure IV-6〉 Forecasts for the Trading Price of Emission Permits

2.2. Response to the K-ETS

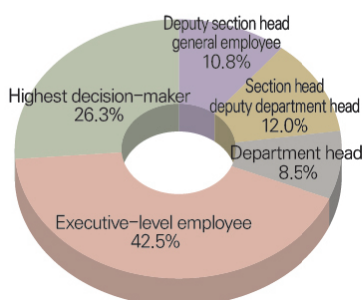
Regarding the positions held by employees within covered entities who have the authority to make decisions regarding the K-ETS, the largest proportion of them held an executive-level position (42.5%, 110 responses), followed by the highest decision-makers (26.3%, 68 responses), section heads or deputy department heads (12.0%, 31 responses), deputy section heads or general employees (10.8%, 28 responses), and department heads (8.5%, 22 responses). This finding indicates that those holding a department head position or higher (77.3%, 200 responses) tend to make decisions regarding how their affiliated entity should respond to the K-ETS.

In terms of the most preferred strategy to comply with the obligation to surrender emission permits, these decision-makers chose the purchase of emission permits (81 responses), banking of emission permits (80 responses), and management and technological investment for internal emission reduction activities (71 responses). In terms of the three most preferred strategies, the number of responses was high for these strategies in the same order (220, 201, and 196 responses, respectively). Of note was that the number of decision-makers who chose to secure a reduction in emissions through participation in external projects (128 responses) has increased.

Broken down by entity size, while large companies (purchase of emission permits: 29 responses; internal emission reduction activities: 24 responses) and other entities (public institutions) (internal emission reduction activities: 12 responses; purchase of emission permits: 10 responses) chose the purchase of emission permits and the management of and technological investment in internal emission reduction activities as the most preferred strategy, mid-sized (banking of emission permits: 41 responses; purchase of emission permits: 31 responses) and small-sized companies (banking of emission permits: 15 responses; purchase of emission permits: 11 responses) chose the banking and purchase of emission permits.

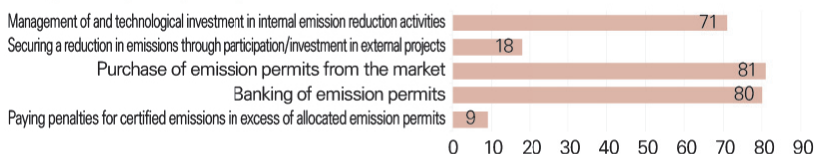
In terms of the three most preferred strategies, large companies preferred the management of and technological investment in internal emission reduction activities (67 responses) and the purchase of emission permits (65 responses), while mid- and small-sized companies preferred the purchase of emission permits (mid-sized companies: 98 responses; small-sized companies: 33 responses) and the banking of emission permits (mid-sized companies: 95 responses; small-sized companies: 30 responses). For other entities (public institutions), preference was evenly distributed among all survey items except for paying penalties (internal emission reduction activities: 22 responses; external projects: 22 responses; purchase of emission permits: 24 responses; banking of emission permits: 23 responses)

Positions of K-ETS decision-makers

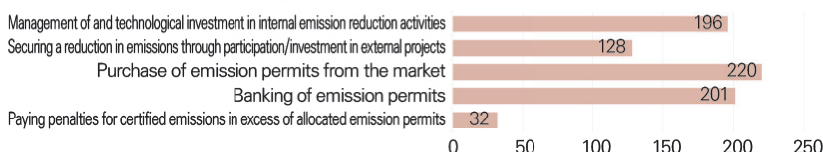


Strategies to comply with the obligation to surrender emission permits

Most preferred(259 responses)

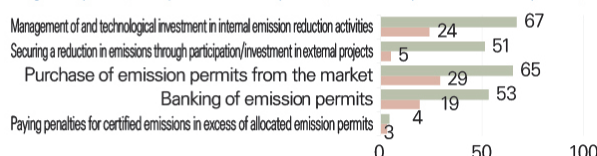


Three most preferred(777 responses)

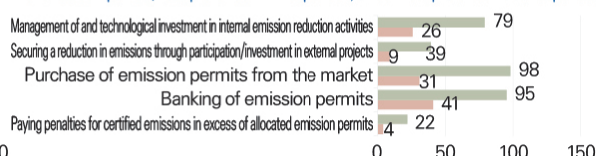


By entity size

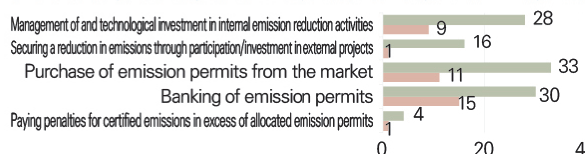
Large companies(most preferred: 80 responses, three most preferred: 240 responses)



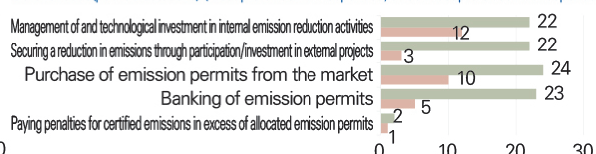
Mid-sized companies(most preferred: 111 responses, three most preferred: 333 responses)



Small-sized companies(most preferred: 37 responses, three most preferred: 111 responses)

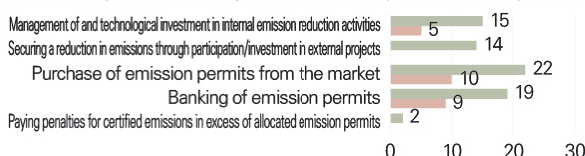


Other entities(public institutions) (most preferred: 31 responses, three most preferred: 93 responses)

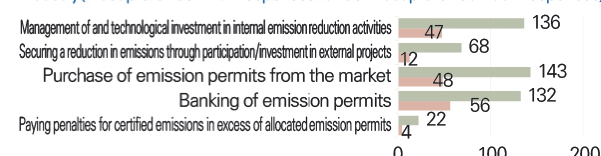


By affiliated sector

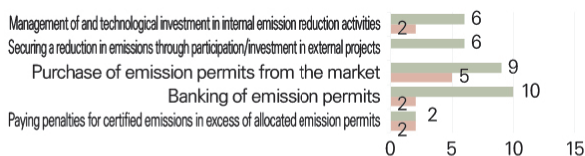
Power(most preferred: 24 responses; three most preferred: 72 responses)



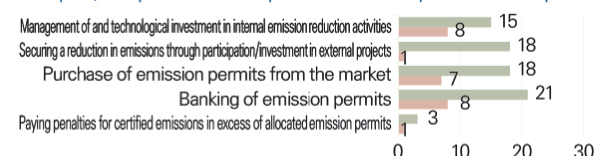
Industry(most preferred: 167 responses; three most preferred: 501 responses)



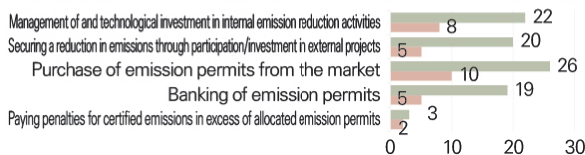
Buildings(most preferred: 11 responses; three most preferred: 33 responses)



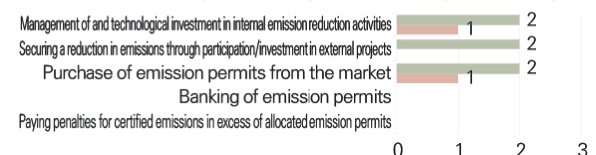
Transport(most preferred: 25 responses; three most preferred: 75 responses)



Waste(most preferred: 30 responses; three most preferred: 90 responses)



Public services/other(most preferred: 2 responses; three most preferred: 6 responses)



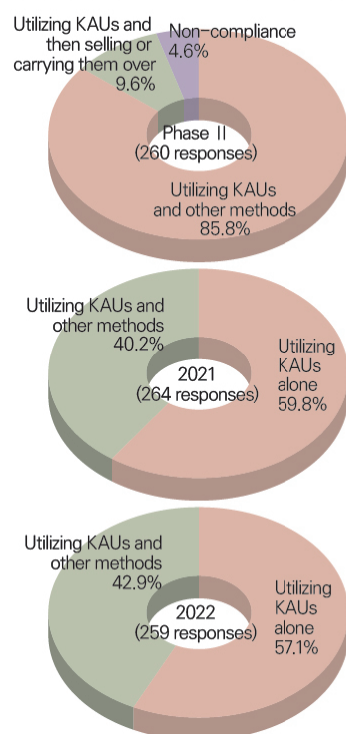
〈Figure IV-7〉 Strategies Preferred by Decision-Makers to Comply with the Obligation to Surrender Emission Permits

With regard to the methods used by covered entities to surrender emission permits, 57.1% of covered entities (148 responses) reported that they were able to meet their obligation to surrender emission permits through allocated emission permits alone, which was somewhat higher than the proportion of entities that responded that they met their obligation using other methods (42.9%, 111 responses). Compared to the results of the previous year's survey regarding the methods used by covered entities to surrender emission permits for Phase II, the proportion of entities reporting that they met their obligation using allocated emission permits alone has increased, and the additional methods they used to meet the obligation were similar to those used for the 2021 compliance year.

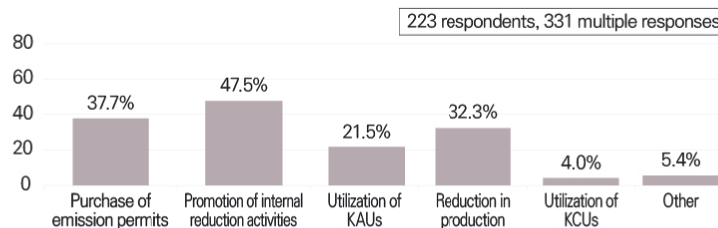
When asked to select up to two reasons for the emission of GHGs in excess of the amount of emission permits allocated to them, an overwhelming majority of the responding entities that reported they had used additional methods other than allocated emission permits chose increased facility utilization to meet increased production (65.8%, 73 responses) and the lack of means to reduce GHG emissions further (39.6%, 44 responses). Other reasons included difficulties in developing low-carbon technologies and obtaining relevant information (9.0%, 10 responses), a shortage of professional manpower to conduct reduction activities (8.1%, 9 responses), difficulties in securing funds for reduction activities (7.2%, 8 responses), difficulties in understanding the settlement schedule and methods for emission permits (5.4%, 5 responses), and uncertainty in government policies (4.5%, 5 responses).

Regarding methods other than allocated emission permits employed by covered entities to comply with the obligation to surrender emission permits, the purchase of emission permits was the most commonly used method (74.8%, 83 responses), followed by the promotion of technological investment and internal emission reduction activities (29.7%, 33 responses) and a reduction in production (18.9%, 21 responses). It was found that the three most widely used additional methods remained unchanged from the results of the previous year's survey. Of particular note was that an overwhelming number of respondents chose the purchase of emission permits as the most commonly used method for two consecutive years. This finding differs from the results of the surveys conducted during Phase II, where the highest response rate was given to the promotion of internal emission reduction activities.

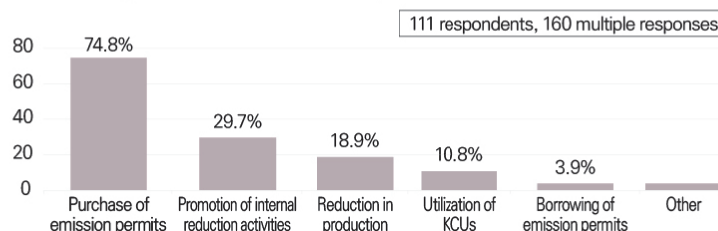
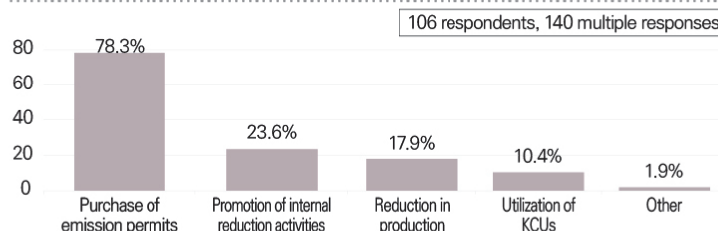
Methods for complying with the surrender obligation



KAUs and other methods(up to two responses)



Other methods(up to two responses)



(Figure IV-8) Methods for complying with the Surrender Obligation

In the 2022 compliance year, 57.9% of the responding entities (150 responses) reported that they had surplus emission permits and 42.1% (109 responses) reported the opposite, indicating that the number of entities with surplus emission permits outnumbered the number of entities that did not. Broken down by sector, the proportion of entities that had surplus emission permits was higher than the proportion of entities that reported otherwise for power (positive: 57.9%, 15 responses; negative: 42.1%, 9 responses), industry (positive: 64.7%, 108 responses; negative: 35.3%, 59 responses), and transport (positive: 60.0%, 15 responses; negative: 40.0%, 10 responses), while the opposite was true for buildings (positive: 27.3%, 3 responses; negative: 72.7%, 8 responses), waste (positive: 30.0%, 9 responses; negative: 70.0%, 21 responses), and public services/other (negative: 100.0%, 2 responses).

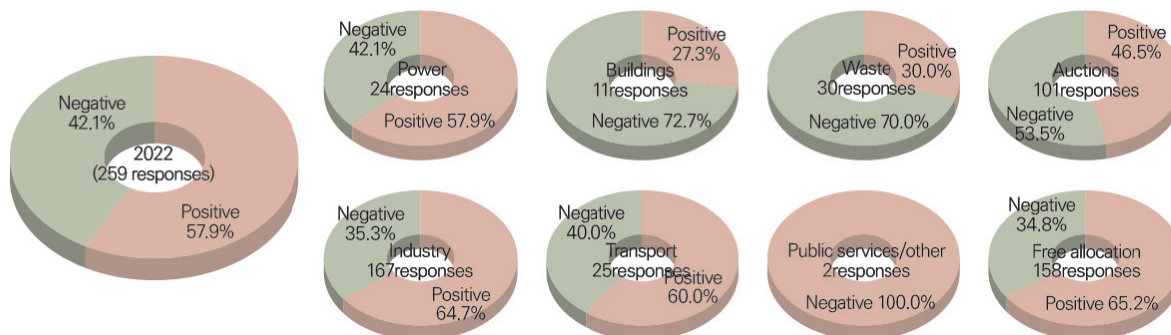
Whether the responding entities' eligibility for auctions had an impact on the presence of surplus emission permits was examined. The results of this examination showed that the proportion of entities without surplus emission permits was higher than the proportion of entities with surplus emission

permits in those sub-sectors eligible for auctions (negative: 53.5%, 54 responses; positive: 46.5%, 47 responses), while the opposite was true in sub-sectors not eligible for auctions (positive: 65.2%, 103 responses; negative: 34.8%, 55 responses).

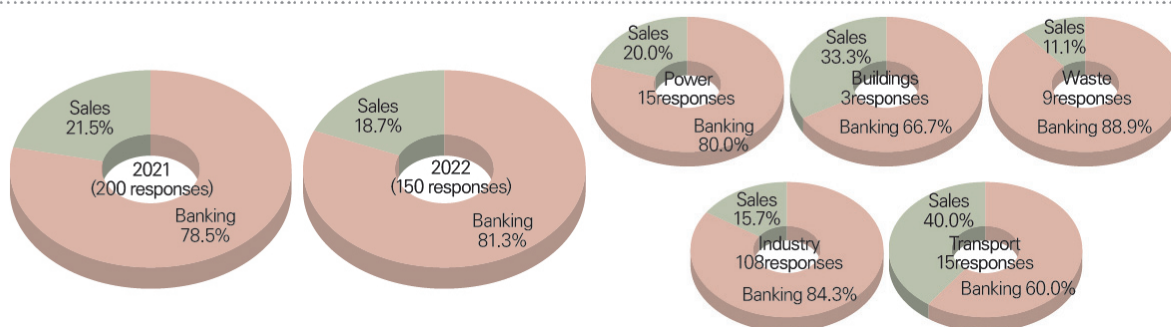
It was found that the tendency of decision-makers to favor the banking of emission permits as a means to secure these permits has affected the methods for dealing with surplus emission permits. In the 2022 compliance year, of the entities that reported having surplus emission permits (150 responses), 81.3% (122 responses) reported that carrying the permits over to the next compliance year was their primary option, while 18.7% (28 responses) stated that the sale of these permits in the exchange or OTC market was their primary option, indicating an overwhelming preference for the banking of surplus emission permits. This finding is in alignment with the fact that there were far more entities that preferred the banking of surplus emission permits (78.5%, 157 responses) than those who preferred the sale of these permits (21.5%, 43 responses) in the 2021 compliance year.

Broken down by sector, entities from all sectors preferred to bank surplus emission permits (power: 80.0%, 12 responses; industry: 84.3%, 91 responses; buildings: 66.7%, 2 responses; transport: 60.0%, 9 responses; waste: 88.9%, 8 responses).

Presence of surplus emission permits

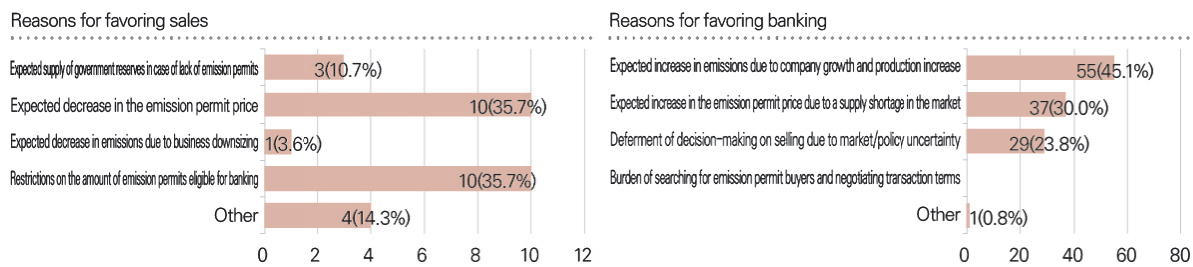


Methods for dealing with surplus emission permits



〈Figure IV-9〉 Methods for Dealing with Surplus Emission Permits

The reasons for favoring the sale of surplus emission permits in the exchange or OTC market over the banking of these permits included an expected decrease in the emission permit price (35.7%, 10 responses) and the restrictions on the amount of emission permits eligible for banking (35.7%, 10 responses). Other reasons included the improvement of profitability through the sale of surplus emission permits. The reasons for favoring the banking of surplus emission permits over their sale included an expected increase in emissions due to the growth of the company and an increase in production (45.1%, 55 responses), an expected increase in the emission permit price due to a supply shortage of permits on the market (30.0%, 37 responses), and the deferment of decision-making on selling due to uncertainty regarding the market and policy (23.8%, 29 responses).



〈Figure IV-10〉 Reasons for Choosing the Methods for Dealing with Surplus Emission Permits

In the 2022 compliance year, 13 responding entities (5.0%) reported that they had not engaged in emissions trading, the proportion of which was similar to that from the previous year's survey. Broken down by entity size, 12.9% of other entities (public institutions) reported that they had not engaged in emissions trading (4 responses), followed by small-sized companies (8.1%, 3 responses), large companies (3.8%, 3 responses), and mid-sized companies (2.7%, 3 responses). Of note was that, except for mid-sized companies, the proportion of entities not having engaged in emissions trading has slightly increased compared to the results of the previous year's survey. Broken down by sector, the proportion of entities that had not engaged in emissions trading was highest for the public services/other sector (50.0%, 1 response), followed by buildings (18.2%, 2 responses), waste (13.3%, 4 responses), transport (8.0%, 2 responses), and industry (2.4%, 4 responses). The non-participation rate was 0% for the power sector. The proportion of entities that had not engaged in emissions trading has increased compared to the previous year in the buildings and waste sectors.

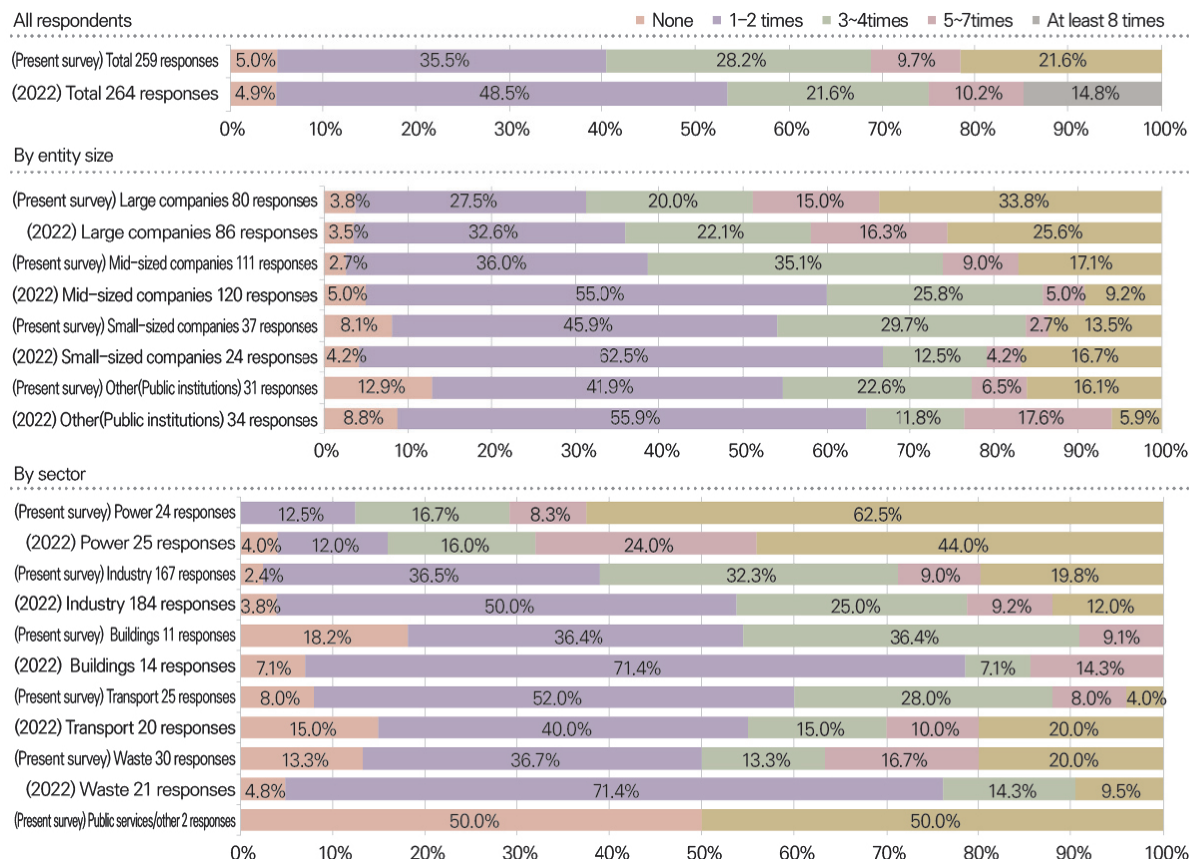
In the 2022 compliance year, 35.5% of the responding entities (92 responses) reported that they had engaged in emissions trading 1–2 times, while 28.2% (73 responses) had engaged in trading 3–4 times, 21.6% (56 responses) at least 8 times, 9.7% (25 responses) 5–7 times, and 5.0% (13 responses) 0 times. Like the previous year's survey, the number of entities that had engaged in emissions trading 1–2 times accounted for the highest proportion of responses. In addition, the proportion of entities that had engaged in emissions trading at least 3 times (59.5%), 5 times (31.3%), and 8 times (21.6%) has all increased, indicating an overall increase in the frequency of emission permit transactions.

In terms of entity size, engagement in emissions trading 1–2 times accounted for the highest proportion of responses for entities of all sizes (mid-sized companies: 36.0%, 40 responses; small-sized companies: 45.9%, 17 responses; other entities (public institutions): 41.9%, 13 responses) except for large companies, the highest proportion of which reported that they had engaged in

emissions trading at least 8 times (33.8%, 27 responses).

Compared to the previous year, the proportion of entities that had engaged in emissions trading at least 3 times has increased for entities of all sizes, with large companies showing the highest response rate (68.8%, 55 responses), followed by mid-sized companies (61.2%, 68 responses), small-sized companies (45.9%, 17 responses), and other entities (public institutions) (45.2%, 14 responses).

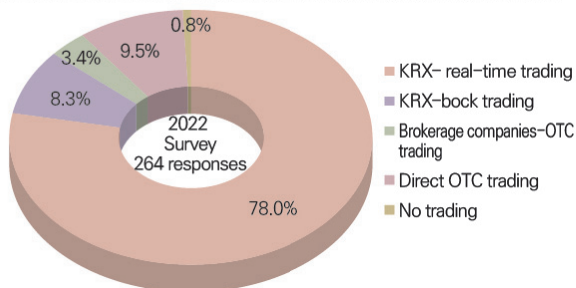
Broken down by sector, the number of entities that had engaged in emissions trading at least 8 times accounted for the highest proportion of responses in the power sector (62.5%, 15 responses), while the number of entities that had engaged in emissions trading 1–2 times accounted for the highest proportion of responses in the industry, transport, and waste sectors (industry: 36.5%, 61 responses; transport: 52.0%, 13 responses; waste: 36.7%, 11 responses). In the buildings sector, the response rates for 1–2 times and 3–4 times were the same (36.4%, 4 responses). In the public services/other sector, the response rate was the same for 0 times and at least 8 times (50.0%, 1 response). Compared to the previous year, the proportion of entities that had engaged in emissions trading at least 3 times has increased for the power, industry, buildings, and waste sectors, while it has decreased for the transport sector. In the power sector, the proportion of entities that had engaged in emissions trading at least 3 and 5 times reached 87.5% (21 responses) and 70.8% (17 responses), respectively.



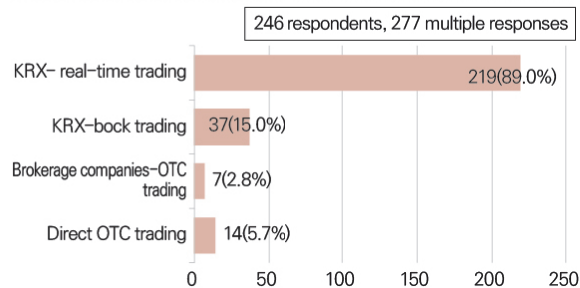
〈Figure IV-11〉 Participation in Emissions Trading

In terms of the methods for the trading of emission permits used primarily by 246 entities for the 2022 compliance year, an overwhelming number of entities stated that they traded emission permits via real-time exchange trading through the KRX (89.0%, 219 responses), followed by those who reported that they used block exchange trading through the KRX (15.0%, 37 responses), direct trading between entities on the OTC market (5.7%, 14 responses), and OTC trading through brokerage companies (2.8%, 7 responses). This result corresponds closely with the results of the previous survey, where the number of entities reporting that they will trade emission permits via real-time trading through the KRX accounted for the highest proportion.

Phase III



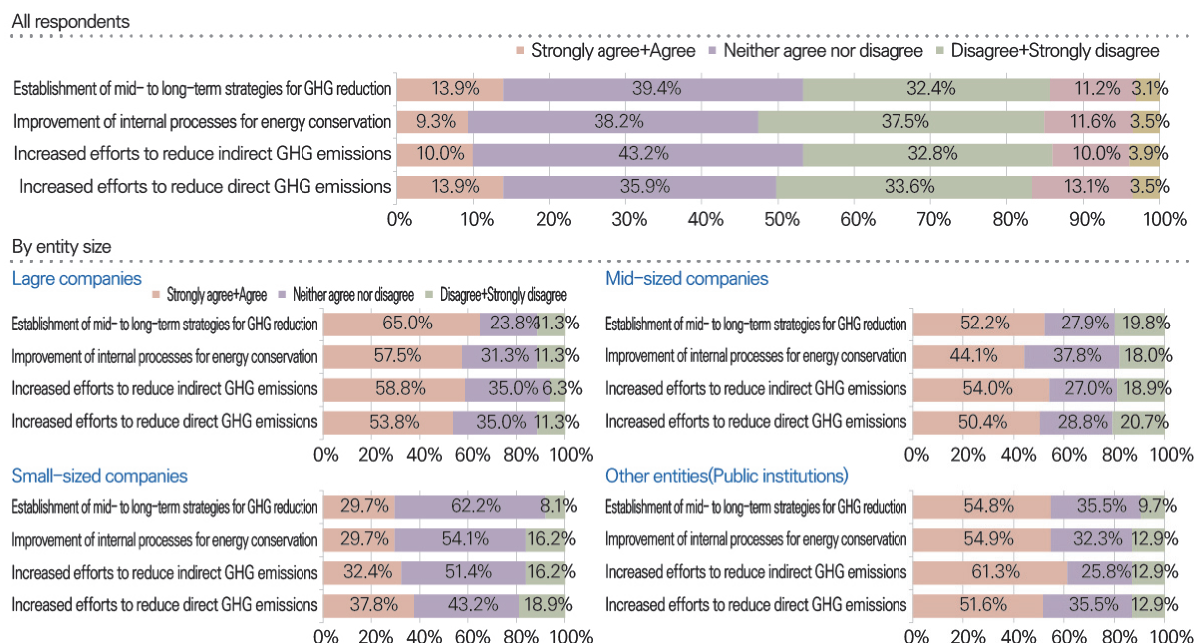
2022 compliance year (up to two responses)



〈Figure IV-12〉 Methods for Trading Emission Permits in Phase III

The impact of the covered entities' participation in the K-ETS on their GHG emission reduction activities was analyzed, with the survey results showing that the proportion of positive responses was higher than the proportion of negative responses for all survey items. The responding entities reported that their participation in the K-ETS has contributed to the establishment of mid- to long-term strategies for GHG reduction (positive: 53.3%, 138 responses; negative: 14.3%, 37 responses) and the improvement of internal processes for energy conservation (positive: 47.5%, 123 responses; negative: 15.1%, 39 responses), and has led to an increase in efforts to reduce indirect (positive: 53.2%, 138 responses; negative: 13.9%, 36 responses) and direct (positive: 49.8%, 129 responses; negative: 16.6%, 43 responses) GHG emissions.

Broken down by entity size, regarding all survey items, the proportion of positive responses was higher than the proportion of negative responses for entities of all sizes, and, in general, the proportion of positive responses has increased in the order of large companies, other entities (public institutions), mid-sized companies, and small-sized companies. The proportion of positive responses regarding the K-ETS's contribution to the establishment of mid- to long-term strategies for GHG reduction was 65.0% (52 responses) for large companies, 54.8% (17 responses) for other entities (public institutions), 52.2% (58 responses) for mid-sized companies, and 29.7% (11 responses) for small-sized companies, and the proportion of positive responses regarding the K-ETS's contribution to the improvement of internal processes for energy conservation was 57.5% (46 responses) for large companies, 54.9% (17 responses) for other entities (public institutions), 44.1% (49 responses) for mid-sized companies, and 29.7% (11 responses) for small-sized companies. The proportion of positive responses for an increase in efforts to reduce indirect GHG emissions was the highest for other entities (public institutions) (61.3%, 19 responses), and that for an increase in efforts to reduce direct GHG emissions was the highest for large companies (53.8%, 33 responses). Of note is that, for small-sized companies, the proportion of positive responses did not exceed 50% for any of the survey items.



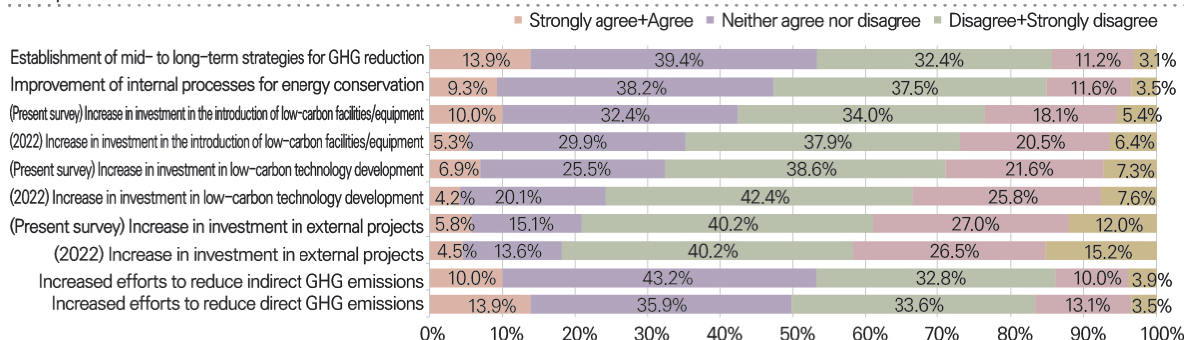
〈Figure IV-13〉 Impact of Participation in the K-ETS on GHG Emission Reduction Activities

The responding entities' views on the level of increase in the investment they have made to reduce GHG emissions after participation in the K-ETS were analyzed. The survey results showed that, identical to the results of the previous year's survey, the responding entities reported an increase in the investment costs of introducing low-carbon facilities and equipment (positive: 42.4%, 110 responses; negative: 23.5%, 61 responses), in the investment costs for low-carbon technology development (positive: 32.4%, 84 responses; negative: 28.9%, 75 responses), and in the investment costs of implementing external projects (positive: 20.9%, 54 responses; negative: 39.0%, 101 responses). In particular, the proportion of positive responses was higher than that of negative responses for an increase in the investment costs of introducing low-carbon facilities and equipment and for low-carbon technology development, which corresponds closely with the survey results regarding the impact of the K-ETS on the business operations of the covered entities (i.e., an increase in the costs of exploring and applying low-carbon technologies and increased investment in reduction technologies for management and process improvement). On the other hand, the proportion of negative responses was higher than that of positive responses for an increase in the investment costs of implementing external projects. This appears to be closely related to the fact that securing a reduction in emissions through participation and investment in external projects was ranked low as a strategy preferred by decision-makers to comply with the obligation to surrender emission permits.

Broken down by entity size, the proportion of positive responses was higher in the same order. The proportion of positive responses for an increase in the investment costs of introducing low-carbon facilities and equipment was the highest for mid-sized companies (45.9%, 51 responses), and that for an increase in the investment costs for low-carbon technology development and in the investment costs of implementing external projects was the highest for large companies (technology development: 40.0%, 32 responses; external projects: 32.6%, 26 responses). Of note was that the proportion of positive responses was higher than that of negative responses for large companies regarding an increase in the investment costs of implementing external projects, while the opposite was true for entities of other sizes. In addition, the proportion of positive responses was lower for small-sized companies regarding all survey items compared to entities of other sizes.

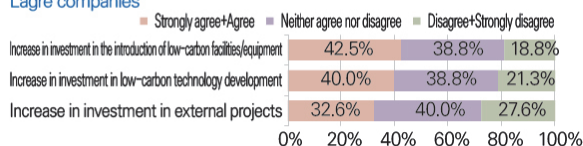
Broken down by sector, the positive response rate was higher in all sectors excluding the public services/other sector in the order of the investment costs of introducing low-carbon facilities and equipment, the investment costs for low-carbon technology development, and the investment costs of implementing external projects. Of particular note was that, compared to other sectors, the proportion of positive responses was lower for the power sector for all survey items, and the proportion of negative responses was higher for the buildings sector for all survey items.

All respondents

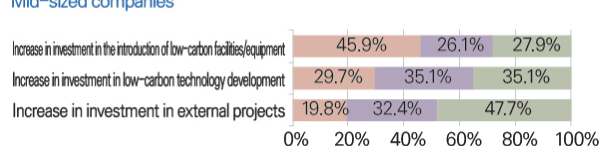


By entity size

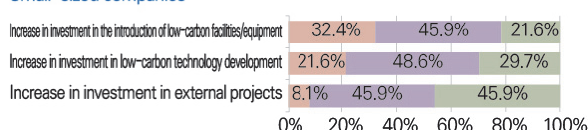
Large companies



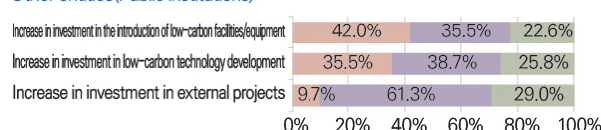
Mid-sized companies



Small-sized companies

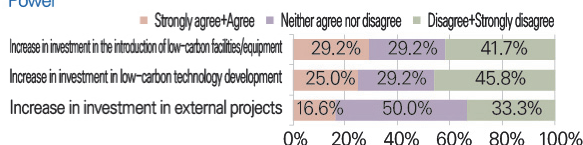


Other entities(Public institutions)

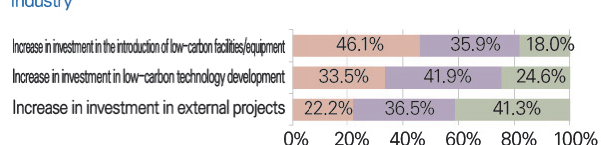


By affiliated sector

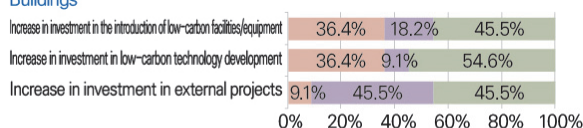
Power



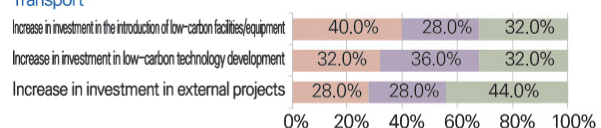
Industry



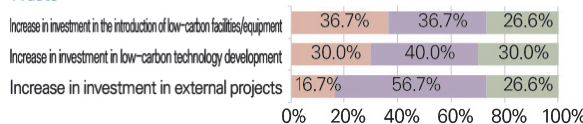
Buildings



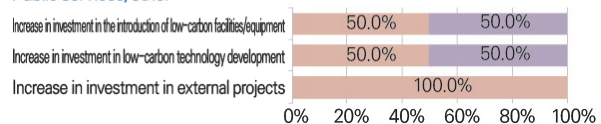
Transport



Waste



Public services/other



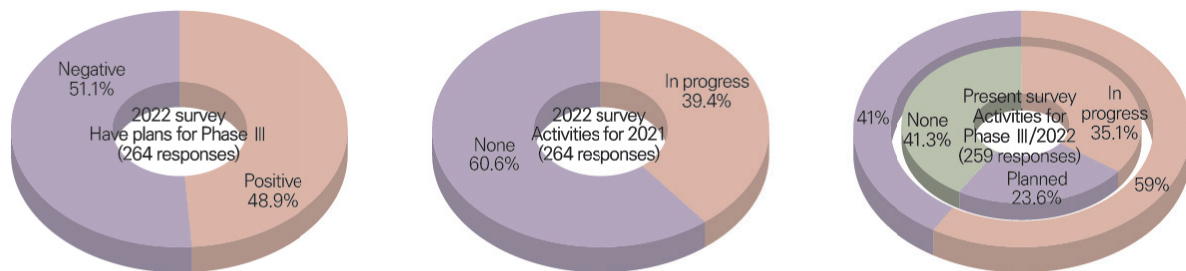
〈Figure IV-14〉 Impact of Participation in the K-ETS on Investment in GHG Emission Reduction

In terms of internal emission reduction activities in Phase III, 91 entities (35.1%) reported that they were currently implementing these activities, while 61 entities (23.6%) reported having plans to implement these activities and 107 entities (41.3%) reported that they have not implemented these activities. The proportion of entities reporting to have implemented internal reduction activities in the 2022 compliance year (35.1%) was slightly lower compared to that in the 2021 compliance year (39.4%). However, the proportion of entities reporting to have plans to implement these activities during Phase III has increased from 48.9% in the previous year's survey to 58.7% in the present survey.

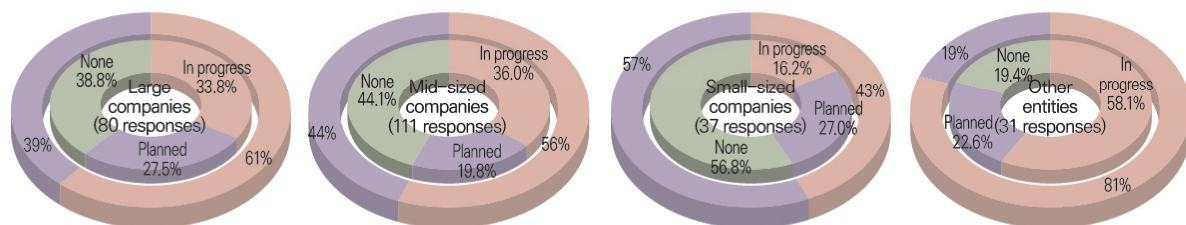
Broken down by entity size, the proportion of entities currently implementing or having plans to implement internal reduction activities during Phase III was the highest for other entities (public institutions) (80.6%, 25 responses), followed by large companies (61.3%, 49 responses), mid-sized companies (55.9%, 62 responses), and small-sized companies (43.2%, 16 responses).

Broken down by sector, the proportion was highest for the waste sector (70.0%, 21 responses), followed by industry (63.5%, 106 responses) and buildings (54.5%, 6 responses), and lowest for the power sector (25.0%, 6 responses).

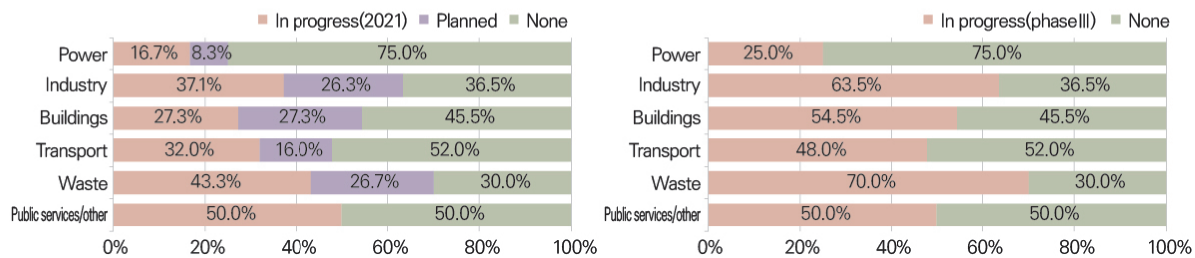
All respondents



By entity size



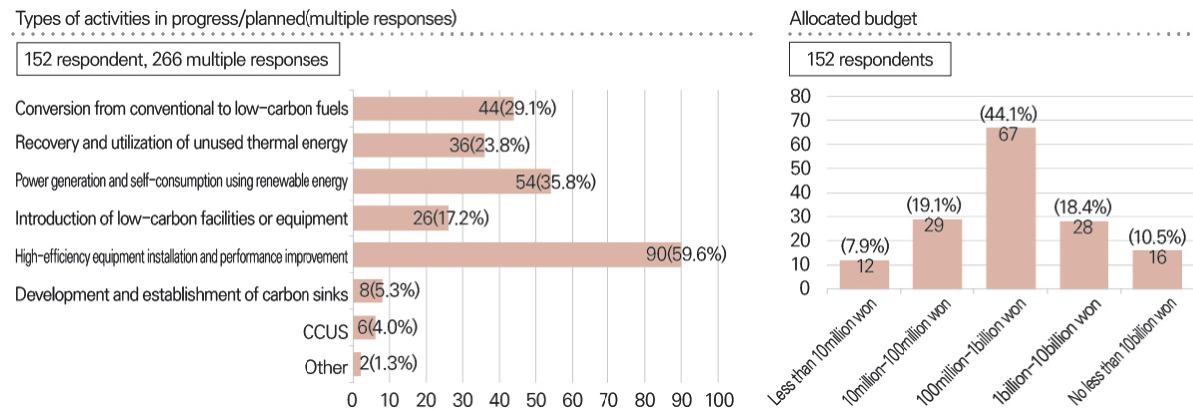
By sector



〈Figure IV-15〉 Implementation of Internal Reduction Activities during Phase III

According to the 152 responding entities that reported they are currently implementing or have plans to implement internal reduction activities, the most common type of activity in progress or planned was the installation of high-efficiency equipment and the improvement of equipment performance (59.6%, 90 responses), followed by power generation and self-consumption using renewable energy (35.8%, 54 responses), conversion to low-carbon fuels (29.1%, 44 responses), and the recovery and utilization of unused thermal energy (23.8%, 36 responses). These activities are identical to the main four actions selected by the responding entities in the previous year's survey regarding the internal reduction activities that they implemented in the 2021 compliance year and planned for Phase III.

Regarding the budget allocated for internal reduction activities, the response rate was the highest for 100 million to 1 billion won (44.1%, 67 responses), followed by 10 million to 100 million won (19.1%, 29 responses), 1 billion to 10 billion won (18.4%, 28 responses), no less than 10 billion won (10.5%, 16 responses), and less than 10 million won (7.9%, 9 responses).



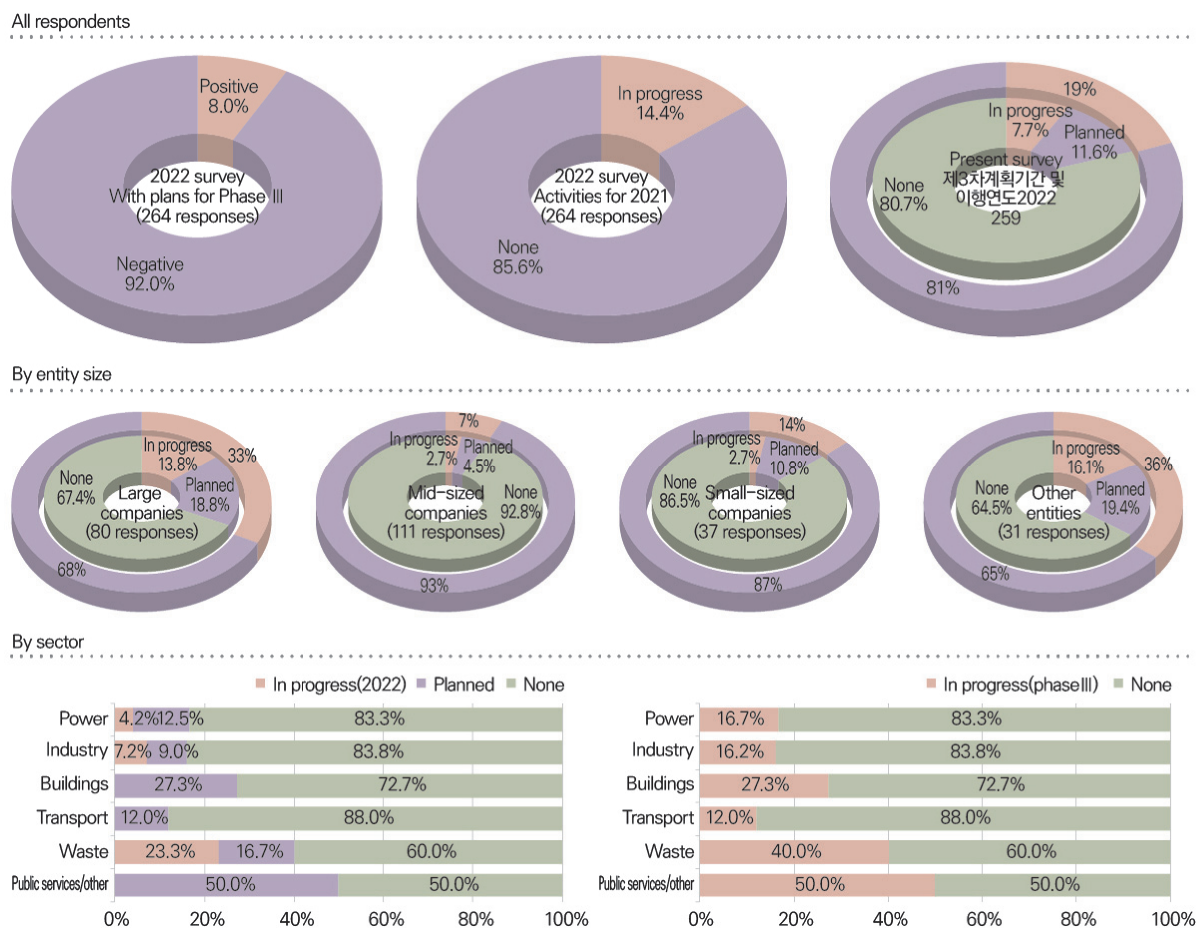
〈Figure IV-16〉 Types of internal Emission Reduction Activities in Progress/Planned for Phase III and Allocated Budget

In terms of external emission reduction activities for Phase III, 20 entities (7.7%) claimed that they are currently implementing these activities and 30 entities (11.6%) claimed that they have plans to implement these activities, while 209 entities (80.7%), representing an overwhelming majority of the responding entities, reported that they do not have a plan to implement these activities. However, what is encouraging is that the proportion of entities with plans to implement external reduction projects during Phase III (19.3%, 50 responses) is higher compared to the previous year's survey, where the proportion of entities with plans to implement these activities in the 2021 compliance year and in the

future was 14.4% (38 responses) and 8.0% (21 responses), respectively.

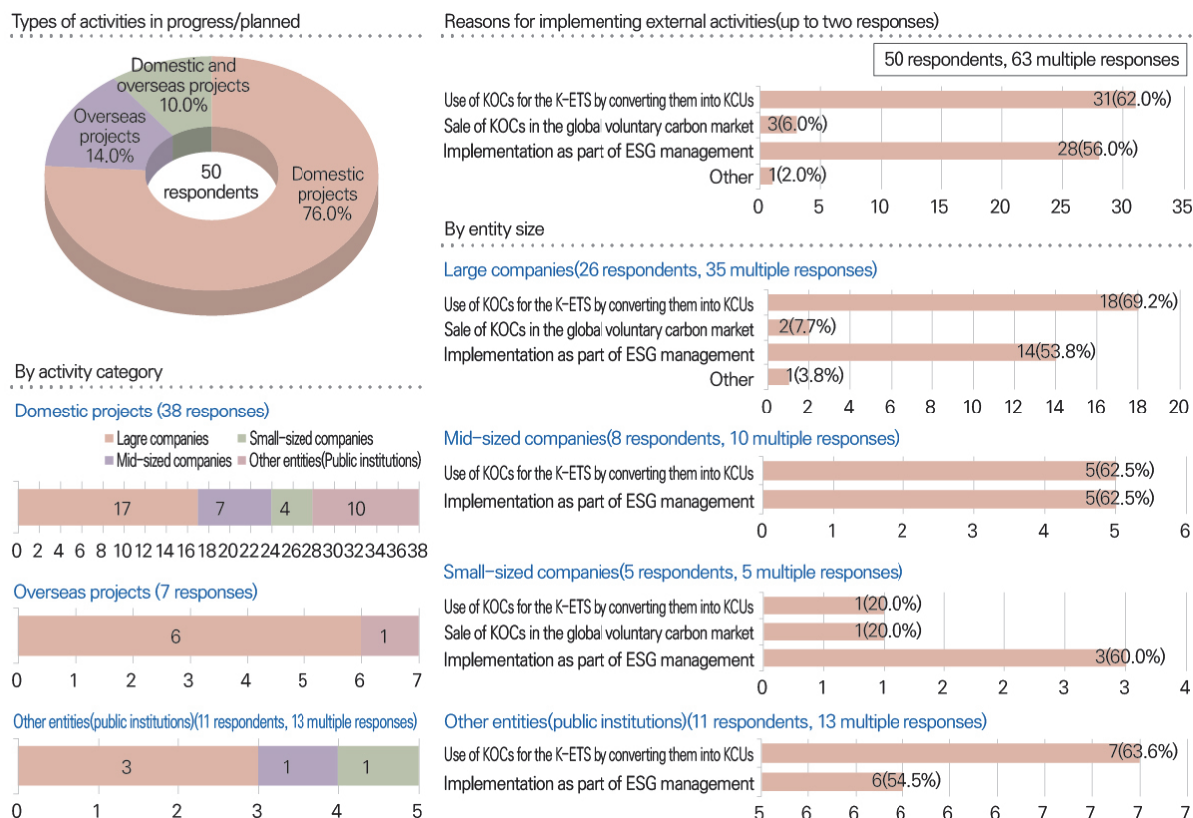
Broken down by entity size, the proportion of entities currently implementing or with plans to implement external reduction activities during Phase III was the highest for other entities (public institutions) (35.5%, 11 responses), followed by large companies (32.5%, 26 responses), small-sized companies (13.5%, 5 responses), and mid-sized companies (7.2%, 8 responses).

Broken down by the sector, the proportion of entities with plans to implement external reduction activities during Phase III was highest in the public services/other sector (50.0%, 1 response), followed by waste (40.0%, 12 responses) and buildings (27.3%, 3 responses), and the proportion of entities currently implementing these activities was highest in the waste sector (23.3%, 7 responses), followed by industry (7.2%, 12 responses) and power (4.2%, 1 response).



〈Figure IV-17〉 Implementation of External Reduction Activities during Phase III

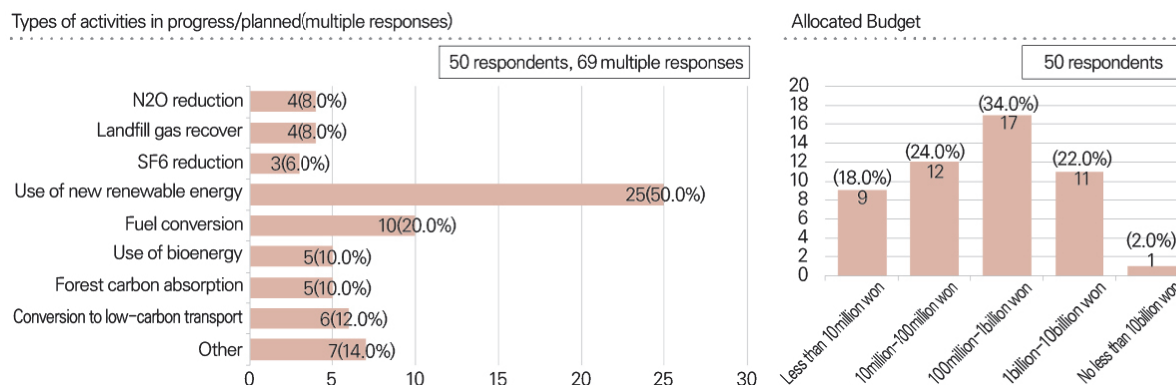
Of the 50 responding entities reporting that they are currently implementing or have plans to implement external reduction activities, the majority selected domestic projects (76.0%, 38 responses) as the category of activities primarily implemented or planned to be implemented, followed by those who selected overseas projects (14.0%, 7 responses) and domestic and overseas projects (10.0%, 5 responses). Of particular note was that, for all types of activity, activities promoted by large companies accounted for the highest proportion of responses. The main reasons for implementing external reduction activities included the use of KOCs for the K-ETS by converting them into KCUs (62.0%, 31 responses) and the implementation of a project as part of ESG management (56.0%, 28 responses). The proportion of entities saying that they engage in external reduction activities to sell KOCs in the global voluntary carbon market (6.0%, 3 responses) was very low.



〈Figure IV-18〉 Categories of External Reduction Activities in Progress/Planned for Phase III and Reasons for Implementing them

In terms of specific types of external reduction activities, the most common activity in progress was the use of new renewable energy (50.0%, 25 responses), followed by fuel conversion projects (20.0%, 10 responses). This result was consistent with the result of the previous year's survey, where 39.5% of the responding entities (15 responses) selected the use of new renewable energy and 18.4% (7 responses) selected conversion to low-carbon transport as the key external projects pursued in the 2021 compliance year and 47.6% (10 responses) selected the use of new renewable energy as a key external project to be implemented during Phase III. This shows that covered entities have been mainly interested in projects that involve the use of new renewable energy.

Regarding the budget allocated for external reduction activities, the response rate was the highest for 100 million to 1 billion won (34.0%, 17 responses), followed by 10 million to 100 million won (24.0%, 12 responses), 1 billion to 10 billion won (22.0%, 11 responses), less than 10 million won (18.0%, 9 responses), and no less than 10 billion won (2.0%, 1 response).

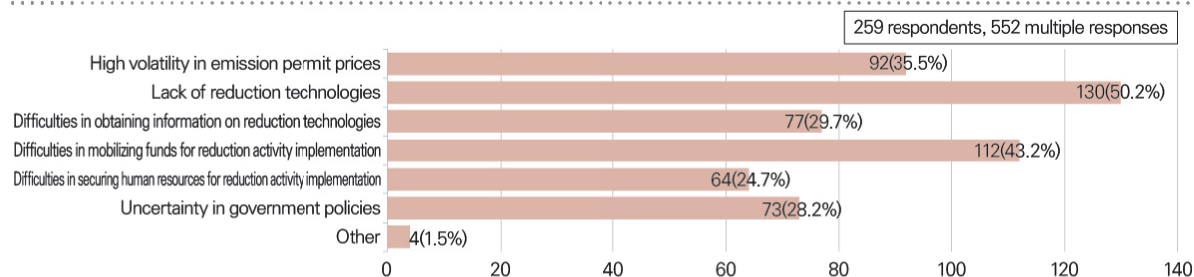


〈Figure IV-19〉 Types of External Reduction Activities in Progress/Planned for phase III and Allocated Budget

In addition, the top three factors hindering the implementation of internal and external GHG emission reduction activities identified by covered entities were the lack of reduction technologies (50.2%, 130 responses), difficulties in mobilizing funds for the implementation of reduction activities (43.2%, 112 responses), and high volatility in emission permit prices (35.5%, 92 responses). Other factors included the lack of managerial interest in reduction activities, insufficient diversity in reduction methodologies, and difficulties in supplying environmentally friendly electricity due to regional conditions.

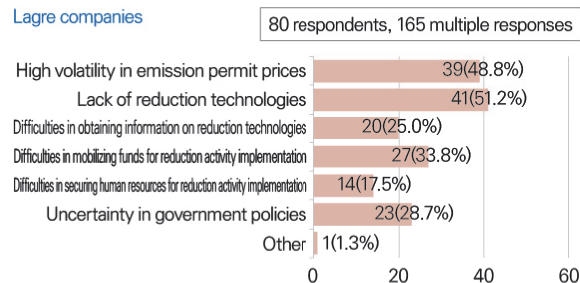
Broken down by entity size, the top two factors hindering the implementation of reduction activities for large companies were the lack of reduction technologies (51.2%, 41 responses) and high volatility in emission permit prices (48.8%, 39 responses), while that for mid-sized, small-sized, and other entities (public institutions) were (although in a different order) difficulties in mobilizing funds for the implementation of reduction activities (mid-sized companies: 51.4%, 57 responses; small-sized companies: 43.2%, 16 responses; other entities (public institutions): 38.7%, 12 responses) and the lack of reduction technologies (mid-sized companies: 48.6%, 54 responses; small-sized companies: 64.9%, 24 responses; other entities (public institutions): 35.5%, 11 responses).

All respondents

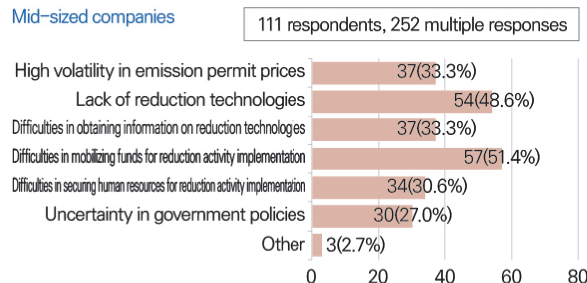


By entity size

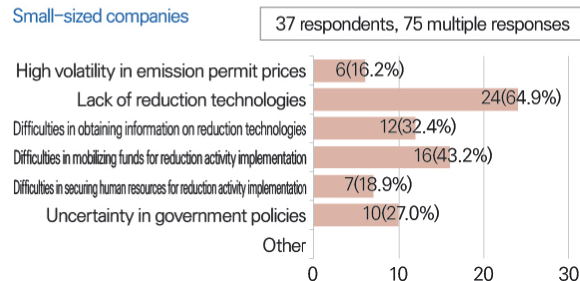
Large companies



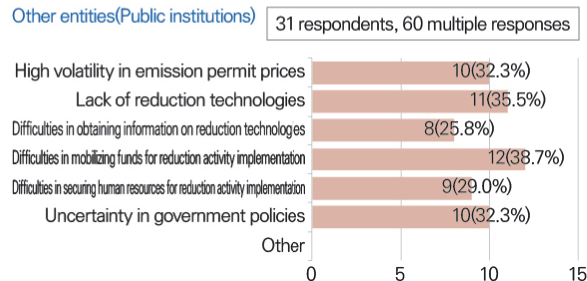
Mid-sized companies



Small-sized companies



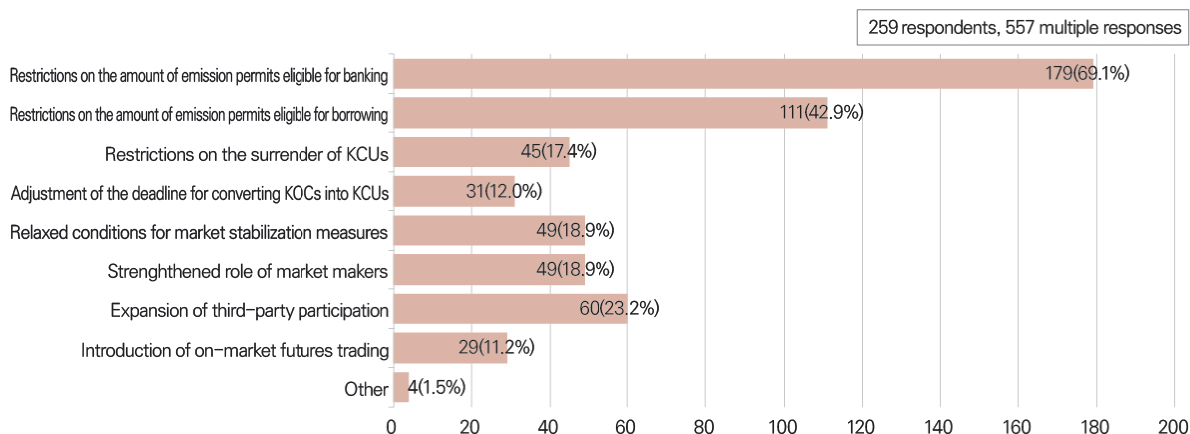
Other entities(Public institutions)



〈Figure IV-20〉 Factors Hindering GHG Emission Reduction Activities

The views of covered entities regarding the institutional improvement of the K-ETS for Phase IV were examined. Regarding the key structural factors affecting the stabilization of emission permit prices, the highest response rate was given to restrictions on the amount of emission permits that may be carried over between phases and compliance years (69.1%, 179 responses), followed by restrictions on the amount of emissions permits that may be borrowed between compliance years (42.9%, 111 responses). This indicates that the responding entities recognize the banking and borrowing of emission permits mechanisms that were introduced to ensure flexibility in the surrender of emission permits by covered entities, have the greatest impact on emission permit price fluctuations.

Of the measures introduced to enhance the liquidity of the emissions trading market and expand market predictability, expansion of third-party participation (23.2%, 60 responses), the strengthened role of market makers (18.9%, 49 responses), and the introduction of on-market futures trading (11.2%, 29 responses) were perceived as less influential than the banking and borrowing of emission permits. This finding is in alignment with the fact that the proportion of negative responses was higher than that of positive responses for the effect of third-party trading on the stabilization of the emission permit price and that the proportion of negative responses was somewhat higher for the market-making system's contribution to mitigating sudden fluctuations in emission permit prices. In addition, 18.9% of the responding entities (49 responses) believed relaxed conditions for market stabilization measures have an impact on the stabilization of emission permit prices.



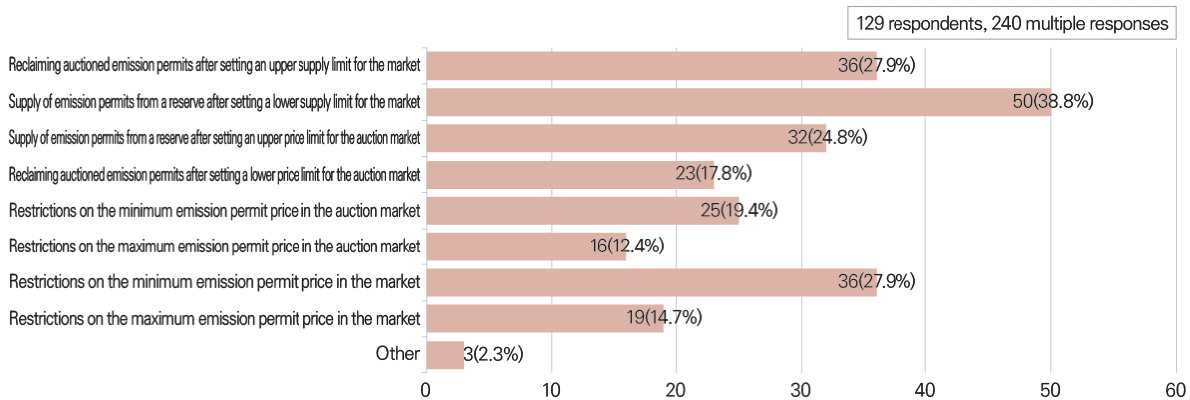
〈Figure IV-21〉 Structural Factors Affecting the Stabilization of Emission Permits Prices

Regarding the question of whether the current market stabilization measures⁴³⁾ function adequately to mitigate the volatility of the emissions trading market, the proportion of positive responses (50.2%, 130 responses) was slightly higher than that of negative responses (49.8%, 129 responses). The key measures required to supplement the market stabilization measures in Phase IV proposed by the 129 entities that responded negatively included the supply of emission permits from a reserve after setting a lower supply limit for the market (38.8%, 50 responses), reclaiming auctioned emission permits after setting an upper supply limit for the market (27.9%, 36 responses), and restrictions on the minimum emission permit price in the market (27.9%, 36 responses).

Broken down by entity size, the improvement measure most commonly preferred by large companies (45.2%, 19 responses), mid-sized companies (43.1%, 22 responses), and small-sized companies (38.1%, 8 responses) was the supply of emission permits from a reserve after setting a lower supply limit for the market. Other entities (public institutions) most favored reclaiming auctioned emission permits after setting an upper supply limit for the market (40.0%, 6 responses) and restrictions on the minimum emission permit price in the auction market (40.0%, 6 responses).

43) In the event of sudden and sharp fluctuations in emission permit prices in the emissions trading market, market stabilization measures are implemented pursuant to the Act, which include additional allocation of emission permits from a reserve, the establishment of the minimum or maximum number of allocated emission permits that an entity may hold, and the establishment of a temporary maximum or minimum trading price for emission permits.

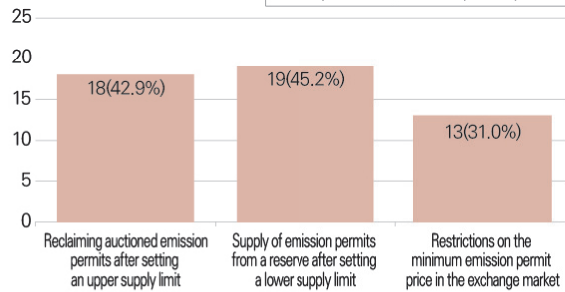
All respondents



By entity size(three most preferred)

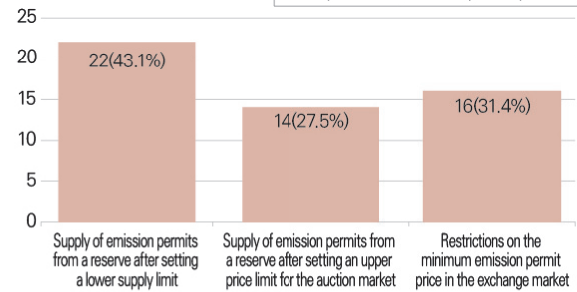
Large companies

42 respondents, 87 multiple responses



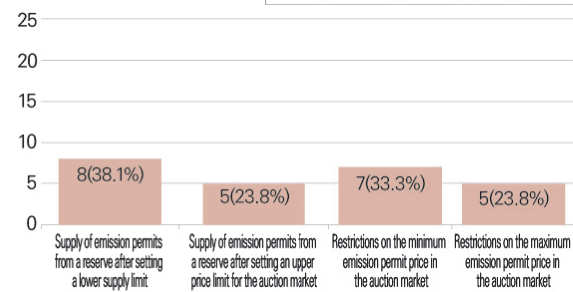
Mid-sized companies

51 respondents, 91 multiple responses



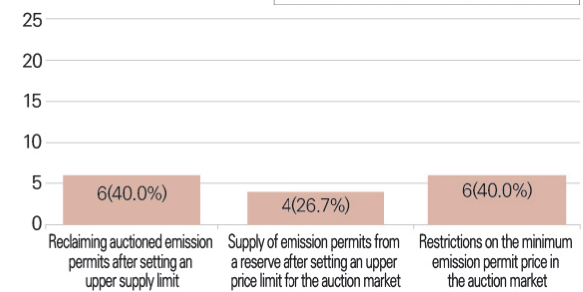
Small-sized companies

21 respondents, 38 multiple responses



Other entities(Public institutions)

15 respondents, 24 multiple responses



〈Figure IV-22〉 Improvement of Market Stabilization Measures

Regarding the improvement of banking, which was identified by the responding entities as having the greatest impact on stabilizing the price fluctuations of emission permits, the most preferred strategy was to abolish restrictions on the banking of emission permits between phases and compliance years (34.7%, 90 responses), which was followed by the revision of banking standards and relaxed restrictions on the amount of emission permits eligible for banking (23.6%, 61 responses), maintaining the existing banking standards and relaxed restrictions on the amount of emission permits eligible for banking (17.0%, 44 responses), and maintaining the existing banking restrictions applied in Phase III (16.6%, 43 responses).

A similar trend was observed when the survey results were analyzed based on the entity size of the responding entities and the sector they were affiliated with, with a significant preference given to the abolition of banking restrictions and the revision of banking standards and relaxed restrictions on the amount of emission permits eligible for banking.

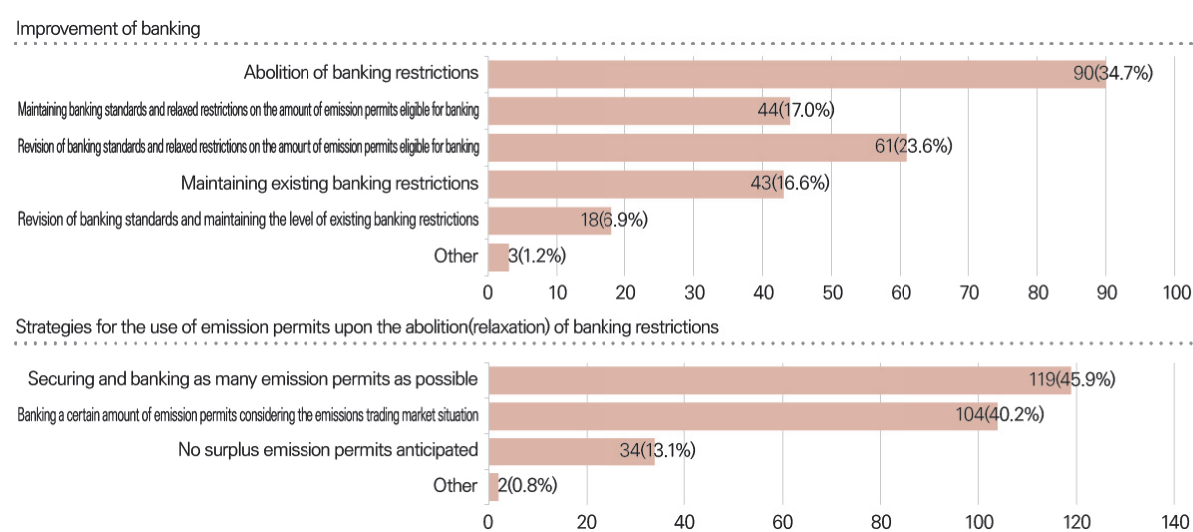
Broken down by entity size, large companies (40.0%, 32 responses) and mid-sized companies (36.9%, 41 responses) showed the highest preference for the abolition of banking restrictions, while small-sized companies (29.7%, 11 responses) and other entities (public institutions) (32.3%, 10 responses) showed the highest preference for the revision of banking standards and relaxed restrictions on the amount of emission permits eligible for banking.

Broken down by sector, the preference for the abolition of banking restrictions was the highest in the power (54.2%, 13 responses), industry (33.5%, 56 responses), buildings (36.4%, 4 responses), and transport (40.0%, 10 responses) sectors. The most preferred strategy in the waste sector (30.0%, 9 responses) was the revision of banking standards and relaxed restrictions on the amount of emission permits eligible for banking. It was found that entities from the public services/other sector equally preferred the revision of banking standards and relaxed restrictions on the amount of emission permits eligible for banking (50.0%, 1 response) and the revision of banking standards and maintaining the level of existing banking restrictions (50.0%, 1 response).

The reasons for suggesting the abolition of banking restrictions included the need for the development and promotion of long-term business and reduction plans, the burden of high price volatility affected by the banking standards applicable at the timing of banking, stabilization of the amount of emission permits on the market, alleviation of the burden on a future increase in emissions, and the minimization of government intervention in the emissions trading market. Reasons for suggesting the need for relaxed banking restrictions included concerns about reduced liquidity and sharp price fluctuations in the emissions trading market due to the abolition of banking restrictions,

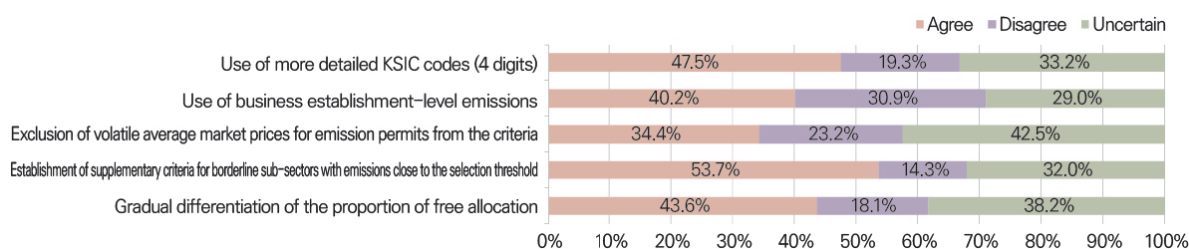
motivating companies to reduce emissions through price stabilization, and ensuring the possibility of achieving the NDC and alleviating the burden on companies. The reasons for choosing the revision of existing banking standards included the complexity of existing banking restrictions, a potential decline in emission permit prices caused by the inducement to sell emission permits, the imposition of the burden to sell emission permits even when prices are low, difficulties in inducing net buyers of emission permits to reduce their emissions and the low predictability of the emission permit supply (caused by allowing net buyers to bank all unused emission permits), and the need to establish flexible banking standards that reflect the domestic economic situation. The reasons for proposing that the existing banking system should be maintained included the burden of responding to frequent regulatory changes and increased market confusion caused by regulatory changes. Other proposals included a suggestion that refining the method of calculating the amount of emission allowances to be allocated to companies should be prioritized over the improvement of the banking system.

The highest proportion of the responding entities (45.9%, 119 entities) responded that, if banking restrictions were relaxed or abolished, they would secure as many emission permits as possible and carry them over to the next compliance year. On the other hand, 104 entities (40.2%) stated that they would carry over a certain amount of emission permits taking into consideration the situation in the emission trading market, and 34 entities (13.1%) anticipated that they would have no surplus emission permits to carry over.



〈Figure IV-23〉 Improvement of Banking and the Use of Emission Permits upon the Abolition(Relaxation) of Banking Restrictions

The responding entities' views on the methods of improving the selection of carbon leakage sub-sectors were also surveyed. Regarding the use of more detailed KSIC codes (4 digits) rather than the currently used 3-digit KSIC codes when selecting carbon leakage sub-sectors, the positive response rate (47.5%, 123 responses) was higher than the negative response rate (19.3%, 50 responses). The number of positive responses (40.2%, 104 responses) was also higher than the number of negative responses (30.9%, 80 responses) for selecting carbon leakage sub-sectors based on business establishment-level emissions instead of entity-level emissions. On the other hand, regarding the exclusion of the average market price for emission permits when calculating the level of carbon leakage, the largest proportion of respondents stated that they were uncertain (42.5%, 110 responses); the positive response rate for this survey item was 34.4% (89 responses) and the negative response rate was 23.2% (60 responses). A majority of the responding entities (53.7%, 139 responses) suggested the establishment of supplementary criteria to determine whether or not to designate borderline sub-sectors with emissions close to the selection threshold as carbon leakage sub-sectors, and the proportion of positive responses (43.6%, 113 responses) was higher than that of negative responses (38.2%, 99 responses) for differentiating the proportion of free allocation based on the level of carbon leakage. Other proposals included the establishment of additional criteria for selecting carbon leakage sub-sectors (other than using the value found by multiplying the production cost incurrence rate and trade intensity of the sub-sector), selection of carbon leakage sub-sectors taking into account the Carbon Border Adjustment Mechanism (CBAM), development of qualitative evaluation criteria that can complement the existing quantitative selection method, differentiation of the proportion of auctionable emission allowances tailored to the characteristics of entities (e.g., heat suppliers), and enhancing transparency in the selection process.



〈Figure IV-24〉 Improvement of the Selection of Carbon Leakage Sub-Sectors

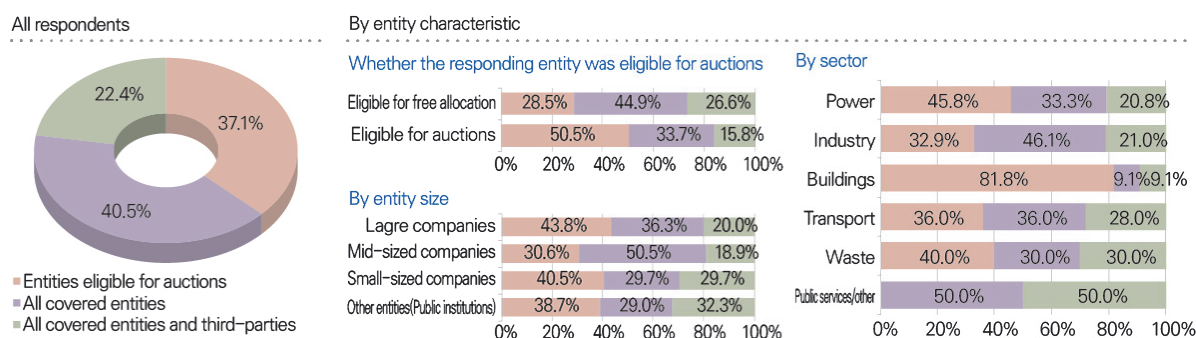
In terms of the possible modification of the scope of participation in auctions, which is currently limited to covered entities from the sub-sectors subject to auctions, the option most preferred by the responding entities was that auctions should be available for all covered entities (40.5%, 105

responses), followed by the response that auctions should be available only for entities eligible for auctions (37.1%, 96 responses) and that auctions should be available for all covered entities and third-parties (e.g., emissions trade brokerage companies) (22.4%, 58 responses). Responses varied depending on whether the responding entity was eligible for auctions in Phase III. While the most preferred option for the entities currently eligible for auctions was the response that auctions should be available only for entities eligible for auctions (50.5%, 51 responses), followed by all covered entities (33.7%, 34 responses) and all covered entities and third-parties (15.8%, 16 responses), the most preferred option for the entities currently eligible for free allocation was the response that auctions should be available for all covered entities (44.9%, 71 responses), followed by entities eligible for auctions (28.5%, 45 responses) and all covered entities and third-parties (26.6%, 42 responses).

Broken down by entity size, the option most preferred by large companies (entities eligible for auctions: 43.8%, 35 responses; all covered entities: 36.3%, 29 responses; all covered entities/third-parties: 20.0%, 16 responses), small-sized companies (entities eligible for auctions: 40.5%, 15 responses; all covered entities: 29.7%, 11 responses; all covered entities/third-parties: 29.7%, 11 responses), and other entities (public institutions) (entities eligible for auctions: 38.7%, 12 responses; all covered entities: 29.0%, 9 responses; all covered entities/third-parties: 32.3%, 10 responses), was that auctions should be available only for entities eligible for auctions. On the other hand, the option most preferred by mid-sized companies (entities eligible for auctions: 30.6%, 34 responses; all covered entities: 50.5%, 56 responses; all covered entities/third-parties: 18.9%, 21 responses) was that the system should be modified so that all covered entities can participate in auctions.

Broken down by sector, responding entities from the buildings (entities eligible for auctions: 81.8%, 9 responses; all covered entities: 9.1%, 1 response; all covered entities/third-parties: 9.1%, 1 response), power (entities eligible for auctions: 45.8%, 11 responses; all covered entities: 33.3%, 8 responses; all covered entities/third-parties: 20.8%, 5 responses), and waste (entities eligible for auctions: 40.0%, 12 responses; all covered entities: 30.0%, 9 responses; all covered entities/third-parties: 30.0%, 9 responses) sectors stated that auctions should be available only for entities eligible for auctions, while those from industry (entities eligible for auctions: 32.9%, 55 responses; all covered entities: 46.1%, 77 responses; all covered entities/third-parties: 21.0%, 35 responses) stated that auctions should be available for all covered entities. In addition, responding entities from the transport sector (entities eligible for auctions: 36.0%, 9 responses; all covered entities: 36.0%, 9 responses; all covered entities/third-parties: 28.0%, 7 responses) equally preferred

that the scope of participation in auctions be limited only to entities eligible for auctions and expanded to all covered entities, while those from the public services/other sector (all covered entities: 50.0%, 1 responses; all covered entities/third-parties: 50.0%, 1 response) equally preferred it being expanded to all covered entities and all covered entities and third-parties.



〈Figure IV-25〉 Scope of Participation in Auctions

In terms of the appropriate use of the revenue generated from emission permit auctions, the reporting entities stated that the revenue should be used as a resource for the implementation of climate change response policies (mitigation, adaptation, and infrastructure development) (34.7%, 90 responses), to only support the covered entities under the K-ETS (42.1% 109 responses), and only to provide a resource for supporting the entities eligible for auctions (23.2%, 60 responses), indicating that the response that the revenue should be used to support the covered entities under the K-ETS accounted for the highest proportion.

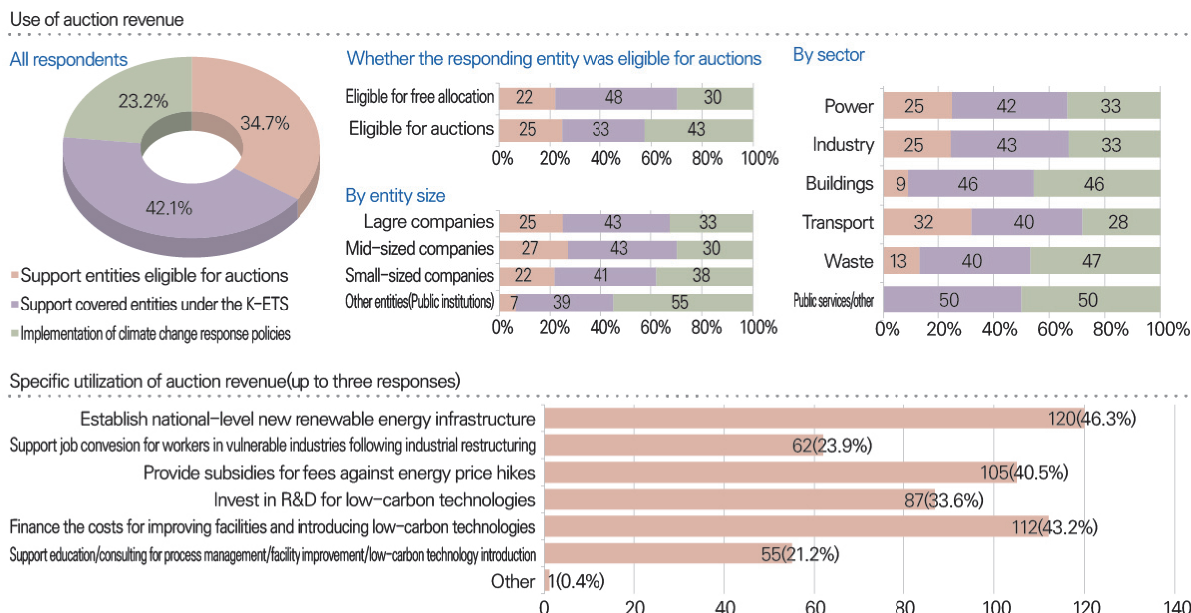
Of note was that entities eligible for auctions showed the highest preference for using the revenue as a resource for the implementation of climate change response policies (42.6%, 43 responses), while entities eligible for free allocation showed the highest preference for using the revenue to support the covered entities under the K-ETS (48.1%, 76 responses).

Broken down by entity size, the proportion of responding entities saying that the revenue should be used only to support the entities eligible for auctions was the lowest for entities of all sizes (large companies: 25.0%, 20 responses; mid-sized companies: 27.0%, 30 responses; small-sized companies: 21.6%, 8 responses; other entities (public institutions): 6.5%, 2 responses), while the proportion of responding entities saying that the revenue should be used to support the covered entities under the K-ETS was the highest for large companies (42.5%, 34 responses), mid-sized companies (43.2%, 48 responses), and small-sized companies (40.5%, 15 responses). The option

most preferred by other entities (public institutions) was to use the revenue as a resource for the implementation of climate change response policies (54.8%, 17 responses).

A similar pattern was observed when the survey results were analyzed based on the sector the responding entities were affiliated with. The proportion of responding entities saying that the revenue should be used only to support the entities eligible for auctions was the lowest in all sectors (power: 25.0%, 6 responses; industry: 24.6%, 41 response; buildings: 9.1%, 1 response; transport: 32.0%, 8 responses; waste: 13.3%, 4 responses; public services/other: 0.0%, 0 response). The option most preferred by the responding entities from the power, industry, and transport sectors was to use the revenue to support the covered entities under the K-ETS (power: 41.7%, 10 responses; industry: 42.5%, 71 responses; transport: 40.0%, 10 responses), while the option preferred by the entities from the waste sector was to use it as a resource for the implementation of climate change response policies (46.7%, 14 responses). For the buildings and public services/other sectors, preference was evenly distributed between the response that the revenue should be used to support the covered entities under the K-ETS and finance the implementation of climate change response policies (buildings: 45.5%, 5 responses; public services/other: 50.0%, 1 response).

In terms of specific utilization of the revenue generated from emission permit auctions, the option most preferred by the reporting entities was to use it to establish national-level new renewable energy infrastructure (46.3%, 120 responses), which was followed by the suggestion that it should be used to finance the costs for improving facilities and introducing low-carbon technologies (43.2%, 112 responses), provide subsidies for fees against energy price hikes (40.5%, 105 responses), and invest in R&D for low-carbon technologies (33.6%, 87 responses).



〈Figure IV-26〉 Utilization of the Revenue Generated from Auctions

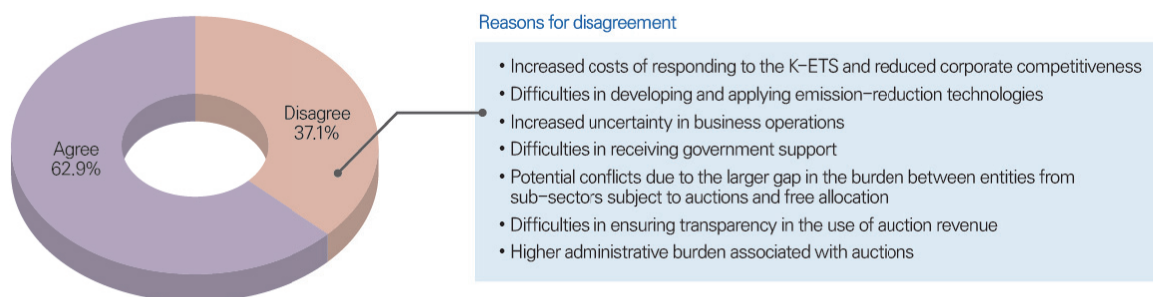
Regarding the question of whether, in the event the revenue generated from emission permit auctions should be used to only support the covered entities under the K-ETS, the proportion of responding entities that agreed that the proportion of emission allowances subject to auctions should be gradually increased (62.9%, 163 responses) was higher than the proportion of entities that disagreed (37.1%, 96 responses). For entities of all sizes, the proportion of entities agreeing with the proposal was higher than that of entities disagreeing with it, with 63.7% of large companies (51 responses), 64.0% of mid-sized companies (71 responses), 51.4% of small-sized companies (19 responses), and 71.0% of other entities (public institutions) (22 responses) agreeing with the proposal. Conversely, the rate of disagreement was 36.3% for large companies (29 responses), 36.0% for mid-sized companies (40 responses), 48.6% for small-sized companies (18 responses), and 29.0% for other entities (public institutions) (9 responses).

Broken down by sector, the majority of responding entities agreed with the proposal in all sectors. In particular, the rate of agreement was higher in the power, buildings, and waste sectors. The rate of agreement was 79.2% for the power sector (19 responses), 58.1% for industry (97 responses), 72.7% for buildings (8 responses), 68.0% for transport (17 responses), 70.0% for waste (21 responses), and 50.0% for public services/other (1 response). Conversely, the rate of disagreement was 20.8% for the power sector (5 responses), 41.9% for industry (70 responses), 27.3% for buildings (3 responses),

32.0% for transport (8 responses), 30.0% for waste (9 responses), and 50.0% for public services/other (1 response).

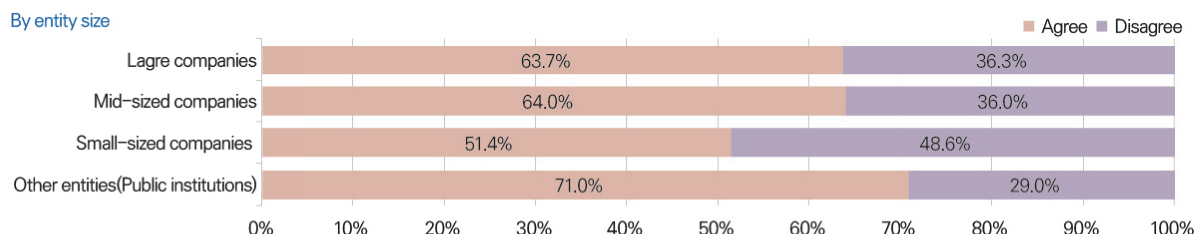
The reasons for disagreeing with the gradual increase in the proportion of emission allowances subject to auctions when the entire revenue generated from emission permit auctions is used to support the covered entities under the K-ETS included the following: increased costs of responding to the K-ETS and reduced corporate competitiveness; difficulties in developing and applying emission-reduction technologies and unsatisfactory reduction effects compared to input costs; increased uncertainty in business operations (e.g., increased market volatility resulting from an increase in auctionable emission allowances, fluctuations in auction revenues depending on economic conditions); difficulties in receiving government support (due to e.g., exclusion from government support, disparity between the size of the required and provided support, ineffective methods of support); potential conflicts among covered entities due to the greater gap in the burden between entities from sub-sectors subject to auctions and free allocation; difficulties in ensuring transparency in the use of auction revenue; and the higher administrative burden associated with auctions.

All respondents

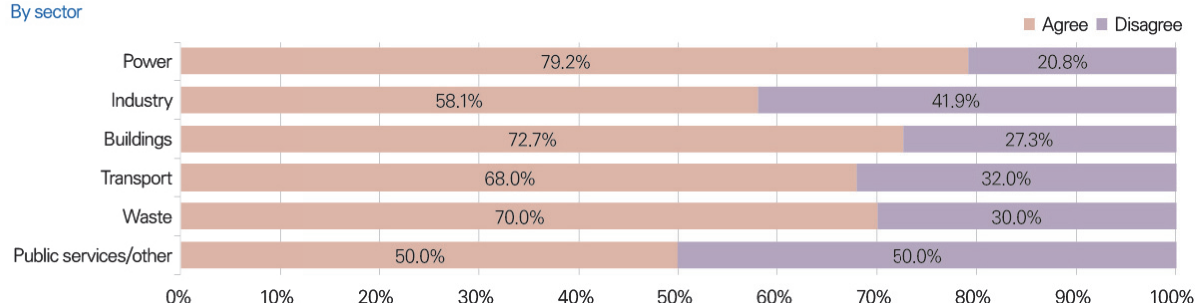


By entity characteristic

By entity size



By sector



〈Figure IV-27〉 view on the Gradual increase in the proportion of emission allowances subject to auctions

In terms of the strategies necessary to improve the K-ETS for Phase IV, the majority of respondents emphasized the need to design an emissions trading system that reflects domestic circumstances, the provision of a clear and consistent institutional direction, restrictions on the introduction of changes to the K-ETS during a particular phase, and the establishment of a system through continuous communication with affected entities. These suggestions indicate that covered entities are hoping for the government to establish, through close communication with covered entities, long-term policy directions that are tailored to Korea's domestic situation. In addition, the respondents requested the refinement of the K-ETS to reflect the characteristics of each sub-sector, including the elaboration of allocation methods for emission allowances, the specification and diversification of criteria for the additional allocation of emission allowances, and the allocation of appropriate sub-sector classification

codes tailored to the main products of the respective entities.

Meanwhile, many respondents mentioned the need for the stabilization of emission permit prices and, in this regard, they called for the prompt introduction of on-exchange derivatives and the establishment of supplementary measures to restrict overseas capital from purchasing emission permits. They also emphasized the need to introduce specific standards for market stabilization measures, which should be codified into law. Moreover, with expectations of the reduced allocation of emission allowances and increased proportion of auctionable emission allowances, responding entities requested various forms of government support to alleviate the burden imposed on them. Specifically, they mentioned support for the development and sharing of reduction technologies, expansion of the supply of and price stabilization for renewable energy, and implementation of various support programs for entities of all sizes. In particular, they requested transparency in disclosing the use of auction revenues.

In addition, responding entities highlighted the need for alleviating their administrative burden by granting sufficient time for emissions report preparation and verification, streamlining government agencies that inform entities about the information they must submit for compliance with the K-ETS, and facilitating information sharing between these agencies.

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