ECOEYE INTERNATIONAL | JULY 2018

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Korea Emission Trading Scheme

2030 Greenhouse Gas Reduction Roadmap

The government has published the draft of the revised 2030 National GHG Reduction Roadmap on June 28th and announced that the roadmap will be finalized by the end of this month.

The draft amendment retains the original framework where the nation will cap its emissions to 536 million tons – a reduction of 314.8 million tons (37 percent) from the 2030 BAU estimate. The draft paper also contains a very crucial change that directly affects the Korean ETS which is the additional reductions in ETS-covered entities.

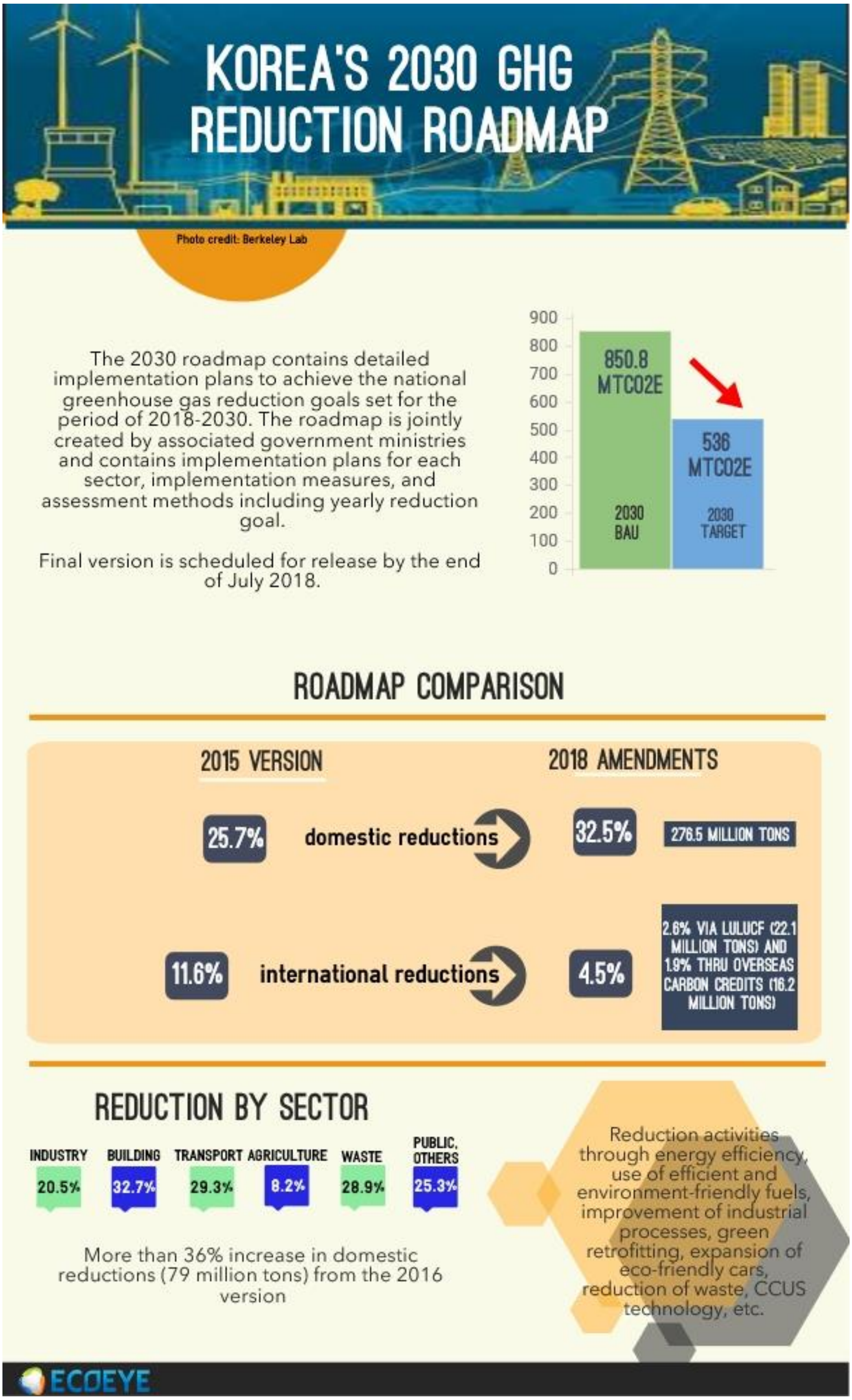
In 2016, the goal to achieve the reduction target was divided into two: 25.7 percent (218.8 million tons) through domestic reductions, and 11.3 percent (96 million tons) through the purchase of international offsets. However, with the recent developments in Article 6 of the Paris Agreement and the costs of buying the credits, the government had to reassess this target. Several joint debates and negotiations had been held since January to tackle this issue.

In the published draft, the government decided a target of 4.5 percent through overseas reductions and LULUCF while increasing domestic reductions to 32.5 percent. The increased in reductions will be divided into the ETS sectors of industry, power generation, building, transportation, agriculture, livestock and waste with the industry and building getting majority of the bulk. The remaining 1.9 percent will be through overseas carbon credits and the 2.6 percent will be reduced via LULUCF.

The reduction ratio in the building sector increased from 18.1 percent to 32.7 percent (28.7 million tons) and the government will implement measures such as green remodeling and retrofitting, strengthening of permit standards for new constructions, identifying urban reintegration and expansion of renewable energy use. Meanwhile, the industry reduction target has been raised to 20.5 percent (equivalent to 42.2 million tons in additional reductions) from the original 11.7 percent and the government plans to implement supplementary mitigation activities in the forms of improved industrial processes, use of environment-friendly fuels, promotion of energy efficiency and efficient technologies, and replacement of GHG refrigerants.

Other planned measures are stringent fuel standards, expansion of eco-friendly cars, improvement of fuel efficiency in maritime and aviation (transport sector), reduction of waste through reinforcement of recycling, efficient capture of methane gas in the waste sector, and application of the Carbon Capture Utilization and Storage (CCUS) technology.

Figure 1. Revised GHG Reduction Roadmap



Carbon Market Surveys

Countries around the world are setting and reevaluating their priorities in responding and adapting to climate change. Korea, for one, implements an emission trading scheme as a means to reduce GHG emissions.

In a market survey conducted by the GHG Inventory and Research Center on January 2018 participated by more than 300 companies, ETS still tend to be unattractive as companies still view the system as a risk in business competitiveness and a subject of unnecessary expenses where most of the budget is spent on consulting costs. Even though some saw it as a means to forge new business opportunities, cut production costs, and improve corporate image, the system dominated by uncertainties during the Phase 1 in addition to the entities' lack of experience in carbon commodity trading makes up for the unfavorable notion. To the entities, the ETS was mainly aimed at fulfilling the shortfall rather than a dynamic market itself.

The survey also showed that most of the entities expect the government to address the repeated shortage of allowances and recognize a wider set of offset credits, among others. The Korean carbon market covers more or less 590 entities that accounts for 67% of the nation's emissions.

In other carbon market surveys conducted by IETA and Thomson Reuters, respondents had a more positive perception of cap-and-trade systems with many expecting the emergence of new carbon initiatives in other regions. The EU ETS prices showed positive market performance driven by the Phase 4 reforms and the revisions made in the market stability reserve. The Chinese ETS set to be the largest carbon market in the world once it starts operating in 2020 will be the basis of the cap-and-trade system's future as it can encourage or discourage other countries in implementing a carbon price, according to the respondents.

When it comes to market mechanisms under the Paris Agreement, respondents were still uncertain whether it will create a significant market given the policy uncertainties surrounding Article 6 and the low demand for carbon credits. However, respondents foresee voluntary carbon markets growing amidst the increase in corporate voluntary offsetting and the developments in the aviation (CORSIA) and maritime transport sectors.

Participation of Energy Service Companies (ESCOs)

With the finalization of the offset credit rules, state-owned corporations and enterprises as well as some government agencies are trying to navigate and explore possible reduction opportunities by tapping into overseas projects. The latest is the Korea Energy Agency (KEA) holding a seminar tailored to promote and encourage the participation of ESCOs in foreign reduction projects. KEA aims to stimulate the interests of companies in implementing ultra-small-scale reduction projects which later be expanded into other business and be connected with the emission trading scheme by utilizing the rule on foreign offsets. The program reduction project is planned to be a voluntary mid-to long-term GHG reduction project implemented by the central government, local government or the private sector.

Phase 2 Allocation Plan

In conjunction with the announcement of the revised roadmap, the government published the amendments on the allocation guidelines on July 12th. A total of 63 sectors (591 companies) are subject to receiving emissions allowances and from next year (2019), 26 sectors where power generation companies belong will be given 97 percent of their emissions allowances for free. 3 percent of the emission rights will be auctioned monthly to these entities. In terms of energy-intensive and trade-exposed industries, 100% of their emissions allowances will be given for free as long as they fit in one of the following criteria:

① 30% (or more) of trade-exposed intensity

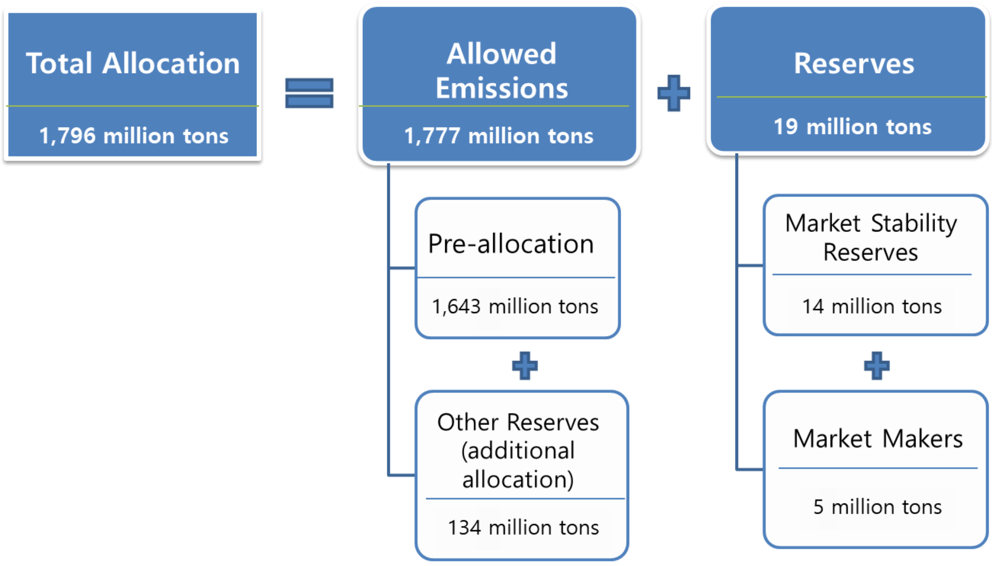
② 30% (or more) of carbon intensity

③ 10% (or more) of trade-exposed intensity AND 5% (or more) of carbon intensity

37 sectors are qualified to receive 100 percent free allocation. The revenues from the auction will be invested in innovative GHG reduction projects such as support for reduction facilities of SMEs and

other assigned companies.

Figure 2. Allowances Allocation



* divided into power generation and non-power generation/conversion

The allocation method will be done through the approaches of grandfathering and benchmarking. Seven business types – power generation, energy, industrial complex/utilities, refinery, cement, aviation, waste - will be allocated through benchmarking (heat/fuel BM, product BM).

The allocation quota will be divided into six major sectors namely: power generation/energy, industry, building, transportation, waste, and public/others. These six sectors are further sub-divided into 63 standard industrial classifications. An allocation quota will be given to each major sector and allocation to each sub-division will be calculated within the sector's quota depending on the company's industrial and energy activities, and previous GHG emissions. Companies with facilities operating CDM, flare stack, and biomass are obligated to report their emissions but do not receive allowances, therefore, these facilities are not obliged to surrender emissions.

According to the allocation plan, the Ministry of Environment set a total emissions allowance of 1.79 billion tons for the second phase (2018-2020). This is an increase of around 90 million tons compared to the previous phase which capped GHG emissions to around 1.70 billion tons. Reserves for new entrants are around 134 million tons while 14 million tons are reserved for market stability. To secure market liquidity, 5 million tons is set aside for market formation and development where three public financial institutions – Korea Development Bank (KDB), Industrial Bank of Korea (IBK), and Korea Export-Import Bank (KOEXIM) - will play the role of market makers. Pre-allocations are equally divided for the whole phase amounting to 547.7 million tons a year.

Table 1. Phase 2 Allocation Quota (Draft)

<table>
<tr><th colspan="3" rowspan="2">Classification</th><th colspan="3">Implementation Year</th><th rowspan="2">Total</th></tr>
<tr><th>2018</th><th>2019</th><th>2020</th></tr>
<tr><td colspan="3">Total Allocation</td><td colspan="3">-</td><td>1,796,133,000</td></tr>
<tr><td rowspan="4">Reserves</td><td colspan="2">MSR</td><td colspan="3">-</td><td>14,000,000</td></tr>
<tr><td colspan="2">Market Makers</td><td colspan="3">-</td><td>5,000,000</td></tr>
<tr><td rowspan="2">Other Reserves</td><td>Power Generation</td><td colspan="3">-</td><td>78,349,000</td></tr>
<tr><td>Non-power</td><td colspan="3">-</td><td>55,803,000</td></tr>
<tr><td colspan="3">Pre-allocation</td><td>547,660,000</td><td>547,660,000</td><td>547,660,000</td><td>1,642,981,000</td></tr>
</table>

The modified guidelines cover an expanded definition for new and sustainable operation facilities to reflect the entity's target management performance. Clarifications on the amount of excess emissions and reductions were also included as well as modifications to the cancellation guideline for allowances and reduction incentives.

Korean Market Update

Overall trend (January 2015 – June 2018)

The first phase had five significant price surges between the periods of January 2015 and June 2018. The first surge happened in May 2016 brought about by allocation issues and concerns about supply. The second compliance year had another surge when KAU16 reached KRW 26,500 due to very limited supply of allowances amidst hedging of entities and over banking of permits. The last three spikes occurred in the third compliance year when KAU17 shot up to KRW 28,000 in November 2017, KRW 26,000 in May 2018 and KRW 28,000 in June 2018. The former was mainly due the delay in allocation plans and the latter two were responses to the MSR auction and roadmap amendments fueled by a concentration of small-volume transactions.

High prices normally gets corrected by the government through market interventions as observed in the recent patterns but the June 29 closing of KAU17 at KRW 28,000 signifies that KAU18 is now set to trade at a higher level, a 29 percent increase from the same period last year.

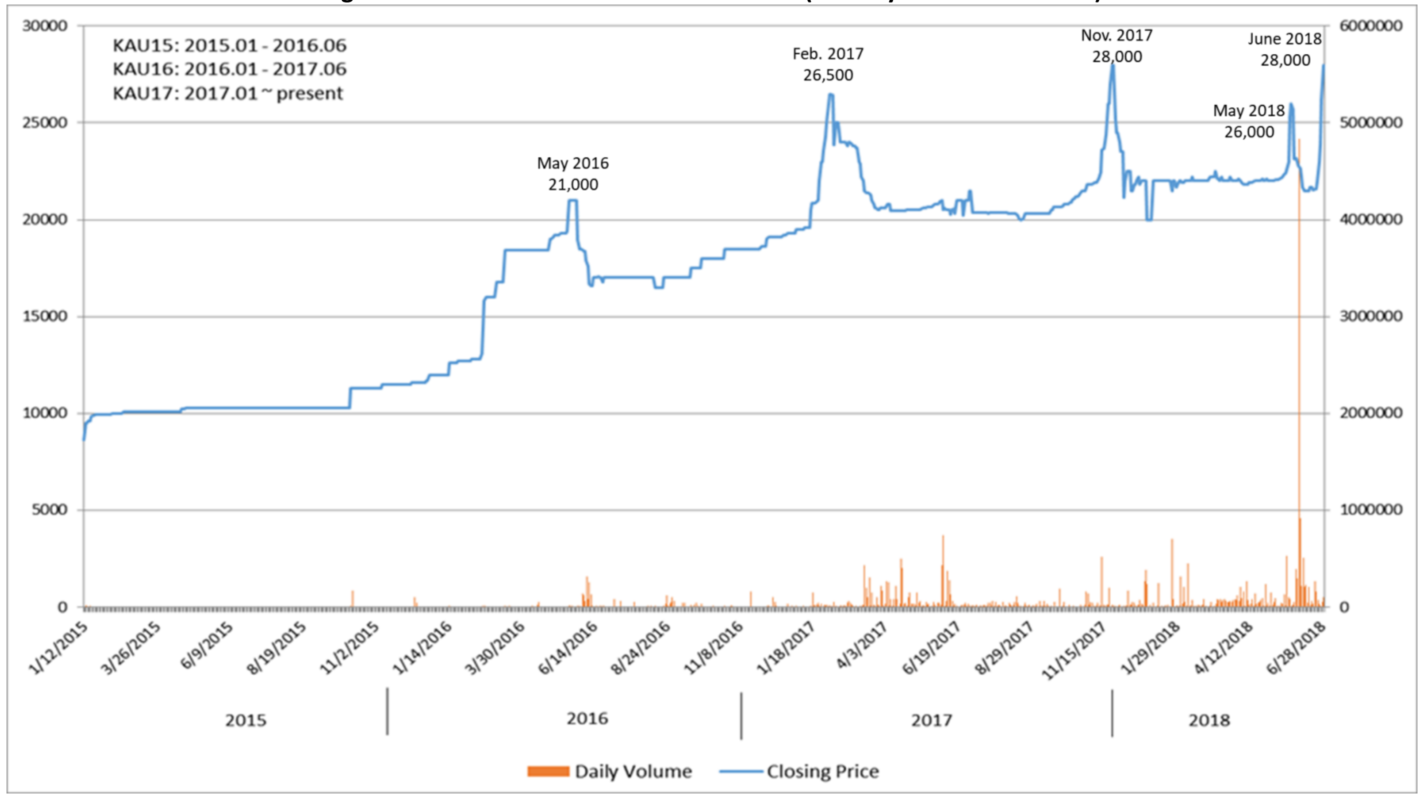
Table 2. Increase Rate of KAU Prices

Period	Starting Price	Increase Rate
KAU15 (July 1, 2015)	10,300 8,640 (Jan. 12, 2015 – ETS start)	-
KAU16 (July 1, 2016)	17,000	65% ** a rate of 96.8% if compared to January 12, 2015
KAU17 (July 3, 2017)	20,350	19.7%
KAU18 (July 2, 2018)	26,250	29%

Note: Prices comparison based every July (start of a compliance year)

Most large-scale negotiations and OTC transactions fall in between the months of March to June with volumes normally peaking every June as entities rush to meet the compliance deadline.

Figure 3. Phase 1 KAU Market Performance (January 2015 – June 2018)



The first compliance year had been mired by several lawsuits which stalled trading activity for months. Insufficient allowances continued to raise the prices until it hit KRW 21,000 in May 2016. In turn, the government auctioned 900,000 tons of reserves and doubled the borrowing limit in a bid to stabilize the prices. KAU prices grew towards the second compliance year as low supply continued. Trading picked up as entities get familiar with the system albeit in limited volumes as permits remained scarce. In April 2017, the government amended the banking regulations effectively implementing a restriction of 10% of the annual average allocation + 20,000 tons from the second phase.

The third compliance year started modestly with prices just above KRW 20,000. Companies were waiting for the government's notice of the allocation plan which was originally scheduled for announcement in June-July 2017. However, internal changes in the responsible ministries and the new government's assessment of the energy roadmap had delayed the allocation plan further into the second quarter of 2017 triggering spike in prices. Along with low market liquidity, allowance prices edged up to KRW 28,000 in November and only cooled down after the government distributed the allocation plan maintaining that stability for several months until the market showed sign of another overheating in May 2018 and subsequently, on June 2018.

One Year Trend (January 2017 – June 2018)

From January 2017 until June 2018, KAUs traded for 232 days and KOCs for 44 days while KCUs did not have any single trade for the whole year. Exchanges in the last compliance year were livelier with monthly trades picking up in November 2017 and maintaining monthly transactions of more than 1 million tons. Monthly trading volume peaked on June 2018 exchanging 8.2 million tons, the highest monthly volume since the ETS began partly due to the auctioned units and the flow of excess permits from those subjected to carry-over restrictions.

Historically, KAU and KOC prices move at the same level as KOC prices follow prevailing market prices of KAUs. However, sharp increases and decreases in KOC prices are more visible compared to its KAU counterpart as credit units have less active daily trades in comparison with KAUs.

Prices in the 12 months (July 2017 – June 2018) averaged between KRW 22,126 – KRW 22,411 supporting the benchmark level of KRW 22,000. If the first six months of 2017 when recorded KAU17 transactions is taken into account, the average price for the whole period is KRW 21,997 and the total volume is 21.5 million tons.

89.6 percent of the total compliance year's market volume was purchased by the power generation (65.6%), petrochemicals (14.2%), cement (3.5%), community/collective energy (3.3%) and non-ferrous metals (3%). In contrast, the largest selling transactions were made by the power generation (24.9%), steel (10.3%), petrochemicals (6.9%), community/collective energy (5.4%), and waste (4.8%) totaling to 52.3 percent of the year's sold allowances. The other 23.7 percent (est. 4.6 million tons) were from auctioned allowances. It is worth noting that there is a relatively balanced share of buying and selling transactions in the case of the power generation and petrochemicals.

In terms of trading approach, bilateral trading is the most dominant as this method is generally preferred by big and seasoned emitters whose large-scale transactions were often negotiated directly.

Figure 4. K-ETS Commodity Units Price Trend (January 2017 – June 2018)

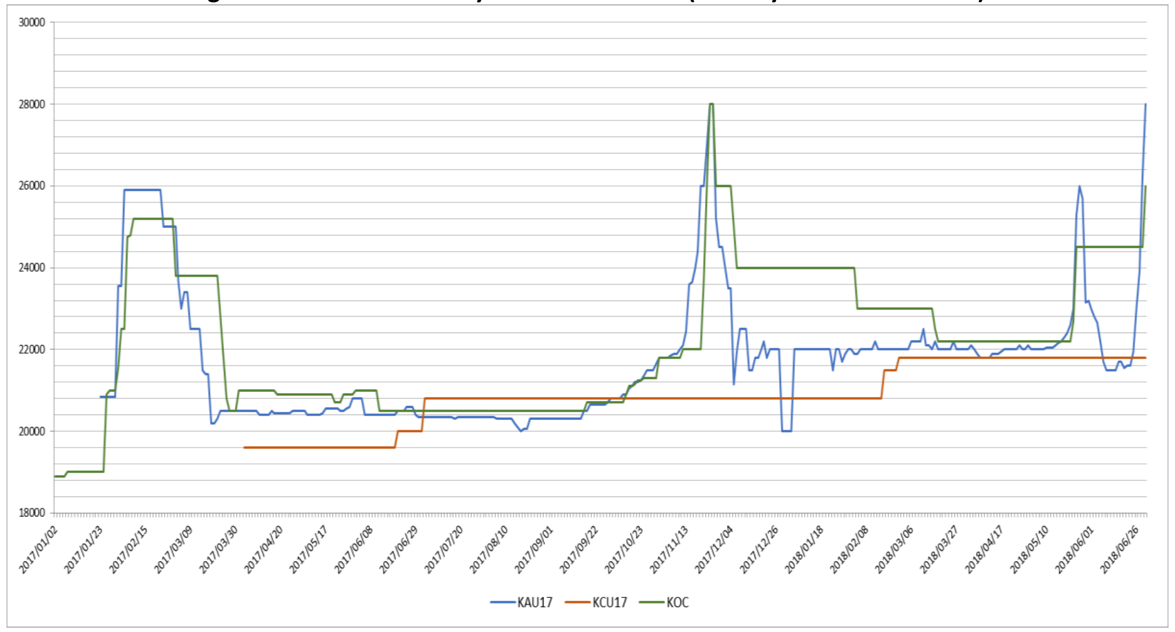


Table 3. KAU17 Market Performance By Period

	Whole Period (January 2017 – June 2018)	1 Year (July 2017 – June 2018)	6 Months (January 2018 – June 2018)	3 Months (Apr. 2018 – June 2018)	1 Month (June 2018)
Trade Volume (tons)	21,480,154	19,683,736	15,502,702	11,896,818	8,267,713
Trade Value (million KRW)	4,725.1	4,355.2	3,448.6	2,656.4	1,852.9
Average Price (KRW)	21,997	22,126	22,245	22,328	22,411

** data excluding OTC market

Figure 5. Third Compliance Year Total Trade Volume Per Unit (January 2015 – June 2018)

		KAU17	KCU17	KOC	Total
Market	Intramarket	6,145,557	-	380,608	6,526,165
	Bilateral	15,334,597	-	-	15,334,597
	Total	21,480,154	-	380,608	21,860,762
OTC (as of May '18)		12,661,276	-	3,142,886	15,804,162
Grand Total		34,141,430	-	3,523,494	37,664,924

Factors that contribute to the volatility of prices in the K-ETS:

① Delay and changes in government policies causing panic and anxiety to market participants which more often fuel speculations buying

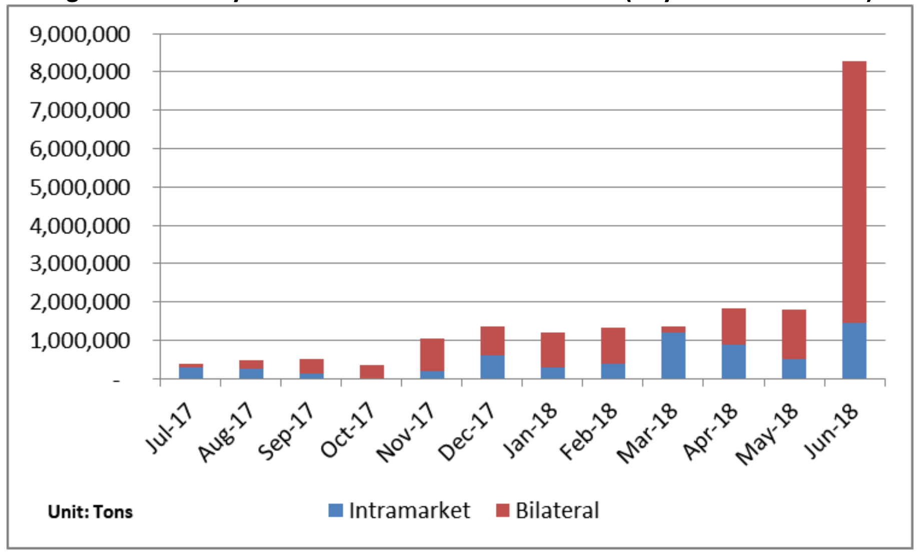
② Chase-purchase or rush buying in uncertain market conditions

③ Concentrated small-volume transactions accelerating the rally

④ Hedging of allowances and over-banking of surplus units

⑤ Tightened allocation quota

Figure 6. Monthly Bilateral and Intramarket Volume (July 2017 - June 2018)



Last Month's Trend (June 2018)

The government has auctioned off 5.5 million tons of market stability reserves on June 1, 2018 to 195 KRX-registered companies that are lacking permits setting a maximum bidding volume of 20 percent of an eligible company's total deficiency. The auction had a successful bid rate of 84.7 percent selling 4,660,000 tons of allowances in the reserve price of KRW 22,500. The remaining permits that were not sold returned to the MSR.

For June 2018, buying and selling of allowances were dominated by the power and petrochemical sectors. The top five buying sectors were power generation, petrochemicals, industrial complexes, aviation and non-ferrous metals which made up 87 percent of the total month's trade. Meanwhile, the top five selling sectors were power generation, steel, petrochemicals, paper manufacturing and waste amounting to 33.6 percent of the total month's trade.

A Carbon-i analysis report determined June's benchmark price at KRW 22,500 while minor and major support levels at KRW 20,000 and KRW 22,000, respectively. The major support and benchmark levels were broken when prices climbed up to KRW 28,000 in the last week of June driven by the announcement of allocation and roadmap plans confirming the absorption of some international targets by the domestic market through the ETS and a tighter reduction target.

Market Forecast

Market activity is expected to slow down after the compliance deadline as companies strategize over their next steps. With the second phase's allocation plan and quota calculation methodology published, giving ample time for companies to plan, price spikes in the first quarter of the new compliance year is highly unlikely. KAU17 will have few trading activities as companies who applied for appeals are still allowed to purchase until September 2018.

Even if the Phase 2 CAP increased compared to the previous phase, newly added reductions from the roadmap will put more pressure to entities. Therefore, market demand is expected to continue to grow and prices to increase in the mid- to long-term forecasts as ETS entities keep their allowances tight and turn to the market to hedge for their deficits. The government has put in place a reserve to be supplied by market makers in the event of very low market liquidity. In addition, an estimated 35 million tons of allowances were applied for carry over to the next period.

As of publication time, KAU17 trades at KRW 28,000 and KAU18 at KRW 26,250.

Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA)

The ICAO Council concluded its meeting in Canada last month with the adoption of the CORSIA Package. The CORSIA Package is the scheme's rulebook containing the standards and practices to be implemented by the scheme including MRV rules, sustainable fuels and eligible offset rules. Countries and airlines can now make final preparations for their monitoring and reporting obligations that will start on January 2019. ICAO has been implementing regional seminars and workshops to explain the detailed procedures, required actions, and expected responsibilities of all aircraft operators.

A media release by the Air Transport Action Group (ATAG) disclosed that although the rulebook has been adopted, much is needed to be done when it comes to the offset eligibility and sustainable fuels criteria as key decisions have been delayed. The Council's urgent priority is ensuring that all related stakeholders – governments, authorities, aircraft operators – are ready to comply. The Council also agreed to widen the definition of sustainable aviation fuels by including lower carbon fossil-based fuels.

It is understood that the Council will assemble a Technical Advisory Body/Board to determine the rules to offset mechanisms wanting to be eligible under CORSIA. Many observers expect that the rules will not be ready until 2020 for the 2021 start of the pilot phase.

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2018 Key Dates

UNFCCC – Paris Agreement
1. September 3 – September 8: Additional negotiating session for the PAWP (SB 48.2, APA 1.6) 2. October 8: Expected release date of IPCC Special Report on 1.5C 3. October 29: Talanoa deadline for submission of inputs (2nd) 4. December 3 – 14: COP24 in Poland

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