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Carbon Pricing in Korea

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RESERVE CARBON

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Carbon Pricing in Korea

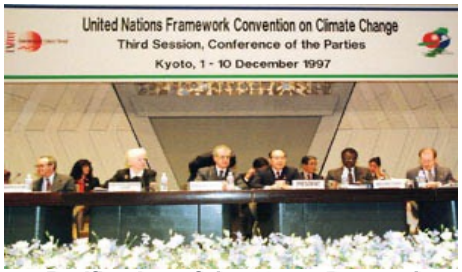
CHAPTER 1
Climate Change

1. Climate Change
2. Agreement
3. Korean Policies

Establishment of an international cooperative system (UNFCCC) with 197 participating countries

Climate Change Overview

United Nations Framework Convention on Climate Change (UNFCCC)



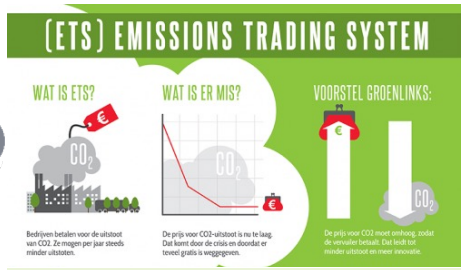
Ratification of the Kyoto Protocol (commitments for developed countries to reduce greenhouse gases)

Adoption of the Paris Agreement (global climate accord)

GREEN CLIMATE FUND

Establishment and operation of the Green Climate Fund (GCF)

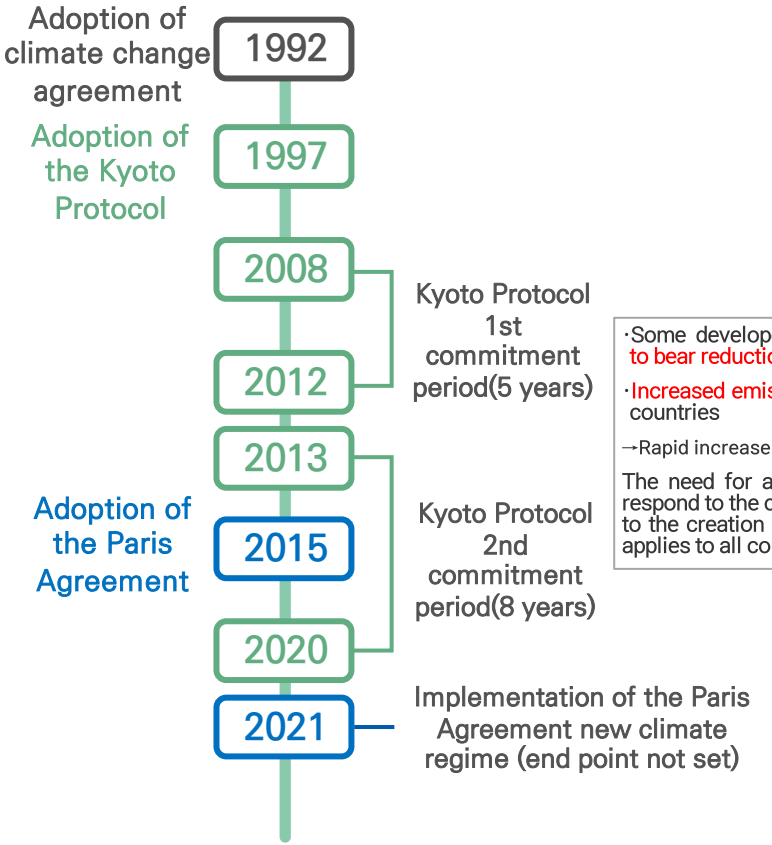
Formation of the carbon market (greenhouse gases = money)



Implementation of the carbon emissions trading system

Addressing climate change is a core global agenda of the 21st century

In order to respond to climate change, the UN Framework Convention on Climate Change was adopted, with 197 parties (196 countries + EU) participating.



·Some developed countries refuse to bear reduction obligations

·Increased emissions in developing countries

→Rapid increase in global emissions

The need for a new framework to respond to the climate crisis has led to the creation of a new treaty that applies to all countries

1992 Adoption of the UNFCCC

With the goal of stabilizing greenhouse gas concentrations in the atmosphere, different responsibilities are imposed on countries to respond to climate change, taking into account each country's capabilities.

※ As of the end of February 2022, 197 parties(196 countries + EU), Korea: Joined in 1993

2008 Adoption of the Kyoto Protocol

- Defines the implementation plan of the agreement
- Annex (A): Specifies greenhouse gases* to be reduced, etc.

  Greenhouse gases subject to reduction *: CO_2, CH_4, N_2O, HFCs, PFCs, SF_6
- Annex (B): Specifies obligatory countries and reduction goals
- (1st period) Obligation to reduce by an average of 5.2% over 5 years(39 countries)
- (2nd period) Reduction obligation of 18% on average over 8 years(38 countries) and NF_3 added

※ As of the end of February 2022, 192 parties(191 countries + EU), Korea: Ratified in 2002

2015 Adoption of the Paris Agreement

- New climate regime with participation of all parties after 2020
- A global long-term temperature goal of 2℃/1.5℃ is set, and each country makes efforts to achieve this goal through NDC.

※ As of the end of February 2022, 193 parties(192 countries + EU), Korea: ratified in 2016

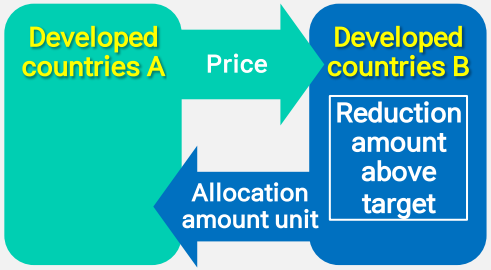
To achieve mid- to long-term greenhouse gas reduction goals, the introduction of the Emissions Trading System and the Clean Development Mechanism was permitted

Kyoto Protocol

Kyoto Mechanism

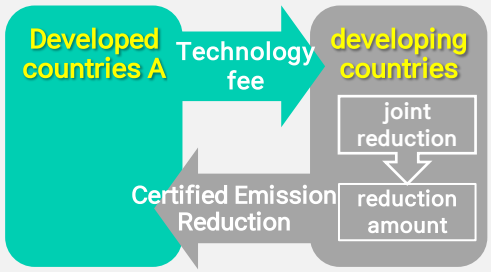
A market-based mechanism to alleviate the burden of greenhouse gas reduction activity costs in countries with mandatory reductions.

Emissions Trading Scheme(ETS)



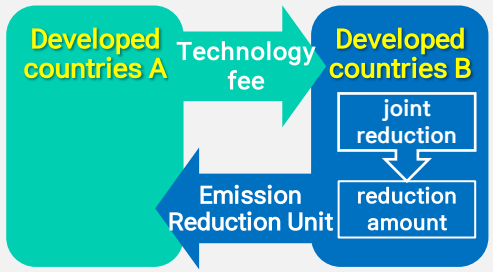
- Countries that exceed the mandatory reduction amount sell the excess.
- Trade emissions permits between countries

Clean Development Mechanism(CDM)



- Recognition of greenhouse gas reduction through investment in developing countries as performance
- Obtaining CERs from non-Annex I

Joint Implementation(JI)

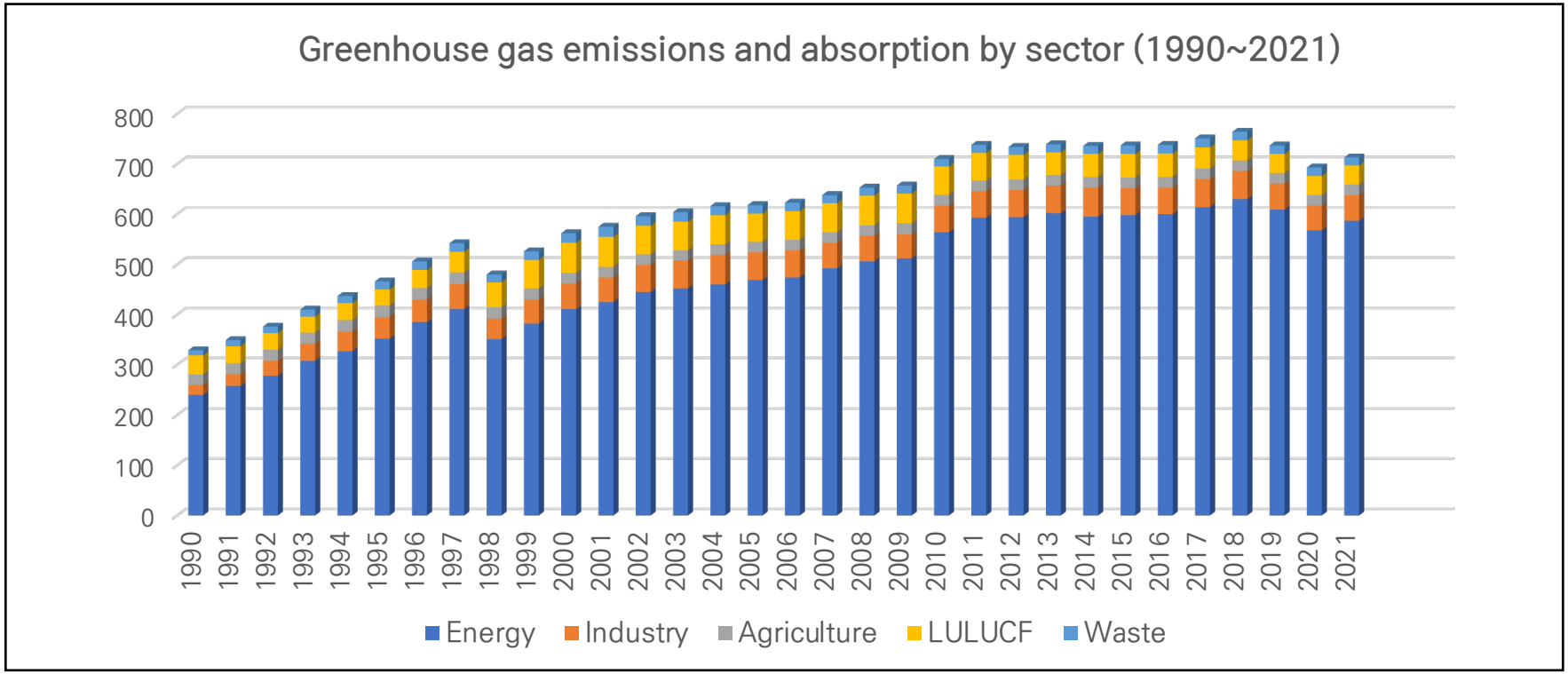


- Recognition of greenhouse gases reduced by investing in countries with reduction obligations
- Transfer or acquire ERU

After the introduction of the EU emissions trading system in 2005,
Korea's emissions trading system was implemented and the emissions trading market opened in 2015.

Korea emitted 676.6 million tons in 2021, an increase of 22 million tons (3.4%) compared to the previous year. This marks the first increase after two consecutive years of decline in 2019 and 2020.

Greenhouse gas emissions



출처 : National Greenhouse Gas Inventory Report of korea(1990~2021)

In 2020, Korea emitted 656.2 million tons, a decrease of 45 million tons (6.4%) compared to the previous year. After peaking in 2018, greenhouse gas emissions decreased for two consecutive years.

Total emissions in 2020

656.2 million tCO_2eq

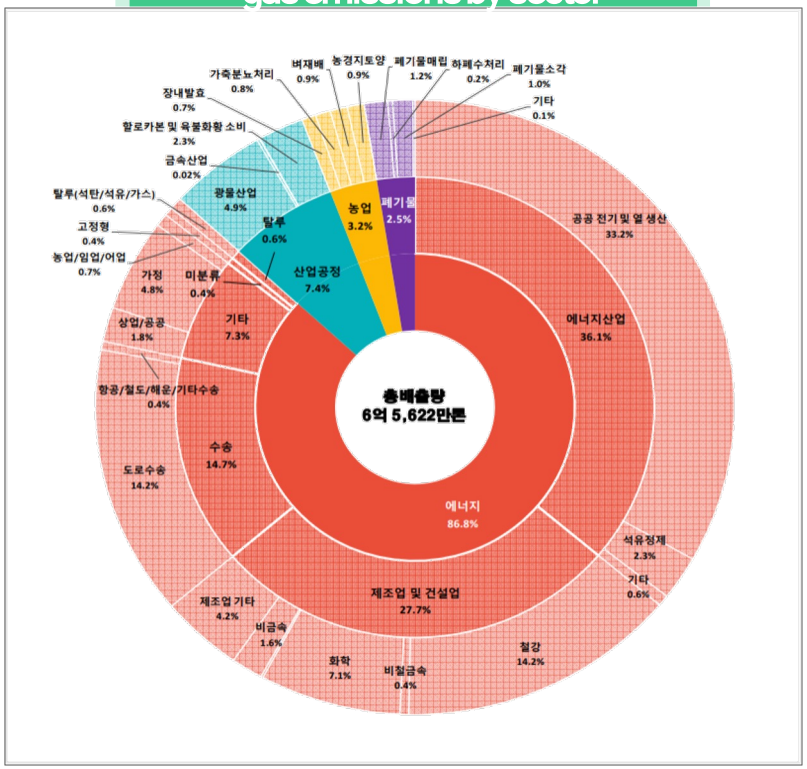
Change from 2019
a decrease of 45 million tCO_2eq (6.4% reduction)

Emissions by source
Energy 86.8%, Industry 7.4%, Agriculture 3.2%, Waste 2.5%

Share of GHG by type
CO_2 91.4%, CH_4 4.1%, N_2O 2.1%, HFCs 1.0%, SF_6 0.8%, PFCs 0.5%

Emissions in 2021 were approximately 680 million tons, an increase of about 3.5% compared to 2020.

National share of greenhouse gas emissions by sector



Establishment of National GHG Reduction Targets and Framework Act on Carbon Neutrality and Green Growth
Adjusted 40% reduction from 2018 BAU levels and formulation of Carbon Neutrality Master Plan ('23.03)

National Determined Contributions

2015.6 — Establishment of 2030 NDC
37% reduction from BAU

2018.7 — Revision of National GHG Reduction Roadmap
Domestic reduction ↑
International offsets ↓

2019.12 — Adoption of absolute targets
37% reduction (BAU) to 24.4% reduction (2017)

2020.12 — Updated NDC
24.4% reduction from 2017 levels

2021.10 — Announcement of enhanced NDC
40% reduction from 2018 levels

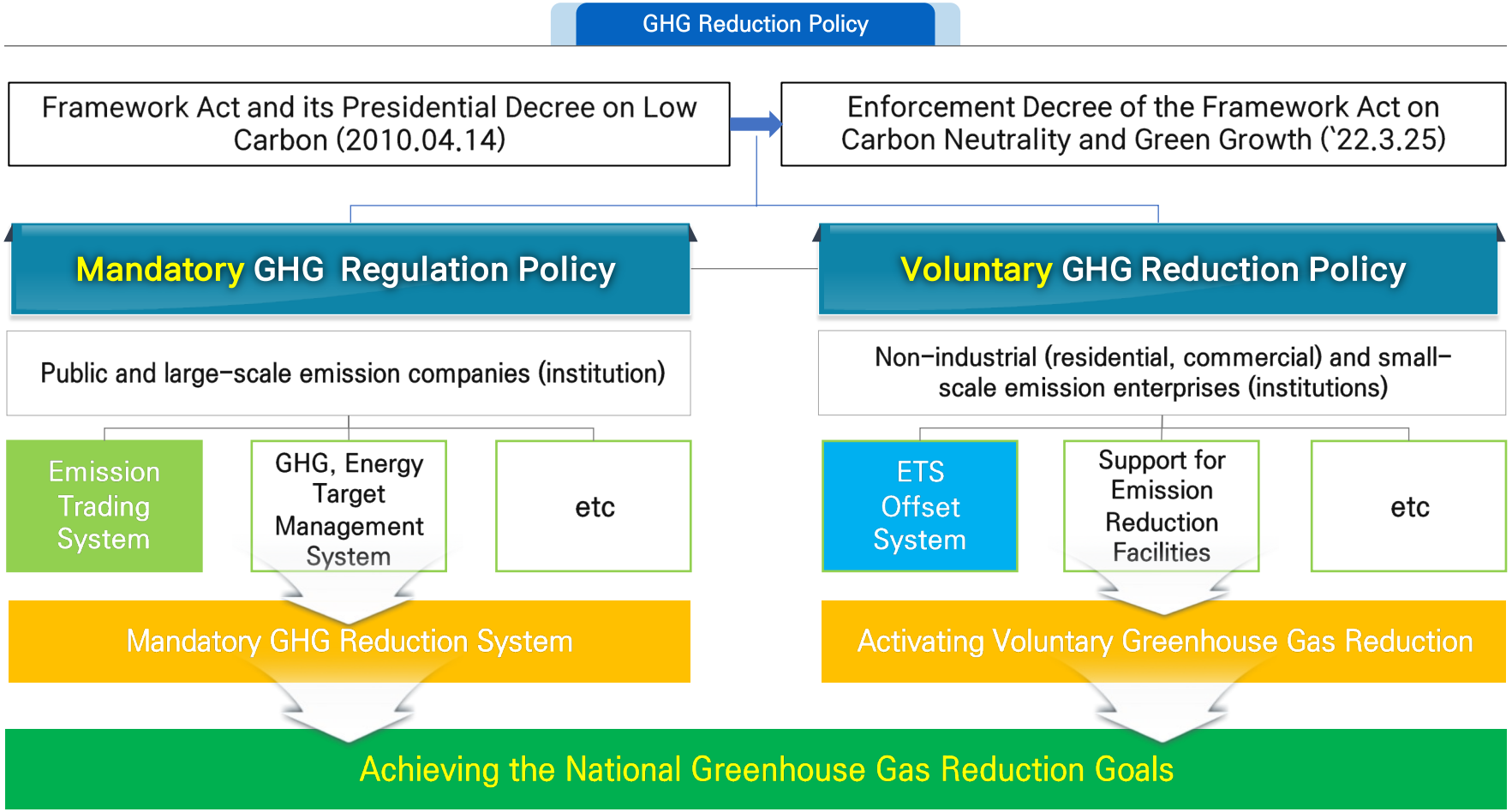
2023.3 — Enhanced NDC Improvement
Industrial sector targets ↓
International offsets and CCUS targets ↑

Division	Sector	Base year ('18)	Initial NDC ('21.10)	Modified NDC('23.3)
Emissions		727.6	436.6(△40.0%)	436.6(△40.0%)
Discharge	Transition	269.6	149.9(△28.5%)	145.9(△45.9%)
	Industry	260.5	222.6(△14.5%)	230.7(△11.4%)
	Building	52.1	35(△32.8%)	35(△32.8%)
	Transportation	98.1	61(△37.8%)	61(△37.8%)
	Agriculture and Fisheries	24.7	18(△27.1%)	18(△27.1%)
	Waste	17.1	9.1(△46.8%)	9.1(△46.8%)
	Hydrogen	-	7.6	8.4
	Others (e.g., fugitive emissions)	5.6	3.9	3.9
Absorption and Removal	Carbon Sinks	-41.3	-26.7	-26.7
	CCUS	-	-10.3	-11.2
	International offset	-	-33.5	-37.5

* BAU (Business As Usual): The projected emissions scenario if no additional mitigation measures are implemented.
* NDC (Nationally Determined Contribution): A country's pledged actions to reduce greenhouse gas emissions under the Paris Agreement.

Increase in reduction targets
Decrease in reduction targets

Voluntary GHG reduction required by GHG emitting companies and non-industrial sectors
ETS is a key system to achieve the national greenhouse gas reduction target

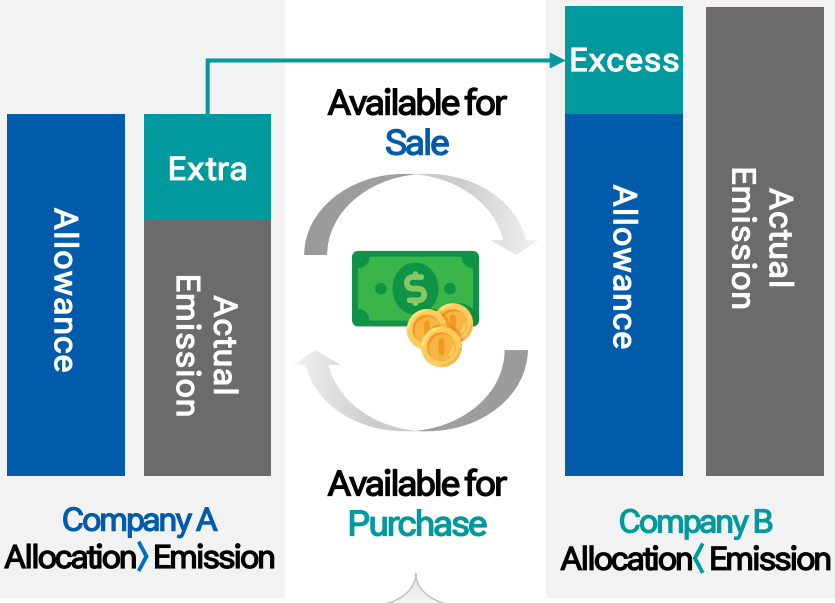


CHAPTER 2
K-ETS & Offset

1. Korean ETS
2. Offset Program
3. Offset Credits
4. Carbon Market

Annual emission allowance(emission permits) are allocated to GHG emitting companies, and a scheme is established to allow trading of emission permits utilizing market mechanisms ➡ Cost-effective GHG reduction

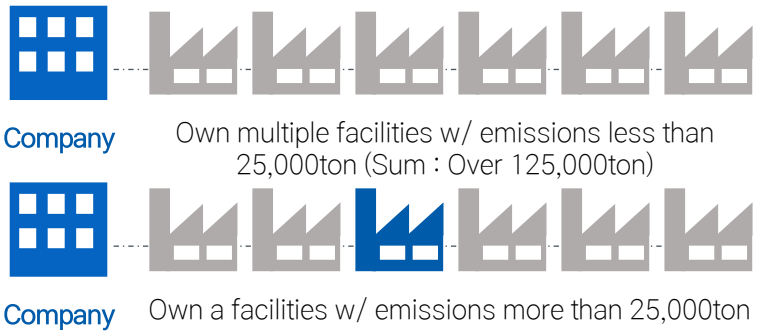
ETS overview



Achieve cost-effective greenhouse gas reductions (currently regulating 811 companies)

Designation Criteria

- Over the past 3 years, Companies holding one or more facilities with an annual average total GHG emissions of 125,000 tons or more, facilities with 25,000 tons or more



- 3rd National Plan Number of Mandatory Company : 736('23.5.)

Designation Criteria and Current Situation of Mandatory Company

**Allowances are determined by the National Allocation Plan (5-year cycle).
The 4th phase (starting 2026) is scheduled to be established this year.**

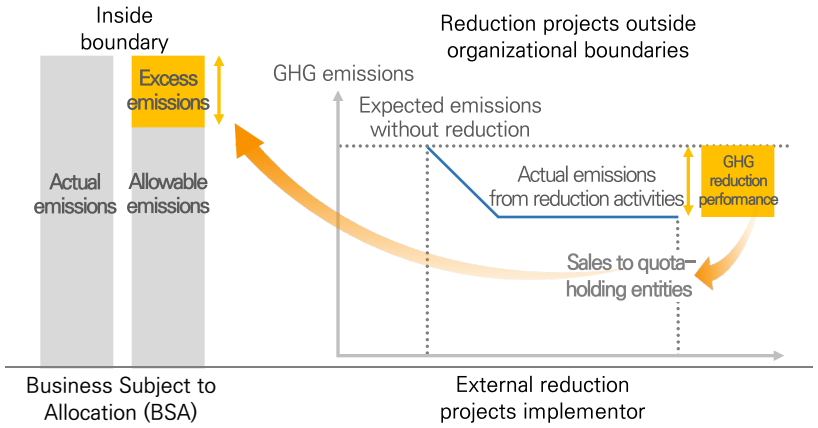
※ (Source) Act on the Allocation and Trading of Greenhouse Gas Emissions Allowances (Act No. 18469)

The offset program in Korea allows emission reductions achieved outside the organizational boundaries of obligated entities to be converted into offset credits for trading and submission.

Offset program overview

Offset program

- A program enabling companies with mandatory GHG quotas to reduce emissions outside their areas and use certified credits as allowances.



KOP

- A project reducing, absorbing, or removing GHGs from sources or activities outside the organizational boundaries of ETS entities, in line with international standards.

Allowance Company	KOC	SMEs and Private Sector
Securing *emissions* allowances for compliance	Investment	Gaining *financial incentives* and credits(KOC) for external projects

Allowance Company have reached their self-reduction limits due to technological advancements.
An offset program is needed for voluntary GHG reduction by both Allowance Company and others.

Conditions for Implementation

1 WHO

- **External reduction projects implementor**
  - Entities responsible for identifying, implementing, and managing external reduction projects (Guideline Article 2)
  - Eligible entities include BSAs, target management companies, public institutions, businesses, local governments, and organizations

2 WHEN

- **Projects initiated after April 14, 2010**

3 WHERE

- **Outside BSA Boundaries**
  - Projects must be conducted outside the organizational boundaries of BSAs

4 WHAT

- **Approved Methodology Required**
  - Projects must follow an approved methodology for GHG reduction calculation; without it, implementation is not possible

5 HOW

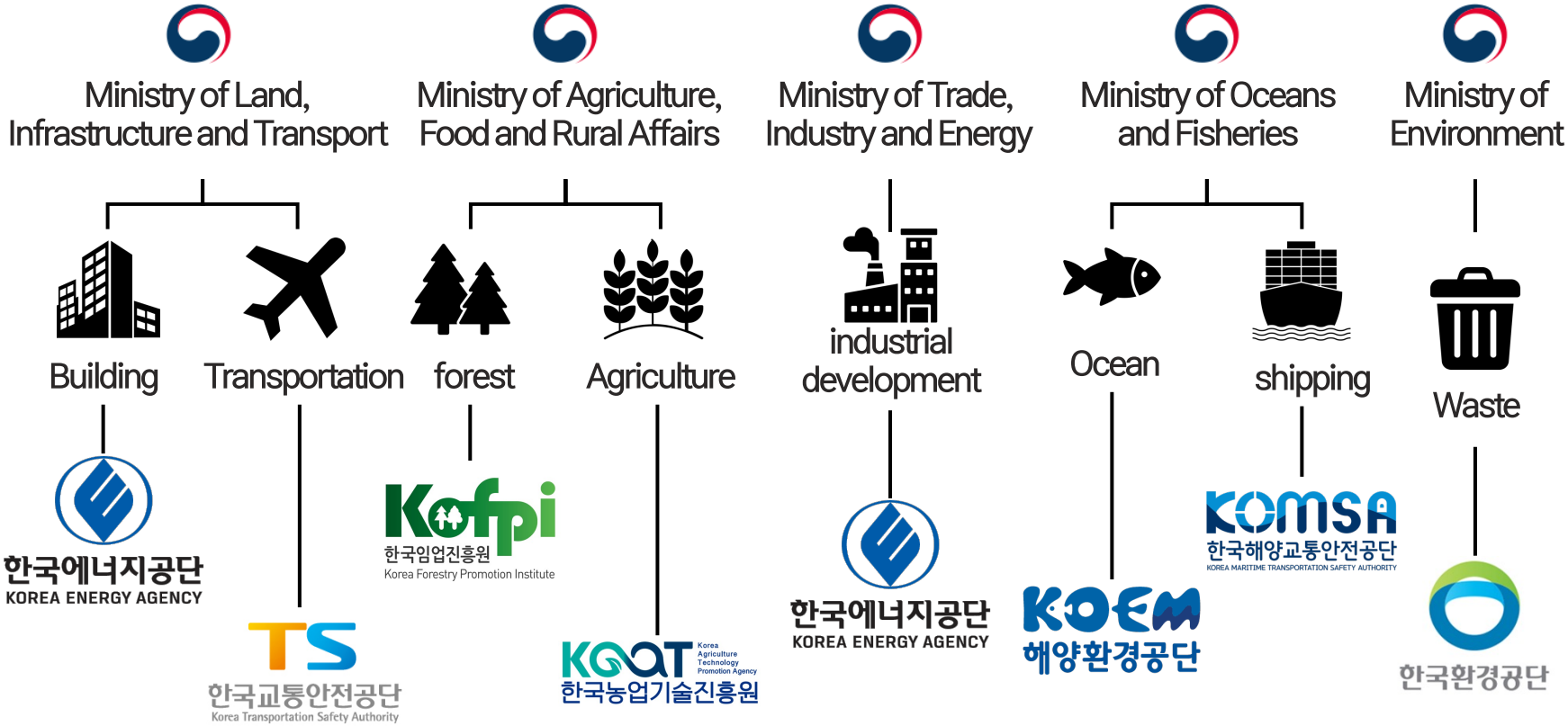
- **Adhere to the 'Guideline on Feasibility Assessment and Certification of Emission Reductions**
  - project plan submission → feasibility assessment → approval → monitoring → verification → issuance of certified reductions

6 WHY

- **Voluntary GHG Reduction Activities**
  - Reductions from mandatory projects under domestic law and regulations are not recognized as external reduction projects

The sectoral Organization consists of five Central Ministry and seven operating institution
Operating institution conducts Consultation and certification committee deliberation process

Korean Offset Program



Offset PJT methodology? Describe the criteria, assumptions, calculation methods, and procedures applied to calculate and monitor GHG reductions or absorptions

Project Registration Process

operating institution	Implementer	operating institution	Implementer · verification institution	operating institution	operating institution
Methodology review · Enrollment	PDD	validation and approval	monitoring · verification	Notification of deliberation results	Issuing certificates
A document that describes the criteria, assumptions, calculations, and procedures applied to calculate and monitor GHG reductions or sequestration		Evaluate whether PDD for project approval applications are prepared in accordance with relevant standards		Final certification of GHG reductions generated through projects conducted through MRV methods that meet international standards	

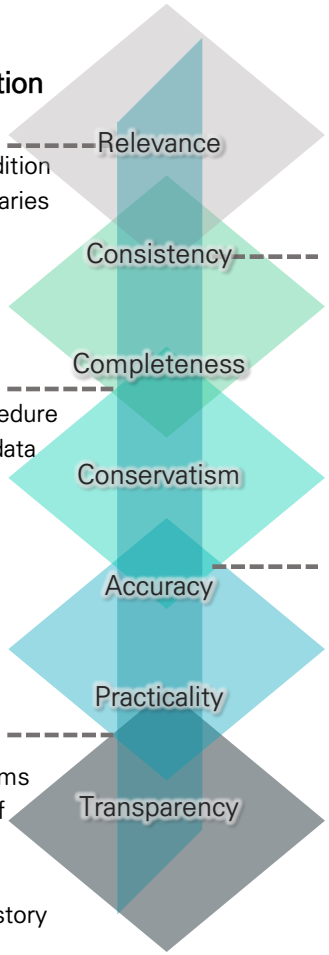
Methodology Development

Ministry of Environment consultation

01	02	03	04	05	06
Methodology Approval application	Approval–Reception Methodology review	Methodology Approval Review	Review result Business Notification	Appeals possible (within 30 days)	Methodology Registration
Offset PJT operator	Government	Certification Committee	Government	Offset PJT operator	Government

An external reduction project methodology outlines the standards, scenarios, calculations, and monitoring for GHG reductions.

【 7 principles and components of methodology development】



1. Methodology General information

1.1 Title
1.2 Application condition
1.3 Business boundaries

2. Baseline Methodology

2.1 Baseline scenario
2.2 Proof of additionality
2.3 GHG emissions calculation method

3. Monitoring Methodology

3.1 Monitoring procedure
3.2 Baseline static data
3.3 Monitoring data and parameter

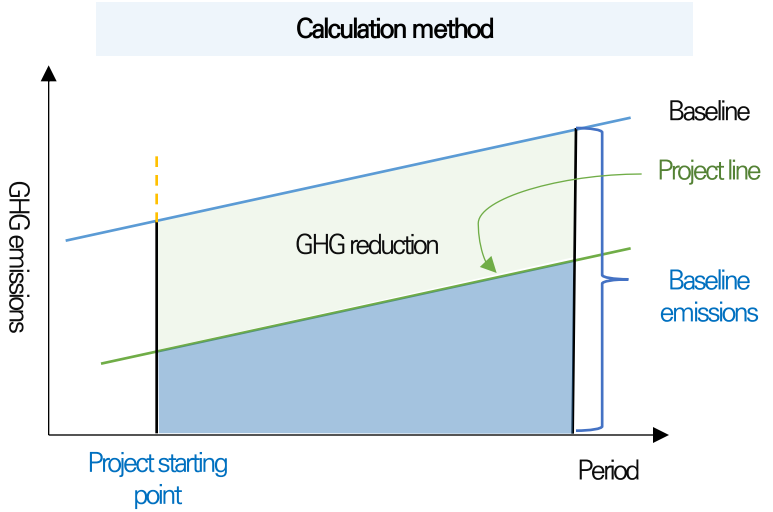
4. Reference

- Reference used in the methodology development process

5. Other matters

5.1 Definition of terms
5.2 Effective date of methodology application
5.3 Methodology history management

【 Principle of calculating greenhouse gas reduction amount 】



Reduction Calculation Formula

Emission Reduction = (CO_2 reduction within project boundaries: Baseline emissions − Project emissions) − Leakages

$ER_y = BE_y - PE_y - LE_y$

※ Leakage: GHG emissions occurring outside the project boundary of an external project. ex) When reduction equipment is transferred externally, consider additional energy consumption of the existing equipment due to the transfer.

As of the 51st Emissions Certification Board approval Total of 291 Offset methodology registrations, of which 211 were CDM methodologies & 80 were Offset methodologies

Methodologies

Approved Methodologies

Total 291 cases

'23년 6월 (인증위 승인)

CDM methodologies for Offset PJT

211 cases

※ 10. 2016 for 211 CDM methodologies Certification Board Approval

Offset PJT Authorization Methodology

80 cases

※ Based on June '23 Accreditation Commission approval

Type	Waste	Industrial/ Power	Buildings	Transportation	Agriculture	Forests	Maritime	shipping
Offset(80)	10*	26	9	7	17	5	3	4
CDM(211)	26	153	6	17	5	4	–	–

* One methodology in agriculture and the same methodology exists: total number of methodologies approved for Offset PJT is 80, excluding duplicates

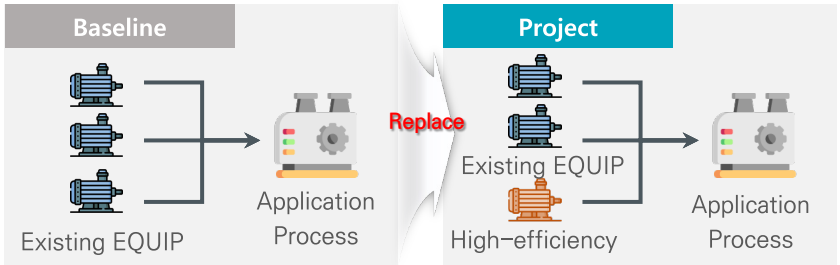
※ CDM projects are categorized into sectoral scopes on the UNFCCC website and the operations of domestic governing bodies.

Methodology is calculated from the baseline emissions, excluding PJT emissions
Reduction GHG emissions by improving the energy efficiency and fuel switch to low carbon fuel

Main methodologies

High-efficiency retrofit Project

☑ Replacing part or all of your equipment with high-efficiency equipment –〉 Save energy



☑ Methodology Key Requirements

Baseline

$$\left[\text{Power emissions} + \text{Fuel Emissions} + \text{Heat EQUIP Emissions} + \text{Refrigerant Emissions}\right] \times \frac{\text{output* after operations}}{\text{output* before operations}}$$

Project

$$\text{Power emissions} + \text{Fuel Emissions} + \text{Heat EQUIP Emissions} + \text{Refrigerant Emissions}$$

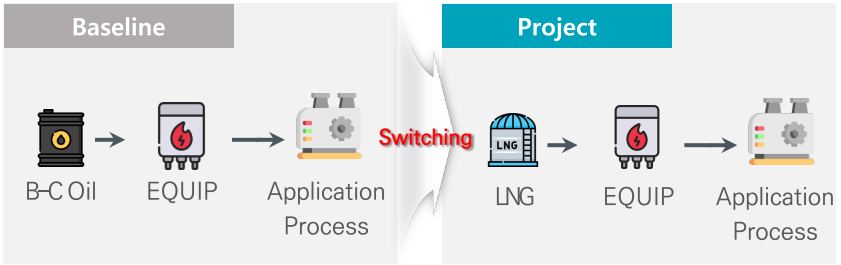
* or input

① The amount of output (or input) must be correlated to the amount of emissions, with the same factors applied before and after

②PJT to increase the capacity of the facility and PJT to install new (green field) facilities are prohibited

Fuel Switching Project

☑ Switching from high-carbon to low-carbon fuels



☑ Methodology Key Requirements

Baseline

① Thermal energy production or use from business activities × Baseline Emission Factor

② Post-business fuel use × Net Calorific Value × Emission Factor

Project

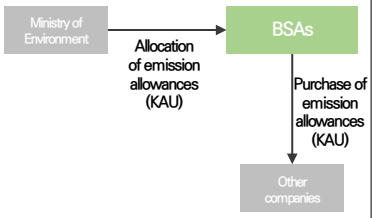
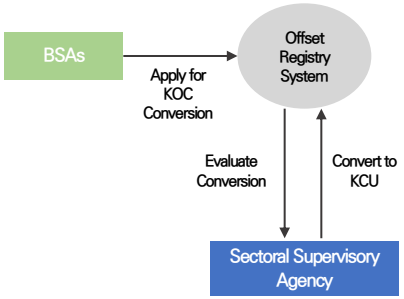
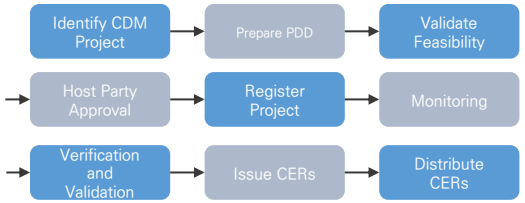
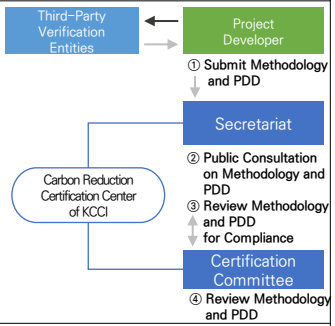
Fuel consumption emissions converted + Additional fossil fuel emissions used + Power use emissions

①Include all facilities that consume energy produced by fuel switching in your business boundaries

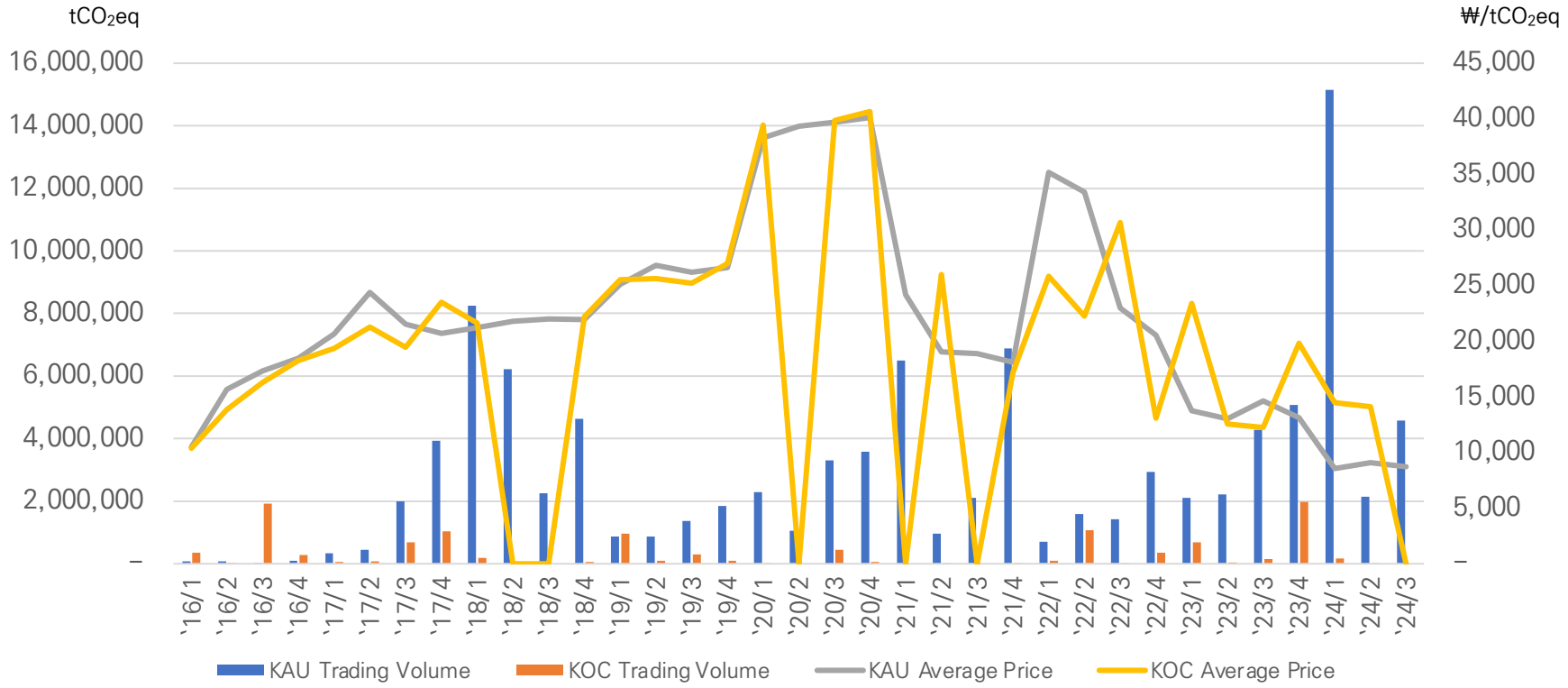
②When switching to LPG, calculate fuel usage by installing (hot water/electric heat) vaporizer

KAU (allocated to BSAs by the government under Korea ETS), KOC (certified external reduction projects), CER (issued from CDM projects), KCR (issued by the Korean Chamber of Commerce and Industry)

Type of carbon credits

	CCM KAU	CCM KOC	VCM CDM CER / ER		VCM KCCI KCR
Name	KAU (Korean Allowance Unit) Allocated allowances	KOC (Korean Offset Credits) External reduction credits	CER (Certified Emission Reduction)	ER (Emission Reduction)	KCR (KCCI Certified Reduction)
Meaning	Government-allocated GHG emission allowances for BSAs	Certified reductions for GHG reduction, absorption, or removal outside the business boundary, in line with international standards	Emission reductions from CDM projects issued by the UN	Unverified credits from non-participatory sectors in mandatory ETS	Reduction achievements certified by the Korean Chamber of Commerce.
Process					
Price	KAU23 : 9,100 won KAU24 : 8,610 won KAU25 : 8,610 won	KOC21-26 : 12,400 won KOC22-27 : 13,000 won KOC23-28 : 16,000 won	14~17 EUR		No current price
Characteristics	• High flexibility allowing carryover and borrowing.	• No Retention Period • KOC can be sold to ETS entities, which can convert purchased credits to KCU (Korean Credit Unit) for compliance • 1 KCU = 1 KAU	• CER can be converted to KOC through application and review via the offset registry • 1 CER = 1 KOC		• Credits from other institutions can be converted to KCR (₩50 fee per credit). • Evaluated based on KCS's four principles: reality, additionality, permanence, and verifiability.

Emissions prices have fallen in the post-COVID-19, but are expected to remain elevated in the future



구분	2016	2017	2018	2019	2020	2021	2022	2023	2024('24.3)
KAU Price (KRW)	16,565	21,296	22,509	29,417	30,602	23,424	23,914	11,069	8,796
Rate of Change (%)	-	▲29	▲6	▲31	▲4	▼23	▲2	▼100	-
Total Trading Volume (t)	4,193,337	21,212,296	44,837,814	33,519,722	40,256,860	48,706,527	33,205,367	82,634,601	21,863,457
Rate of Change (%)	-	▲406	▲111	▼25	▲20	▲21	▼32	▲149	-

CHAPTER 3
Strategy for Article 6

1. Paris Agreement
2. Article 6 for Korea
3. ITMO
4. Bilateral Agreement
5. Budget for Article 6

All the parties have committed to reducing GHG since Paris agreement in 2015
Reduce under Article 6.2 and Article 6.4 of the Paris Agreement

Paris Agreement

Global Target	Reduction Target	Global Implementation Inspection	IMM (International Market Mechanism)	Adaptation	Resource & Technology Transfer	REDD+
2.0℃	Every 5 years	Every 5 years		Establish measures	$100B/year	Carbon sink

1 Sustainable Development

- International Organizations' management
- Sustainable Development & Environmental soundness

2 Cooperative Approaches

- Permit to use ITMO
- CMA standard

3 Non-market Approaches

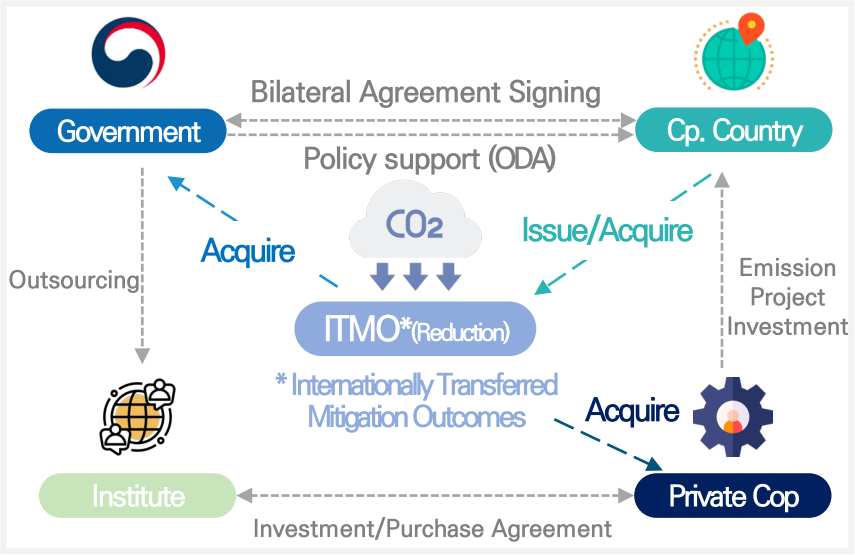
- Mitigation & Adaptation
- Consider technology transfer, cultivate ability, etc.

NDC & LEDS	Environmental Soundness	Sustainability(SDG)	Progress Principle
Sustainable GHG reduction	Global GHG Net reduction	Sustainable Development of Developing Countries	Implementation/No retreat

Paris Agreement Article 6 divides the international carbon market mechanism into 6.2 (Cooperative approaches) and 6.4 (Sustainable development mechanism)

Article 6 for Korea

6.2 Cooperative approach



1. Host Govt negotiation, emission allocation, G2G bilateral agreement
2. Develop method and detailing plans obtain global approvals
3. Distributed reduction based on project performance and govt funding

6.4 Sustainable Development Mechanism

CDM	Article 6.4 (SDM)
1 Step : Project Development/Planning(Including Methodology)	
2 Step : Cp. Govt Approval	2 Step : Cp. Govt Approval and permit
3 Step : Feasibility Assessment	
4 Step : Project Registration	
5 Step : Emission Reduction Activity Monitoring	
6 Step : Performance Verification and Certification	
7 Step : Emission Reduction Performance Issuance	

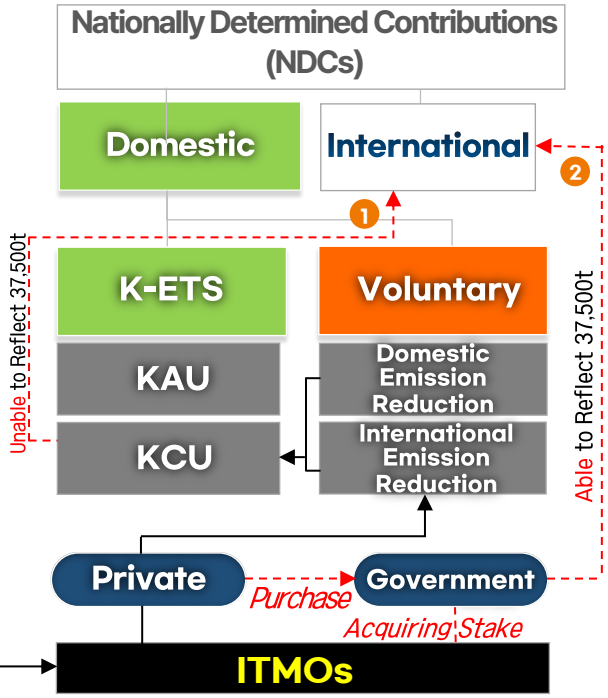
- ☑ Transitioning existing CDM to SDM (applying till 23, approval till 25)
- ☑ Lack of oversight details and approval requirement for current SDM

The ITMOs obtained by allocated entities are used within the emissions trading system and included in the domestic reduction account. Not part of the global reduction target (37.5 Mt) but needs adjustment due to international transfer

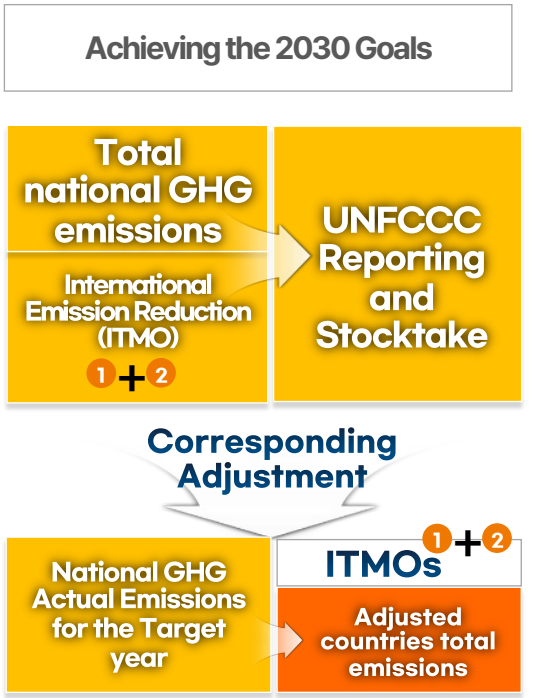
Utilization of ITMO

Implementation of Article 6 of the PA

Domestic Use of Overseas Emission Reductions



NDC country emissions after corresponding adjustments



If the requirements outlined by CMA for the following ITMOs are satisfied
Can be obtained various types of international mitigation project By Article 6

Definition of ITMO

- ☑ The measures must be practical, verifiable, and demonstrate additionality
- ☑ If internationally transferred, emissions reduction should include co-benefits, adaptation, economic diversification, or the means to achieve them
- ☑ CMA requires emissions to be measured in tCO_2-eq by IPCC methodology or align with the participating country's NDC using alternative methods
- ☑ Mitigation outcomes from Article 6.2 activities must be internationally transferred and authorized for NDC achievement in line with Article 6.3
- ☑ Reductions must be from 2021 or later.
- ☑ Reduction outcomes approved by cp. Countries may be endorsed for international reduction goals or other purpose, not necessarily aligned with NDC attainment
- ☑ A6.4ERs approved under the Article 6.4 of the Paris Agreement for use in achieving NDCs or for other international mitigation purposes are also ITMOs.

Republic of Korea has settled framework agreement on "ITMO(international transferred mitigation outcomes)" with 27 different countries

Bilateral Agreement

Agreement	Settled (4)	VN('21.5), MN('23.2), GA('23.5), UZ('23.6)
	Initialing (5)	UAE('23.1), PE('23.5), MA('23.7), LK('23.12), GH('23.12)
	Negotiating (18)	CL, TH, PH, CO, PK, SA, BR, NP, CR, UG, ID, MM, Georgia, BD, SN, LA, IN, Kyrgyzstan
MOU	Complete (2)	VN('23.6), LA('23.12)

The Ministry of Trade, Industry and Energy supported international GHG reduction projects in 2023
Vietnam's low-carbon brick project has already received 3 billion KRW(USD 2.18 million) in support from the Korean government

'23년 정부지원금

베트남·우즈벡과 국제감축 4개 사업 착수

- '23년도 국제감축사업으로 총 270억 투자, 총 1,025만톤 탄소 감축 전망

「2023년 온실가스 국제감축사업* 협약식」이 9월 25일(월) 15시, 코트라 대회의실에서 산업통상자원부 안덕근 통상교섭본부장과 주한 베트남 대사, KOTRA 사장, 에너지공단 이사장, 수행기업 대표 등이 참석한 가운데 열렸다.

* 우리 기업의 해외 온실가스 감축 사업에 설비 투자를 지원하고, 향후 감축 실적을 확보하는 사업으로, 2030 국가 온실가스 감축목표(NDC) 중 국외 감축분은 3,750만 톤

산업부는 총 4건을 선정하였으며, 이번 시범사업을 통해 총 270억의 투자가 이루어지고, 사업기간 동안 약 1,025만 톤의 온실가스 감축이 전망된다. 우리 정부는 이 중 정부 지원금 59.2억원에 대한 약 26만 톤을 국외 감축분으로 확보하게 된다. 국가별로는 베트남 3건, 우즈벡 1건이다. 특히, 베트남 경우 첫 양자사업으로 지난 6월 체결된 「파리협정 제6조 이행에 관한 업무협약(MOU)」의 후속 성과다.

안덕근 통상교섭본부장은 "이번 시범사업은 양국이 기본협정 체결, 업무협약(MOU) 체결 등을 통해 다져온 두터운 신뢰 속에 나온 첫 성과물로서, 베트남, 우즈벡 정부와 협력 범위를 확대하는 중요한 계기"가 될 것이라고 강조하였다.

행사에 참석한 베트남 응우옌 부 뚱 대사와 우즈벡 알리셔 압둘살로모프 참사관은 산업부 시범사업을 통해 에너지전환, 공정 개선 등 탄소중립 분야에서 양국 간의 협력이 더욱 공고해지기를 희망한다고 밝혔다.

산업부는 내년 초 '24년도 사업 공고를 실시하고, 올해 60억 원에서 330억 원(정부안)으로 예산 규모를 확대해 지원할 예정이다.

연번	사업명	수행기관	사업개요	예상 감축실적 (tCO_2eq/y)	정부 분배분 (tCO_2eq/y)	정부 지원금 (억원)
1	우즈벡 벽돌공장 바이오펠릿 연료전환	케이아이씨씨㈜ ㈜웨코스	벽돌공장 연료(유연탄)를 바이오펠릿 (농산폐기물)으로 전환하여 온실가스 감축	10,741	4,082	9
2	베트남 폐냉매 회수 및 정제/재생	㈜에코아이 ㈜오운알투텍 V-Water Solutions	폐냉매 회수·정제·재생 후 유통시장에 재생냉매를 공급하여 온실가스 감축	30,000	2,198	5.2
3	베트남 벽돌공장 석탄 가마 공정개선	㈜그릿씨 Noble Grit Pte. Ltd.	벽돌공장 공정개선으로 석탄 가마를 프레스머신으로 대체하여 온실가스 감축	975,609	12,222	30
4	베트남 산업단지 7MW 지붕 태양광 발전	SK E&S	Tay Ninh주 TTC 산업단지에 7MW 지붕 태양광 발전사업으로 온실가스 감축	8,302	7,420	15
합 계				1,024,652	25,922	59.2

3,000,000,000 KRW = 2,180,232 USD

※ 예상 감축실적 및 정부 분배분은 1년 기준, 감축실적 발급 유효기간은 총 10년 가정

RESERVE CARBON

Carbon Pricing in Korea

THANK YOU