

# IMPACT CARBON

[www.ecoeye-int.com](http://www.ecoeye-int.com)



## Contents

<b>Korea Policy Instruments</b> .....	2
Third Energy Master Plan.....	2
<b>Korean Market Update</b> .....	3
Market Analysis.....	3
Analysis of Projected Emissions and Estimated Surplus in Phase 2 .....	5
1. Projected Emissions .....	5
2. Estimated Surplus.....	6
Market Outlook (Phase 2).....	7
<b>Paris Agreement</b> .....	11

## Korea Policy Instruments

### Third Energy Master Plan

The Energy Master Plan is part of Korea's Low Carbon Green Growth Act guiding the government in planning the country's mid- to long-term energy policies in a twenty-year cycle with policy reviews conducted every five years.

On the 6<sup>th</sup> of September, a forum was held to discuss the 3<sup>rd</sup> Energy Master Plan. The forum was attended by related officials and stakeholders to discuss the domestic and international energy demand and supply, energy management plans, development of environment-friendly technologies, and international cooperation, among others.

In reviewing the performance and limitations of the 2<sup>nd</sup> Energy Master Plan, it was found out that it contains a high composition for nuclear power planning (around 29%) and that there is no prompt implementation of the plan. Therefore, the direction of the 3<sup>rd</sup> Master Plan is set on improving the previous plan and putting additional focus on energy transformation, job creation and promotion.

The 3<sup>rd</sup> Energy Master Plan will reflect the changes in the global energy market. It will aim to expand the use and investment in clean energy such as renewable energy, and an environment-friendly and smart ecosystem for energy industries. It will also set the tone in achieving a lesser energy intensity through upping the supply ratio from RE and monitoring GHG and fine dust emissions.

The 3<sup>rd</sup> Energy Master Plan will be drafted by a working group composed of people from the academe, private organizations, industries and the government and will focus on six policy directions - demand, supply, industry, governance, cooperation and infrastructure.

The demand policy aims to structure the energy tax for an optimized energy mix and a customized demand management. The supply policy aims to develop a blueprint for an integrated smart energy system for 2040. The industry policy aims to raise the competitiveness of the RE industry through technological innovation and new expertise. The governance policy aims to promote the public's higher participation in energy policy-making. The cooperation policy aims to promote greater bilateral and multilateral cooperation and the study for a North East Asian energy grid. And lastly, the infrastructure policy aims to provide a suitable energy welfare for consumers through energy statistics.

The draft proposal of the working group will be presented in early October 2018 followed by public hearings in October – November 2018.

# Korean Market Update

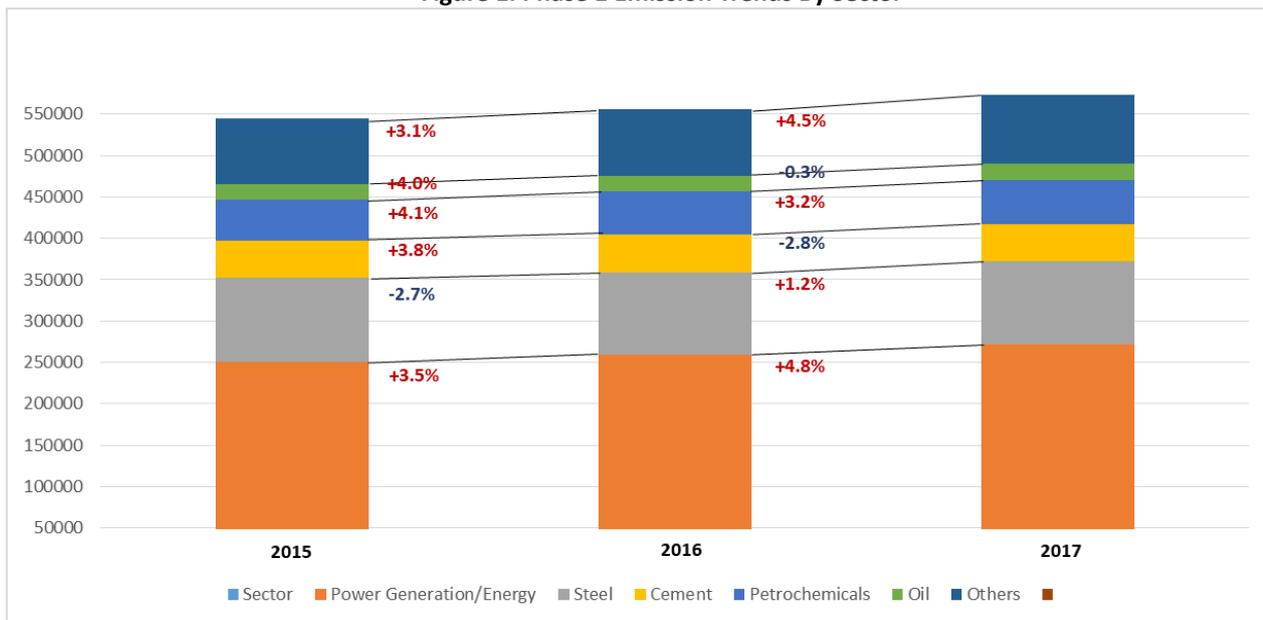
## Market Analysis

Carbon-i has released its quarterly market forecast projecting the second phase's market prices and surplus estimates.

The government has released the second phase's National Emission Permit Allocation Plan in the end of July 2018. The allocation plan was delayed from its original schedule due to changes in the responsible agencies and the government's new energy policies. The second phase's allocation is 1,796 million tons of which 1,777 million tons are delegated as CAP, 5.4% and 5.2% higher than Phase 1, respectively. The total amount of allowed emissions in Phase 2 is 2% higher than the emissions in 2014-2016. The power/conversion sector is lower by -0.1% while the non-conversion sector is 3.8% higher.

Covered entities were given until the end of August 2018 to apply for allocations. The result will be notified by the end of October 2018.

Figure 1. Phase 1 Emission Trends By Sector



Certified emissions amounted to 542.6 million tons in 2015. The power generation and energy industries (power generation, collective industry, industrial complex) generated 249 million tons (46%), the steel industry with 101.9 million tons (18.8%), the cement industry with 44.5 million tons (8.2%), the petrochemical industry with 49.4 million tons (9.1%), and oil refining with 18.7 million tons (3.5%). These five industries made up 85.6% of the total certified emissions in the same year.

In 2016, certified emissions amounted to 554.4 million tons, up by 2.2% from the previous year. Emissions of the five major industries accounted for 85.5% of the total and all industries, except steel, showed an increase in emissions.

Emissions from the phase's last cycle (2017) increased by 3.2% certifying around 571.89 million tons. Emissions from the cement and oil refinery industries declined, in comparison with the previous year, while power & energy and steel showed an increase.

**Table 1. Phase 2 Allocation Plan**

Classification		Implementation Year			Total	
		2018	2019	2020		
Total Allocation		-			1,796,133,000	
Reserves	MSR		-			14,000,000
	Market Formation		-			5,000,000
	Other Reserves	Conversion/Power	-			78,349,000
		Non-Conversion	-			55,803,000
Pre-allocation	Power	228,061,000	228,061,000	228,061,000	684,182,000	
	Non-Power	319,600,000	319,600,000	319,600,000	958,799,000	

The second phase's total allocation is 1,796 million tons of which 1,777 million tons were allocated for emissions of entities (1,643 million tons) and additional allocations for new entrants and new facilities (134 million tons) which is 5.4% higher than the first phase's total allocation. A part of the total allocation assigned 14 million tons to the market stability reserve, and 5 million tons to market creation which is 30% of the KAU trading volume between 2015 to 2017. The allocation will be applied to each individual companies in each of the six sectors using the same adjustment factor.

The 134-million reserve for new entrants and additional capacities allocated 10.5% (78.3 million tons) of the total amount for new entrants in the 8<sup>th</sup> Power Supply and Demand Plan and new facilities. For the non-conversion sector, 55.8 million tons or 5.5% of the total amount was allocated.

**Table 2. Quota Comparison for Phase 1 and Phase 2**

Phase 1		Phase 2 ***			Rate
Pre-allocation *	1,614,735,000	Pre-allocation		1,642,981,000	+1.7%
Other Reserves **	23,730,000	Other Reserves	Power/Conversion	78,349,000	+5.7%
			Non-Conversion	55,803,000	
Early Action Credits **	51,932,000	Removed			
Sub-Total	1,690,397,000	Sub-Total		1,777,133,000	+5.2%
Market Stability Reserve	14,316,000	Market Stability Reserve		14,000,000	Same
-	-	Market Formation		5,000,000	New
Sub-Total	14,316,000	Sub-Total		19,000,000	+32.7%
<b>Grand Total</b>	<b>1,704,713,000</b>	<b>Grand Total</b>		<b>1,796,133,000</b>	<b>+5.4%</b>

\*2015 – 2016 quotas based on the National Plan of Emission Allocation (2014.9) and 2017 quota in the first phase of the plan

\*\*10 million tons from the other reserves were transferred to EACs and increase in 2017 were due to the re-allocation of 616,825 tons

\*\*\*Phase 2 quota based on the National Emission Permit Allocation Plan (2018.7)

The total quota for the first phase was 1.69 million tons wherein 2015 was allotted with 540,730 thousand tons, 2016 with 559,766 thousand tons, and 2017 with 590,032 thousand tons. A linear reduction of 2% was applied in each cycle year but early reduction credits (EACs) worth 51.3 million tons and the reallocation of 17 million tons cause the increase of 3.5% and 5.4%.

Adding the total balance from 2015-2017 resulted to a surplus of around 37 million tons. Meanwhile, KOC issuance in the same period amounted to 21,996,000 tons of which 70% (15.4 million tons) was converted into KCUs for compliance. The remaining 6,607,000 tons is automatically carried forward into the succeeding phase.

### Analysis of Projected Emissions and Estimated Surplus in Phase 2

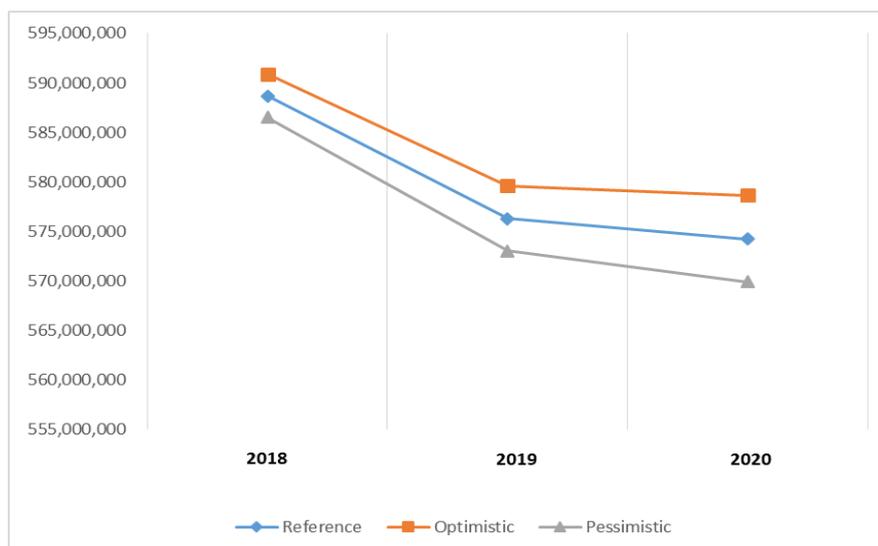
#### 1. Projected Emissions

Analysis and values used in this section is based on Ecoeye’s analysis of the estimated national GHG emissions of the power and conversion sectors based on the 8<sup>th</sup> Power Supply and Demand Plan (energy demand, additions/shutdowns of power facilities, etc.)

The Phase 2 allocation plan covered six sectors and estimated emissions are classified into two: power/conversion and non-conversion category. The power/conversion sector includes energy generation and collective energy while the non-conversion is comprised of industries and industrial complexes.

**Table 3. Estimated Emissions by Scenarios**

Classification		2018	2019	2020	Total
Power/Conversion	Power Generation	245,297,000	233,448,000	231,266,000	710,011,000
	Collective Energy	12,958,000	12,426,000	12,524,000	37,908,000
	Sub-total	258,255,000	245,874,000	243,790,000	747,919,000
Non-conversion	Reference	330,440,000	330,434,000	330,446,000	991,320,000
	Optimistic	332,628,000	333,723,000	334,838,000	1,001,189,000
	Pessimistic	328,259,000	327,169,000	326,099,000	981,527,000
Total	Reference	588,695,000	576,308,000	574,236,000	1,739,239,000
	Optimistic	590,883,000	579,597,000	578,628,000	1,749,108,000
	Pessimistic	586,514,000	573,043,000	569,889,000	1,729,446,000



The reference scenario used the values of 588,695,000 tons for 2018, decreasing to 576,308,000 tons for 2019, and further down to 574,236,000 tons for 2020.

<b>Reference scenario:</b>	2014-2016 average value of certified emissions
<b>Optimistic scenario:</b>	Considering the compound annual growth rate (CAGR) of 0.7% for 2014-2016 and excluding the increase/decrease rate of new facilities (assuming 50%), an <i>increase rate of 0.35% annually</i>
<b>Pessimistic scenario:</b>	Assuming that the economic downturn will continue, a <i>reduction of 0.35% annually</i>

Following the above, the values and results below were derived.

#### A. Power/Conversion Sector

The 2018 emission amount of the power/conversion sector is 258,255,000 up by 0.9% from 2017 as large-scale coal plants are expected to start commercial operations. In 2020, the emission would decrease due to the addition of nuclear power facilities, the emissions are estimated to be 245,874,000 (down by 4.8%) in 2019 and 243,790,000 tons (down by 0.8%) in 2020.

Nuclear plants scheduled to open are Shingori 4<sup>th</sup> (1,400MW – 2018.9), Shinhanwool 1<sup>st</sup> (1,400MW – 2018.12), and Shinhanwool 2<sup>nd</sup> (1,400MW – 2019.10)

#### B. Non-conversion Sector

Three scenarios were set based on the amount of certified emissions for 2014-2016 and the estimated emissions from 2018-2020.

The non-conversion sector will have a total projected emissions of 991,319,000 tons under the reference scenario, emissions of 1,001,189,000 tons under the optimistic scenario, and emissions of 981,527,000 tons under the pessimistic scenario.

**Table 4. Estimated Surplus in Phase 2 by Scenarios**

Classification		2018	2019	2020	Total	
Supply (A)	Pre-allocation <sup>1</sup>	547,660,000	547,660,000	547,660,000	1,642,980,000	
	Carry-over (Phase 1)	37,013,000	-	-	37,013,000	
	Offset Credits <sup>2</sup>	Domestic	9,607,000	3,000,000	3,000,000	15,607,000
		Overseas	-	500,000	2,000,000	2,500,000
Other Reserves (Power/Conversion)		16,667,000	16,667,000	16,667,000	50,001,000	
Estimated Emissions (B)	Reference	588,695,000	576,308,000	574,236,000	1,739,239,000	
	Optimistic	590,883,000	579,597,000	578,628,000	1,749,108,000	
	Pessimistic	586,514,000	573,043,000	569,889,000	1,729,446,000	
Balance (A-B)	Reference	22,252,000	(8,481,000)	(4,909,000)	8,862,000	
	Optimistic	20,064,000	(11,770,000)	(9,301,000)	(1,007,000)	
	Pessimistic	24,433,000	(5,216,000)	(562,000)	18,655,000	

1) Phase 2 of the ETS (2018 ~ 2020)

2) Based on KOC's domestic / overseas projected volume (2018.06) analyzed by Ecoeye

## 2. Estimated Surplus

The estimated emission in the second phase is calculated and classified between the power/conversion sector and the non-conversion sector.

From Phase 2, allocation for new entrants and facilities categorized under the non-conversion sector

will automatically be classified as additional allocation once they become operational. These additional allocations is covered by the “other reserves”. However, adjustment factors have yet to be confirmed, therefore, calculations for the non-conversion sector’s new entrants/facilities were not included in this analysis.

If the adjustment factor is less than 1, there is a possibility that the estimated shortfall in Phase 2 may exceed the current forecast.

Phase 2 is pre-allocated with a yearly amount of 547,660,000 tons totaling to 1,642,980,000 tons. In 2018, the total permits in the market is expected to be 584,673,000 including the banked permits, offset credits and other reserves.

KOC issuance every year is forecasted to be at 3 million tons. Assuming that 6.6 million tons of KOCs issued during the Phase 1 will be supplied to the market in the first cycle, the total available KOCs for 2018 is 9.6 million tons. From 2019 and 2020, it is expected that credits from overseas offset projects will flow into the market.

Under the reference scenario, a surplus of 22.3 million tons is expected as banked permits amounting to 37 million and KOCs amounting to 9 million tons will be available in the market. In the period from 2019 to 2020, there will be no surplus and the market is expected to be short by 8.5 million tons and 4.5 million tons, respectively. Under the optimistic and pessimistic scenarios, a difference of  $\pm 10$  million tons came about in comparison with the reference scenario.

#### Market Outlook (Phase 2)

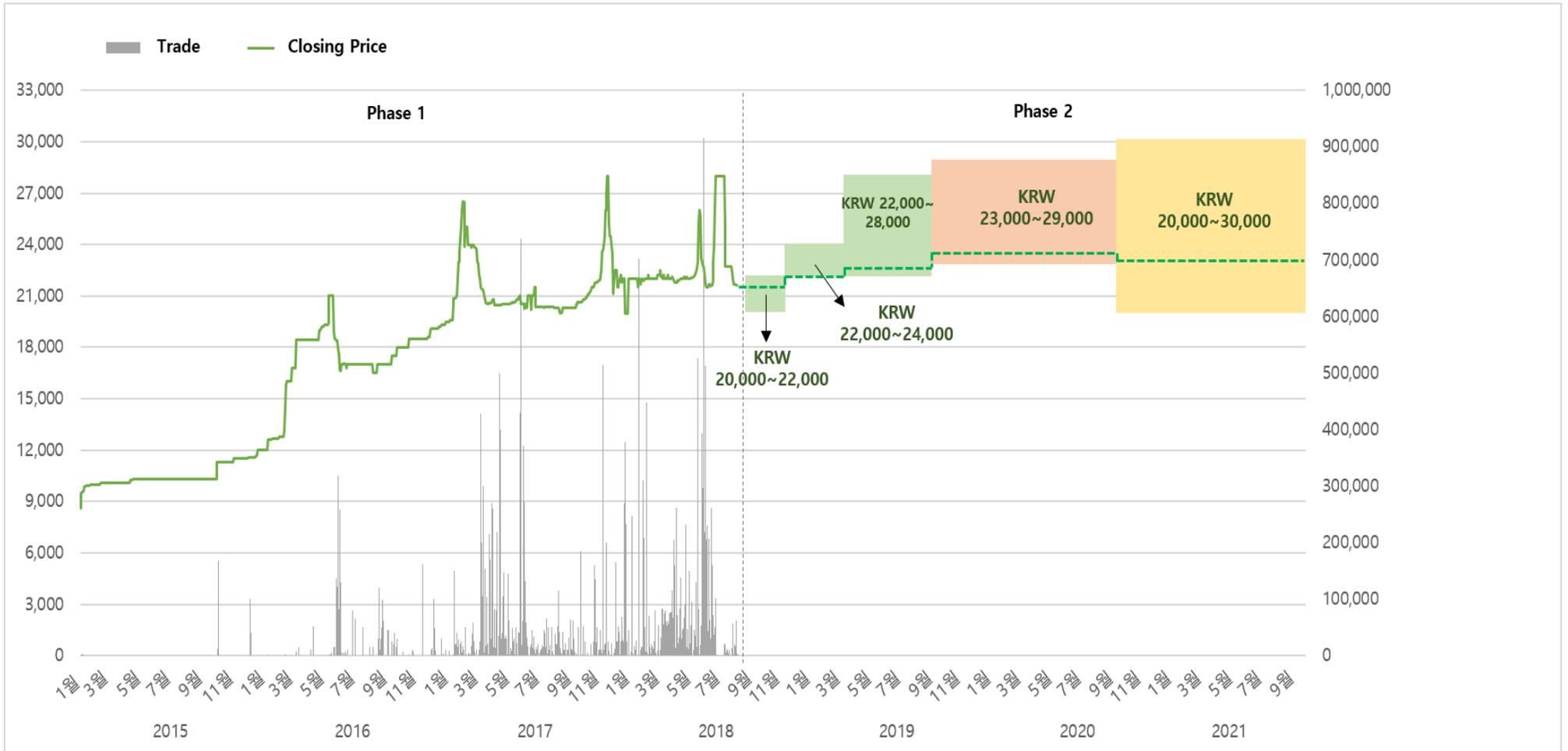
The market price forecasts are divided into three to cover each cycle of the second phase. The forecasts were made in consideration of the past market trends from 2015-2017 and the estimated emissions for Phase 2.

**Table 5. Market Price Forecast**

<p>First Cycle (August 2018 – August 2019)</p> <p>Price Range: KRW 20,000 – KRW 28,000</p>	<p>August 2018 – October 2018 (Stagnant Period)</p> <p>Average Price: KRW 21,600</p>	<p>The estimated price is expected to be at the range of KRW 20,000 – KRW 22,000</p> <p>KAU17 was de-listed on August 10, 2018 and KAU18 started full-scale trading at an initial price of KRW 21,600</p> <p>Trading volume is expected to be limited until entities' quotas are confirmed by the end of October 2018</p>
	<p>November 2018 – February 2019 (Rising Period)</p> <p>Average Price: KRW 22,000</p>	<p>During this period, prices may range between KRW 22,000 – KRW 24,000</p> <p>The supply of surplus volume will be limited in the long-term despite the carry-over from the first phase</p> <p>Monthly auctioning of 1 million tons will start on January 2019 and is expected to contribute to the stabilization of the price. Gaps between the selling and buying prices might cause slight price increases</p>
	<p>March 2019 – August 2019 (Peak Period)</p> <p>Average Price: KRW 22,500</p>	<p>The months leading to the compliance deadline is expected to have a surge of prices that might hit KRW 28,000 and play along the level of KRW 22,000 at the lowest</p> <p>Entities lacking permits and those holding surpluses will assess the market situation before making use of their banked or borrowed permits. Price volatility is expected to ease compared to the first phase but temporary price surges might occur due to the buying spree after March</p>
<p>Second Cycle (September 2019 – August 2020)</p>	<p>Price Range: KRW 23,000 – KRW 29,000</p> <p>Average Price: KRW 23,500</p>	<p>In the first cycle, many companies are expected to utilize their borrowing limit of 15% which in turn will affect their borrowing ratio for the second cycle resulting to fewer on-hand permits.</p> <p>Examples:</p> <p>① (Borrowed 15% in 2018) Allowed borrowing rate in 2019 = <math>[15\% - (15\% \times 50\%)] = 7.5\%</math></p> <p>② (Borrowed 10% in 2018) Allowed borrowing rate in 2019 = <math>[15\% - (10\% \times 50\%)] = 10\%</math></p>

		<p>Aggressive selling of carry-over is expected to start in the third cycle which means less extra permits available in the market creating a demand with lesser supply</p> <p>The average trading price is expected to be at the highest in this cycle and the market stabilization reserves might be used in the event of price hikes or supply/demand imbalance.</p>
<p>Third Cycle (September 2020 – August 2021)</p>	<p>Price Range: KRW 20,000 – KRW 30,000</p> <p>Average Price: KRW 23,000</p>	<p>Price volatility will intensify as the supply of surplus is concentrated in the last cycle.</p> <p>Carry-over rules are reinforced compared to the first phase with only a maximum of 25% of the total KAU quota allowed for banking.</p> <p><i>Example:</i>  ① <i>Surplus amount of 1 million tons: 20% is allowed which is equivalent to 250,000 tons; the remaining 750,000 tons must be sold</i></p> <p>It is expected that there will either be a shortage of 1,007,000 tons or a surplus of up to a maximum of 18,655,000 tons.</p> <p>If the permits are insufficient due to economic outlook or market supply, market stabilization reserves will be made available to the market to stabilize the prices.</p>

Figure 2. Phase 1 Actual Prices and Phase 2 Expected Prices



## **Paris Agreement**

The Bangkok Climate Change Conference, an additional negotiating meeting in Bangkok, Thailand concluded its session on the 9<sup>th</sup> of September leaving a 307-page “Paris Agreement Work Programme (PAWP) compilation” and many parts still for discussion in the upcoming COP24. The PAWP or the agreement’s implementation guidelines which has been under negotiation for two years are set for adoption in the COP24 in Katowice.

It was reported that progress has been slow in Bangkok and Parties had made “uneven” progress with no issues fully resolved across different agenda items particularly on elements that are more politically complex. Countries had been struggling on reflecting the contributions and responsibilities under the common but differentiated responsibility element of the PAWP as countries have different circumstances.

Many are turning their hopes to the Presiding Officers because they are mandated to prepare a Joint Reflection Note that will reflect the progress made into a more solid basis for negotiations in the COP24. Many anticipate that the co-chairs will change the course of negotiations if they are bold and fair in reflecting all Parties’ views and identify potential compromises for possible conflict on high-level issues.

## Climate Finance

It has been widely reported that the climate finance debate has hit an obstacle as a number of developed countries tried to water down the planned \$100 billion a year finance commitment that is due to start in 2020 therefore prompting calls for political intervention in the upcoming global summit.

## Article 6

Some media outlets conveyed that the Bangkok delegates produced draft negotiating texts outlining the options for the sustainable development mechanism and bilateral trading of emission credits under the Article 6 of the PAWP with many different options and possibilities laid on the table such as whether existing UN credits will be eligible in the post-Kyoto regime and setting limits on how nations can use these credits in meeting their pledges. However, issues vary greatly and delegates were unable to narrow down these options leaving the co-chairpersons to keep working on the legal texts. The delegates also proposed to create new supervisory bodies to oversee these mechanisms.

The Reflection Note is expected to be circulated by mid-October 2018 in time for the pre-COP meeting scheduled on 21-24 October 2018 in Poland.

[Disclaimer]

---

This newsletter is intended solely for information purposes and is published once a month by Ecoeye International. If you wish to subscribe to our mailing list, please visit our website at [www.ecoeye-int.com](http://www.ecoeye-int.com).

This newsletter may contain forward-looking statements, uncertainties and assumptions which reflect our view with respect to the current and future performance of the market. Although we try to provide quality information, actual results may differ due to other factors; therefore, we do not guarantee the accuracy, completeness, reliability and suitability of the contents of this newsletter. Any decision made or action taken in reliance on the information is strictly at your own risk. In no event will we be liable for any loss or damage including without limitation, indirect or consequential loss or damage, or any loss or damage arising out of, or in connection with, the use of this newsletter.

---



**Maureen Balamiento-Lee**  
Market Analyst | [mlee@ecoeye.com](mailto:mlee@ecoeye.com)