

Carbon Market: Current Status & Future of Carbon Tax and Emission Trading System

CCS Group 1 (Soyoung Park, Sooyoung Park, Haesoo Jung, Youngeun Kim, Tse Hei Ue)



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I. Outline

- a. Importance of Carbon Trading
- b. Definition & Structure of Carbon Markets



Importance of Carbon Trading

유엔기후변화협약 당사국총회

United Nations Framework Convention on Climate Change (UNFCCC)

Convention aimed at stabilizing the concentration of greenhouse gases in the atmosphere to prevent global warming



Kyoto Protocol

Adopted by COP3(1997)

For the first time, countries striving to reduce their greenhouse gas emission to 1990 levels are required to reduce their emissions.

The revision to set the second pledge period from 2013 to 2020 is effective by COP18(2012).



Paris Climate Agreement

A New Climate Regime and Intended Nationally Determined Contributions(INDC) to replace the Kyoto Protocol

COP21(2015) required all countries to participate in New Climate Regime from 2021.

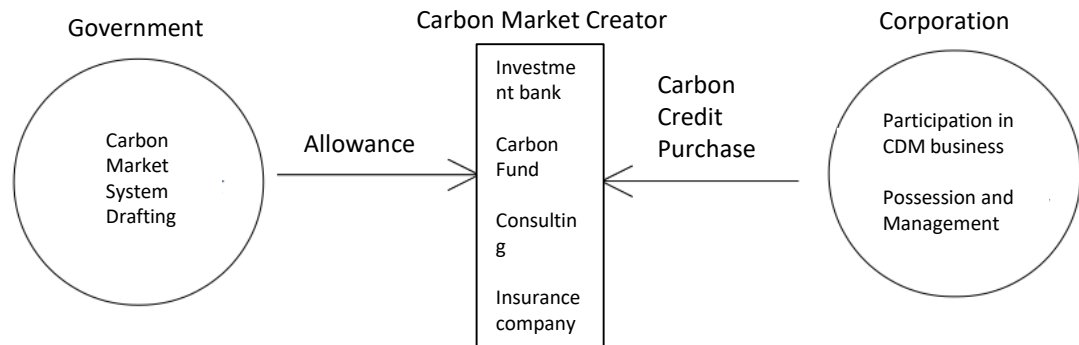
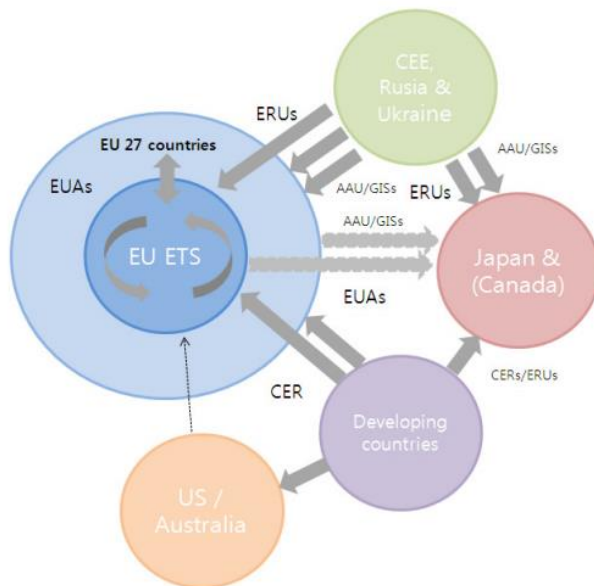
Unlike the Kyoto protocol, in which only developed countries were obliged to reduce greenhouse gas emissions, a universal first-ever climate agreement binding on all 195 countries directly involved.

Definition & Structure of Carbon Markets

파리협정 후속 협상 동향분석을 통한 국제 탄소시장 전망(201805)

Carbon Market: A market opened to commercialize and trade the right to emit greenhouse gases in the form of carbon credits

국제 탄소시장 동향 및 전망, 이윤, 손원익, 2010



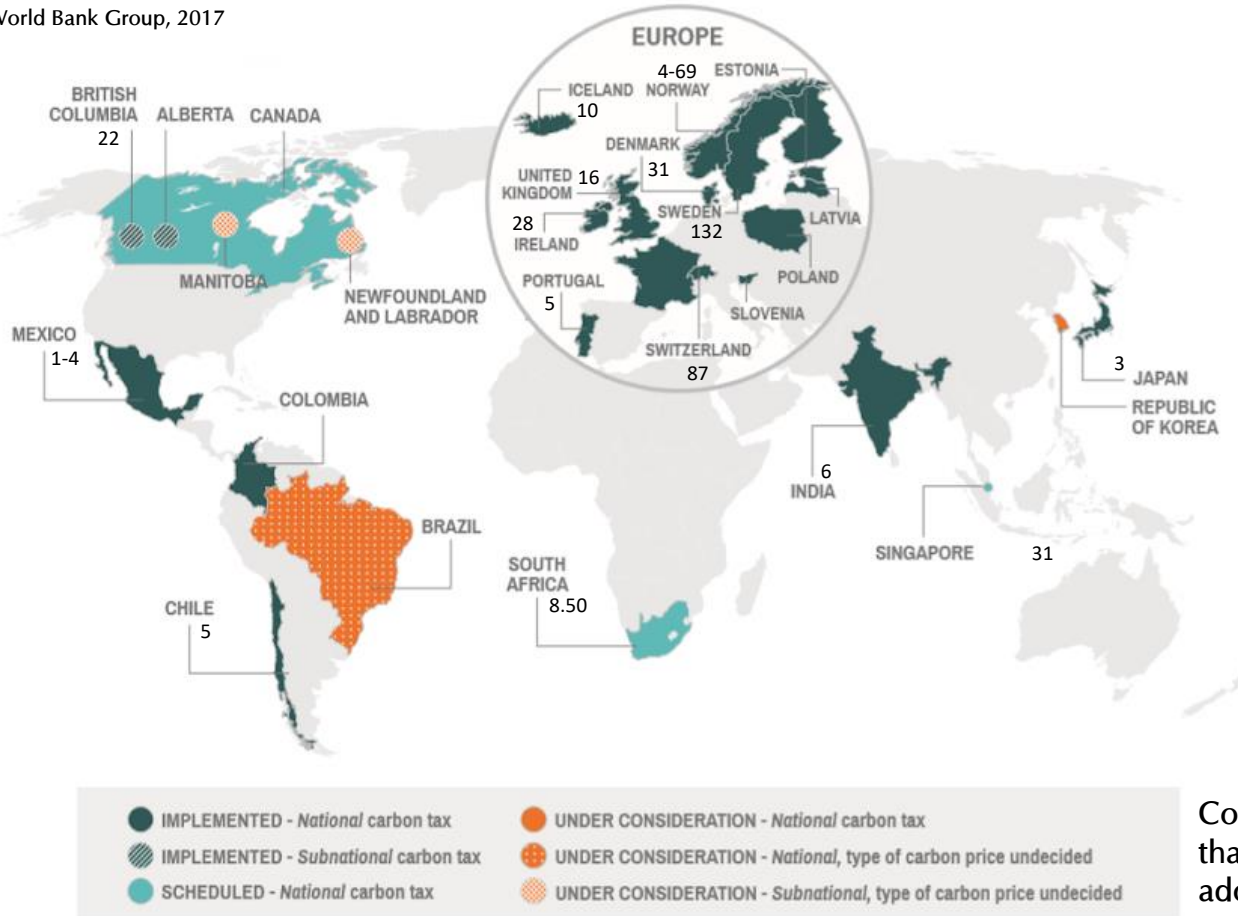
II. Carbon Tax

- a. Status & Definition of Carbon Tax
- b. Approaches to Set Carbon Tax
- c. Good Example: Finland, Sweden
- d. Bad Example: France
- e. Consideration on the Introduction of a Carbon Tax



Status & Definition of Carbon Tax

World Bank Group, 2017



Carbon Tax:

One of countermeasure to reduce carbon dioxide

When fossil fuels are used, they are taxed in proportion to the carbon content in the fuel.

경제학사전, 박은태, 2011.03.09

Countries and sub-national jurisdictions that had adopted or were scheduled to adopt a carbon tax by February 2017

Approaches to Set Carbon Tax

Carbon Tax Guide, World Bank Group, 2017

The Social Cost of Carbon (SCC) Approach Social Cost of Carbon :

Global damage caused by the additional release of 1 ton of carbon dioxide

Marginal Abatement Cost(MAC):

Costs associated with further reduction of 1 ton of CO₂e to reduce damage

Reducing emissions does not incur these costs

→ Occurrence of Marginal Abatement Benefits(MAB)

Carbon Tax Rate:

Set Marginal Abatement Cost(MAC) and Marginal Abatement Benefits(MAB) to the same level

Limitation:

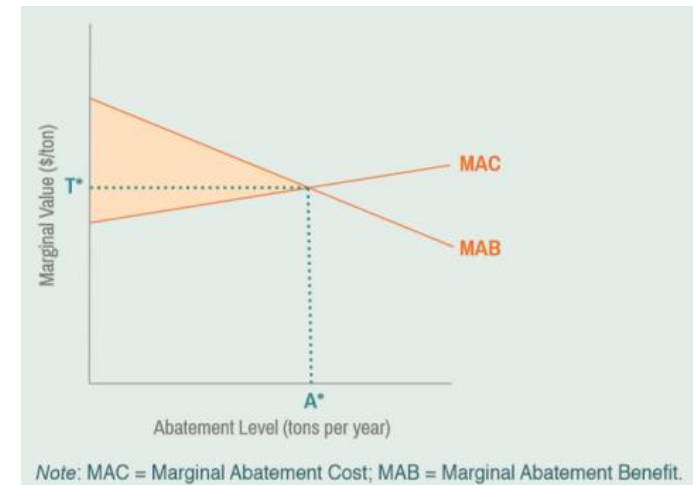
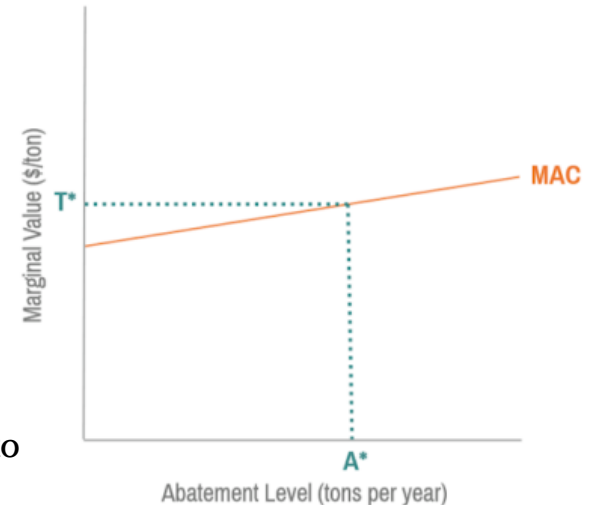
Lack of Consensus on the Value of the SCC

The Abatement Target Approach:

Reduction targets that the government has pursued to achieve specific emission reduction targets are known and can be taxed using MACC

Form and Level of Comprehensive MAC:

Determined by many factors, including carbon tax coverage relative to national emissions and the existence of complementary policies



Approaches to Set Carbon Tax

Carbon Tax Guide, World Bank Group ,2017

The Revenue Target Approach:

Carbon Tax: Goal of increasing profit - Tax rates can be set to generate a certain level of revenue, even if determined by supply and demand

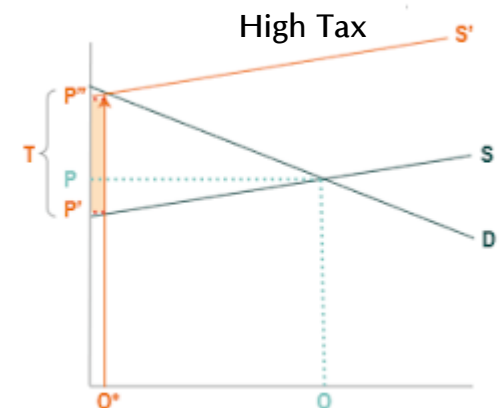
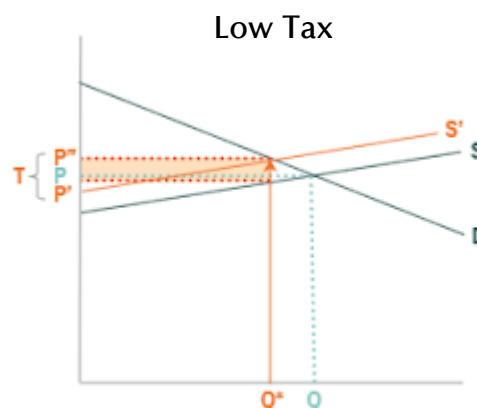
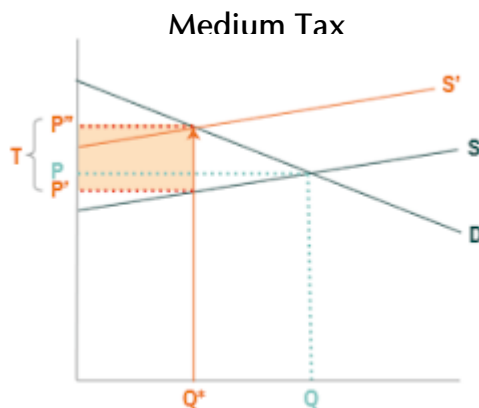
➡ Goal of The Revenue Target Approach: Maximize tax rate

EX) Chile: Policy commitments to raise funds for educational reforms using carbon taxes

The Benchmarking Approach:

Provide one of the simplest and cheapest approaches

Including investigating what other countries and international competitors have done in relation to overall tax planning and selected tax rates



Good Example :Finland, Sweden

Finland:

58 to 62 euros for 1ton of carbon dioxide

Reduction of income tax and corporate social security expenses through tax reform

Sweden:

25% reduction in greenhouse gas emissions

and 55% economic growth in carbon tax

Country	Carbon Tax Introduction Period	Key Features
Finland	1990	World first introduction
Sweden	1991	Imposed on Diesel, Gasoline, Natural gas and etc.

<https://www.msn.com/ko-kr/news/world/%EB%B0%98%EB%B0%9C-%EB%B6%80%EB%A5%B4%EB%8A%94-%ED%83%84%EC%86%8C%EC%84%B8%E2%80%A621%EC%84%B8%EA%B8%B0-%EC%A7%80%EA%B5%AC%EC%B4%8C%EC%9D%98-%EA%B0%80%EB%A0%B4%EC%A3%BC%EA%B5%AC%EC%9D%B8%EA%B0%80/ar-BBQYIFU#page=2>

Bad Example :France



Due to the reduction of production in oil-producing countries, 23% increase in light oil and 15% increase in gasoline taxes over a year. / The news that the price of oil will be significantly increased from 2019 due to the carbon tax introduced by the French government



France:

Carbon tax introduction in 2014

As of 2017, charge 30.5 euros(30,950 won) per ton of a carbon dioxide

Plan to charge 100 euros per ton of carbon dioxide by 2030

Carbon taxes will be used to expand renewable energy, develop electric vehicles, and fill the government's budget deficit.

November 17, 2018
'Gilets Jaunes' demonstration
in Paris, France

<https://www.msn.com/ko-kr/news/world/%EB%B0%98%EB%B0%9C-%EB%B6%80%EB%A5%B4%EB%8A%94-%ED%83%84%EC%86%8C%EC%84%B8%E2%80%A621%EC%84%B8%EA%B8%B0-%EC%A7%80%EA%B5%AC%EC%B4%8C%EC%9D%98-%EA%B0%80%EB%A0%B4%EC%A3%BC%EA%B5%AC%EC%9D%B8%EA%B0%80/ar-BBQYIFU#page=2>

Consideration in introducing Carbon Tax

1. Effects on the international competitiveness of industry

Carbon tax can negatively affect international competitiveness due to rising costs for companies

→ When implementing Carbon Tax or strengthening the Energy tax system, most countries ease the tax burden to a certain degree for some major industrial companies, households, subsistence business, etc.

For steel, metal products, transportation storage, nonmetallic mineral products, petrochemicals, nonferrous metals, transport machinery, pulp earth products, etc, in particular, the cost competitiveness could seriously get weak comparing to other fields.

→ Consideration in reducing the Burden of Tax through Reduction in Carbon Tax, Introduction of Emissions Trading Scheme, and running Energy Efficiency Improvement Programs & other Voluntary Agreement (VA) is needed

2. Effects on Redistribution of Income

Carbon Tax could lead to various Income Redistributive Effects by income level and sectors

→ If the introduction of Carbon Tax has a negative effect in Income Redistribution, the opposition of the victims becomes an obstacle in introducing Carbon Tax.

→ In order to justify the social legitimacy of Carbon Tax and for a successful introduction for Carbon Tax, solution for the Income Redistributive Effect is needed!

Because the percentage of energy consumption in income is larger for the lower-income group than the higher-income group, there are concerns that Carbon Tax could relatively be a burden to the lower-income group

→ Compensation System using transfer payment through tax revenue of Carbon Tax such as social security spending of low-income groups, drawback system, pension system, etc, needs to be devised

III. Emissions Trading System

- a. Definition
- b. Domestic ETS
- c. Global ETS



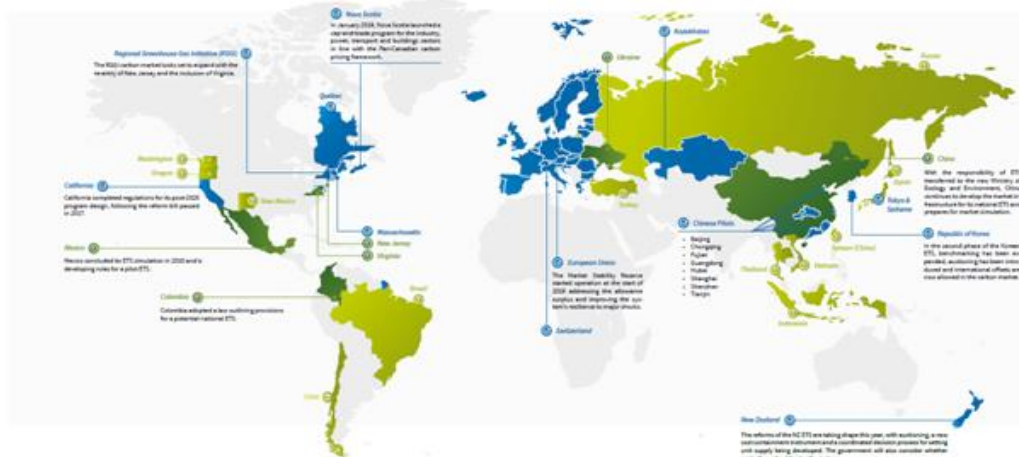
Emissions Trading System :Definition

EMISSIONS TRADING WORLDWIDE

The state of play of cap-and-trade in 2019

The ICAP ETS world map depicts emissions trading systems currently in force, scheduled or under consideration. There are now 20 systems covering 17 jurisdictions that could be operating in the next few years, including China and Mexico. 12 jurisdictions are also considering the role an ETS can play in their climate change policy mix, including Chile, Thailand and Vietnam.

A regularly updated interactive version of the ICAP ETS map with detailed information on all systems is available at: www.icapcarbonaction.com/ets-map



Emissions Trading System(ETS)(Cap and Trade):

Market instrument that puts a price on emissions

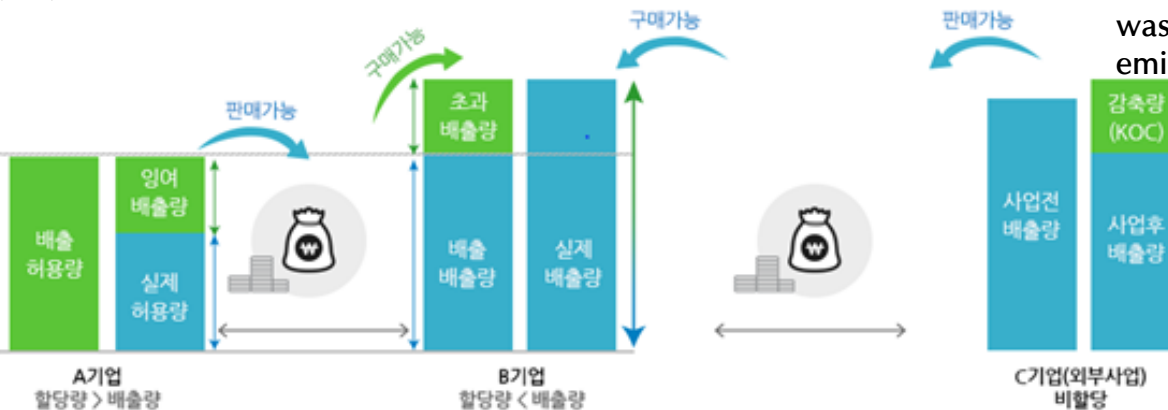
A total cap on the number of emissions is set in one or more sectors of the economy and the government distributes tradable allowances among the regulated entities. Each regulated entity must submit enough allowances to cover their emissions. Under an ETS, emissions are reduced where it is most cost effective to do so.

Origin of Carbon Emissions:

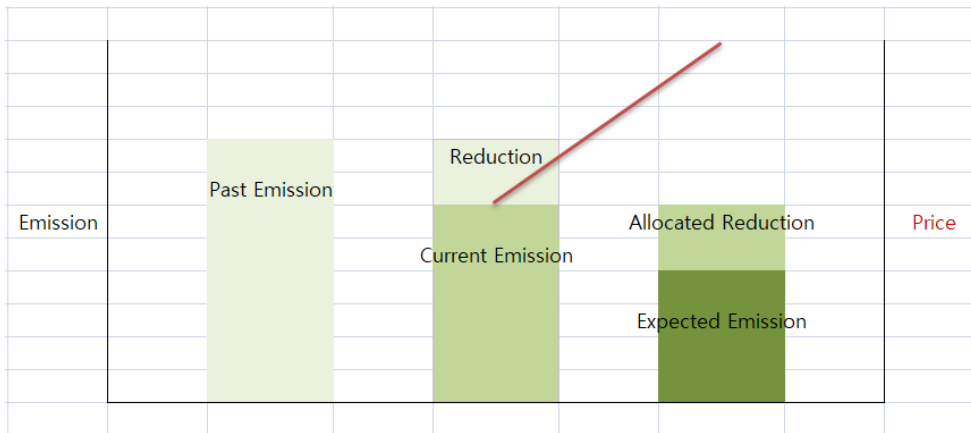
Kyoto mechanism: mechanism to allow mandatory reduction countries to buy or sell emissions rights to other reduction countries

The K-ETS launched in January 2015, covering emitters from power, industry, domestic aviation, waste and buildings, representing 66% of total emissions.

https://icapcarbonaction.com/en/?option=com_attach&task=download&id=613
(ICAP)



Domestic ETS :Present Status & Problem



1) Ratchet effects

Exceeding the current reduction target compared to the past will reduce current emissions and reduce future quotas.

→ Even though industries are capable of further reductions, they will be able to reduce less.



2) Inconsistency of Policy

* Price fluctuation: 2015: 8,640 Won/t → 2018 : 26,000 Won/t
→ Companies do not bring out their spare credits on the market.

* The department in charge is changing rapidly.

→ high policy risks

→ a market where there is a buyer and no seller.

→ Seller's dominance, stock up with credits.

→ Unbalance in supply and demand.

Domestic ETS :Present Status & Problem

3) *The Corporate position*

*Recognize as 'environmental regulation', not as 'financial activity'

- Other developed countries : use separate policy measures & variable risk management department in corporate
- Korea : no information, no specialists.
beyond the ability of medium-sized enterprises

4) *New • Expanded facilities*

- a) have plans
 - not included for the base year emissions.
- b) no plans
 - receive the same adjustment factor as those that have plans for new and expanded facilities.
→ Insufficient quota

'A' Industry Type
Adjustment Factor

= 'A' Industry Type Emission Allowance / 'A' Industry Type Recognition of
Amount of Application for Allocation(Existing Facility + Expected New /
Expansion Facility)

Domestic ETS: Solution plans for the Settlement

1. Activating the functions of Emission Trading Market

(1) Restriction in transferring surplus emission credits

-WCI(Western Climate Initiative):

North America's largest market for emission trading in California and Quebec, Canada

Major reason for the large amount of emissions trading in the WCI market: Restriction of emission rights to participating companies

(2) Introduction of derivative products trading(Carbon Fund)

-Increase liquidity by introducing various emission derivatives(from 2021)

→ release government-held reserves of carbon credits

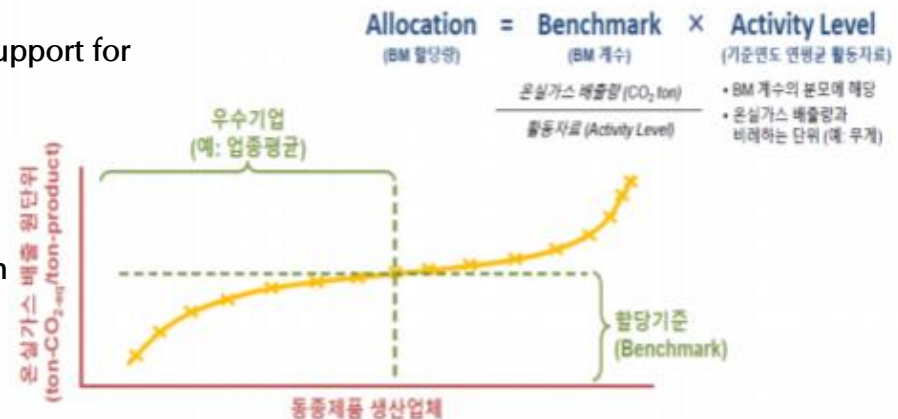
→ alleviate imbalance btw supply and demand

→ Development of greenhouse gas reduction technology and support for facility investment.

우리나라 온실가스 배출권거래제 진단과 개선방안, 2017, keei, 김길환, 심성희



[그림 4-1] 벤치마크 할당 방식의 개념도



출처: 한국환경공단(2016)

2. Improvement in Allocation of Emission

(1) Gradual expansion of the Benchmark Allocation

An allocation method to enhance the investment incentive in energy-efficient, low-emission facilities & allocates emissions to top companies

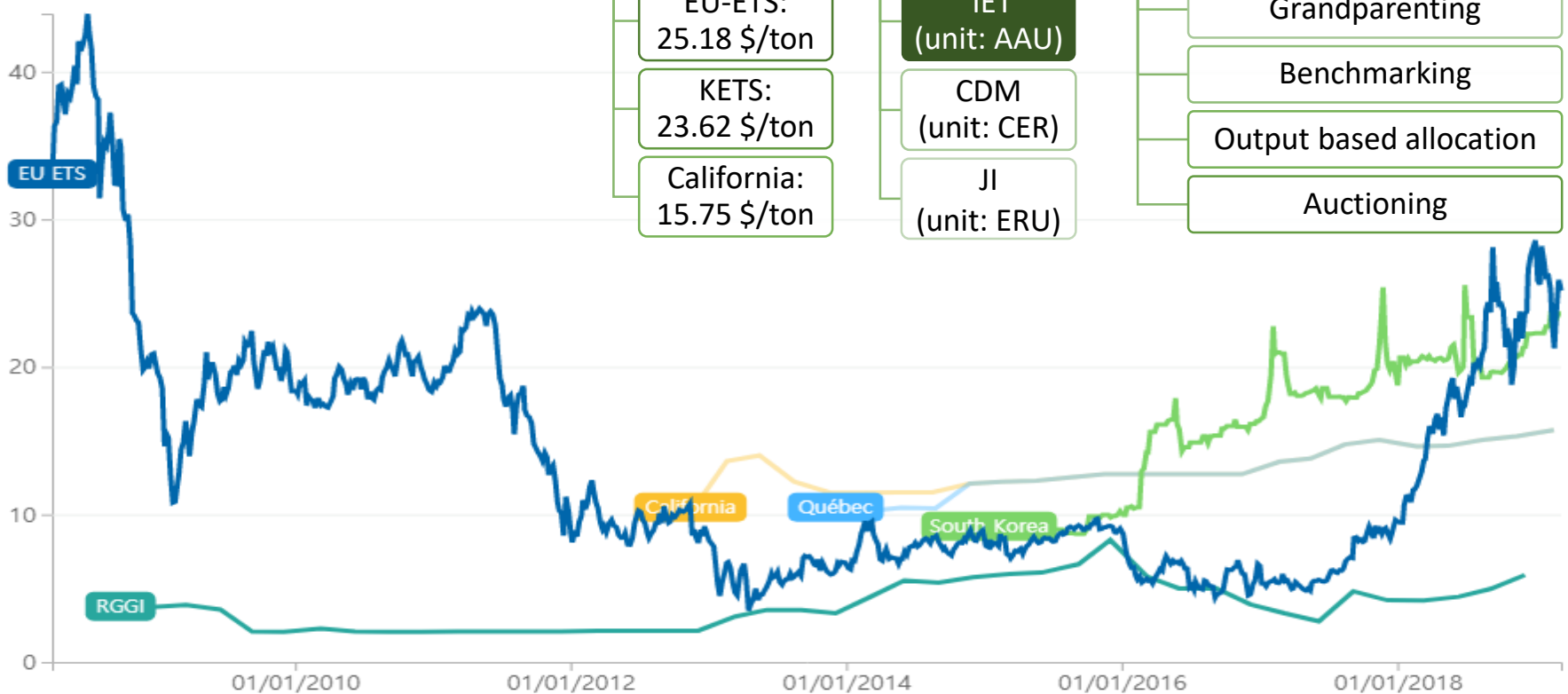
→ Able to reflect the Characteristics of Emissions

Global ETS



ICAP Allowance Price Explorer

\$/ton



Various Allowance Price

Various Allowance Type

Various Allocation Type

EU-ETS:
25.18 \$/ton

KETS:
23.62 \$/ton

California:
15.75 \$/ton

IET
(unit: AAU)

CDM
(unit: CER)

JI
(unit: ERU)

Grandparenting

Benchmarking

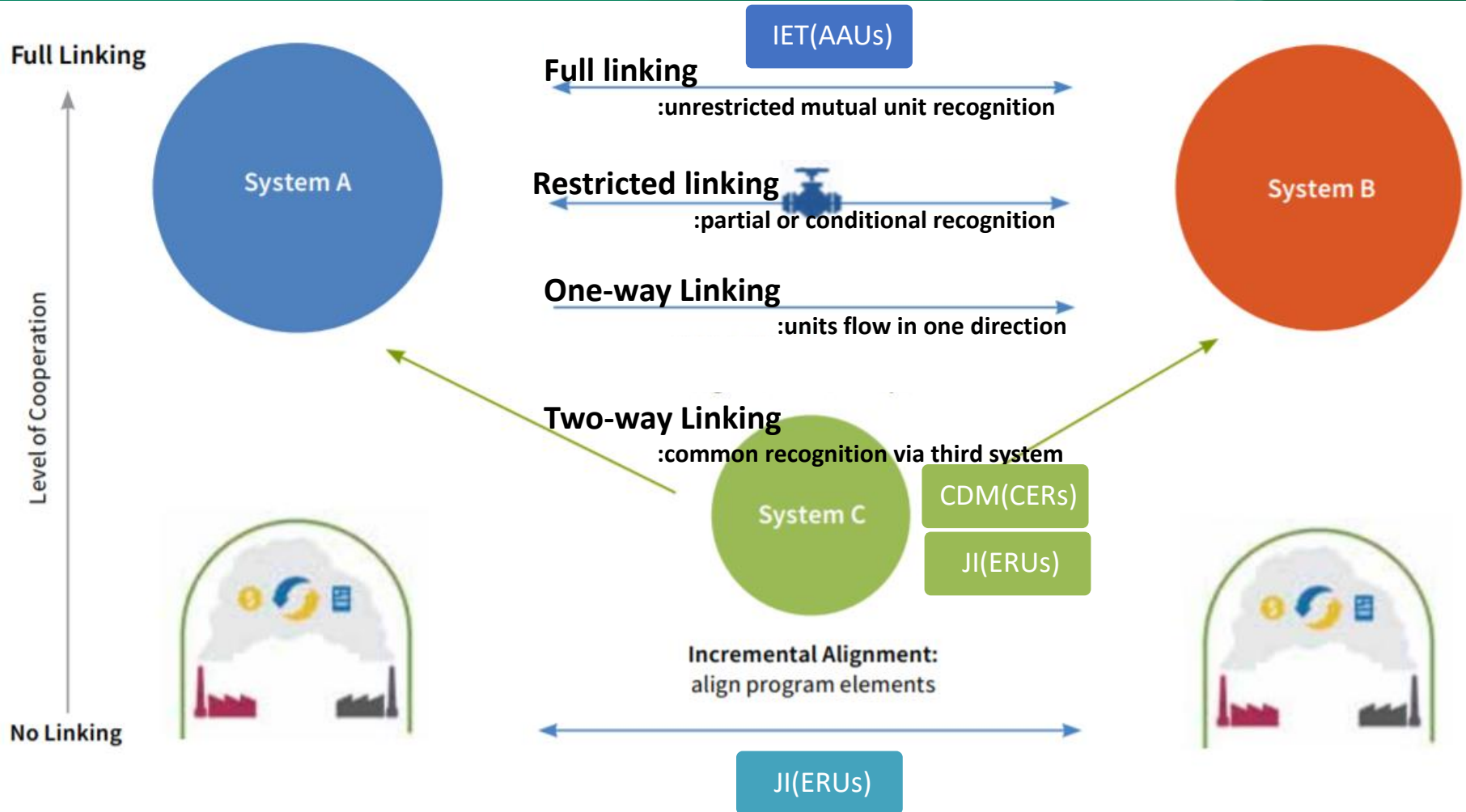
Output based allocation

Auctioning

source: <https://icapcarbonaction.com/en/ets-prices>

Different types of linking

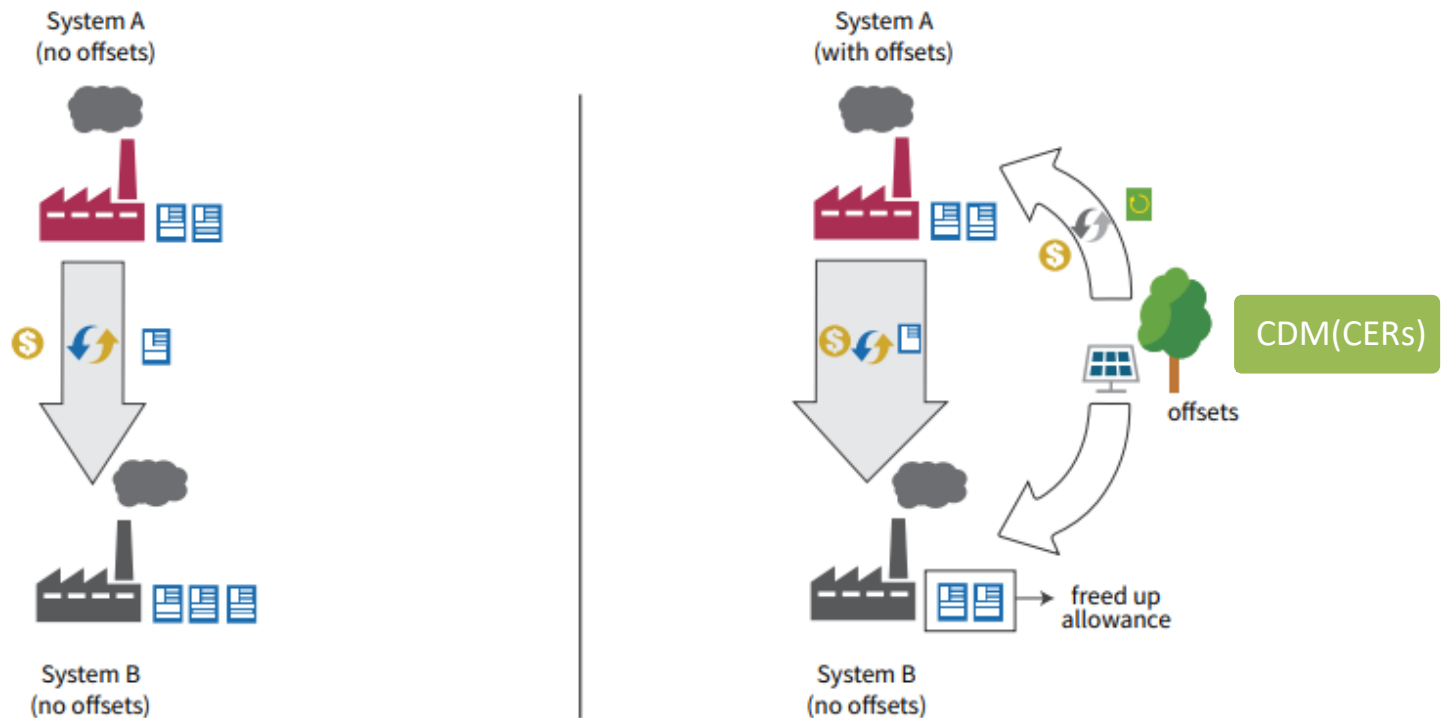
source: A Guide to Linking Emissions Trading Systems, icap, 2018



Two-way linking(Indirect linking) :purchasing offset credits.

source: A Guide to Linking Emissions Trading Systems, icap, 2018

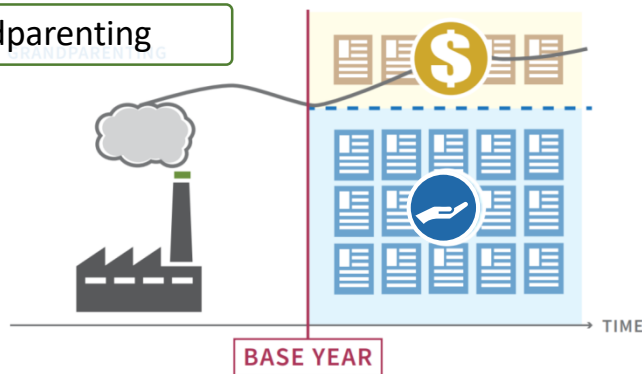
FIGURE 4.3: Unaligned offset protocols and “freeing up” allowances



Considerations in Linking :Allocation method difference

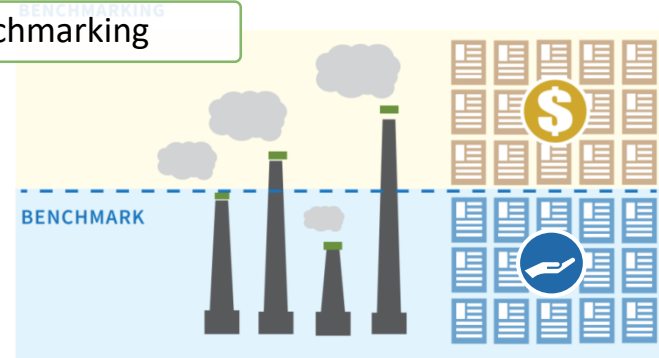
source: A Guide to Linking Emissions Trading Systems, icap, 2018

Grandparenting



Allowances are distributed for free based on historical emissions.

Benchmarking



Allowances are allocated for free, based on set performance standards based on the emissions intensity of a product or across the whole sector.

Output based allocation



Regulated entities are given allowances based on a sector benchmark multiplied by their economic output, which is then updated at the end of each successive year.

Auctioning

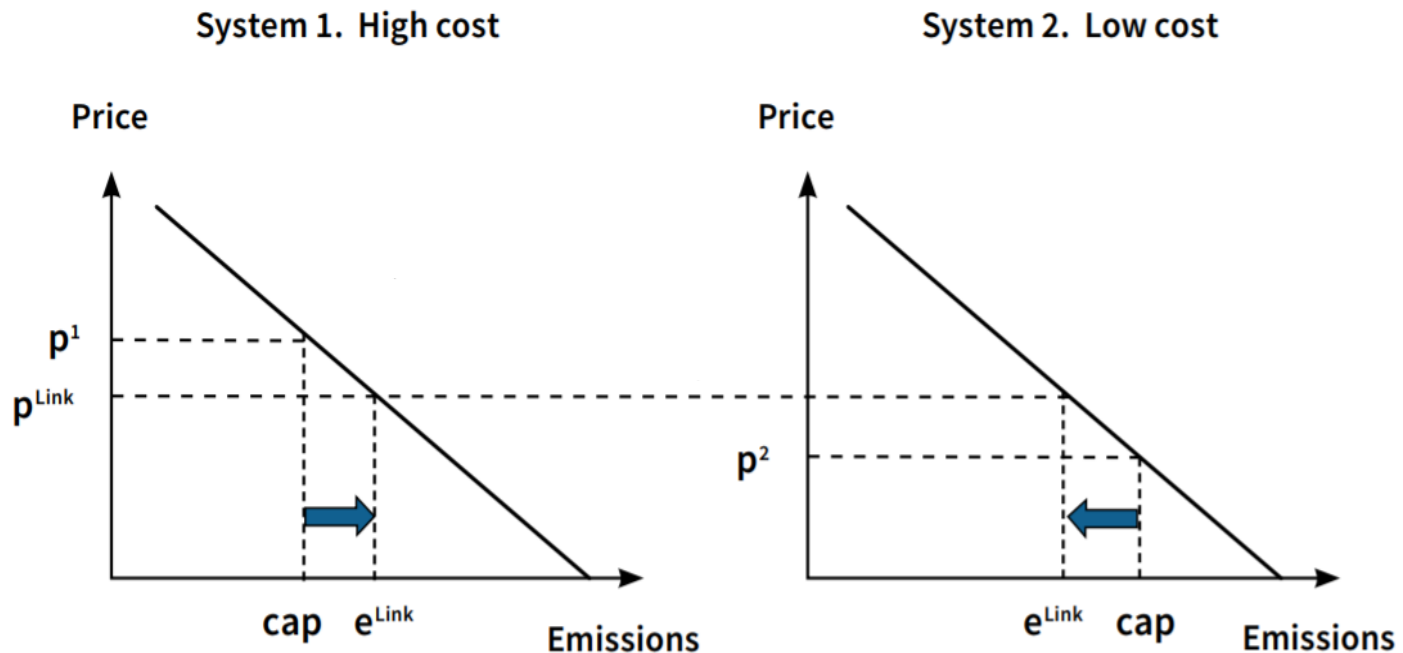


Allowances can also be auctioned, which provides the government with proceeds for investment.

Considerations in Linking :Price Difference between Each Market

source: A Guide to Linking Emissions Trading Systems, icap, 2018

FIGURE 2.1: Linking emissions trading systems



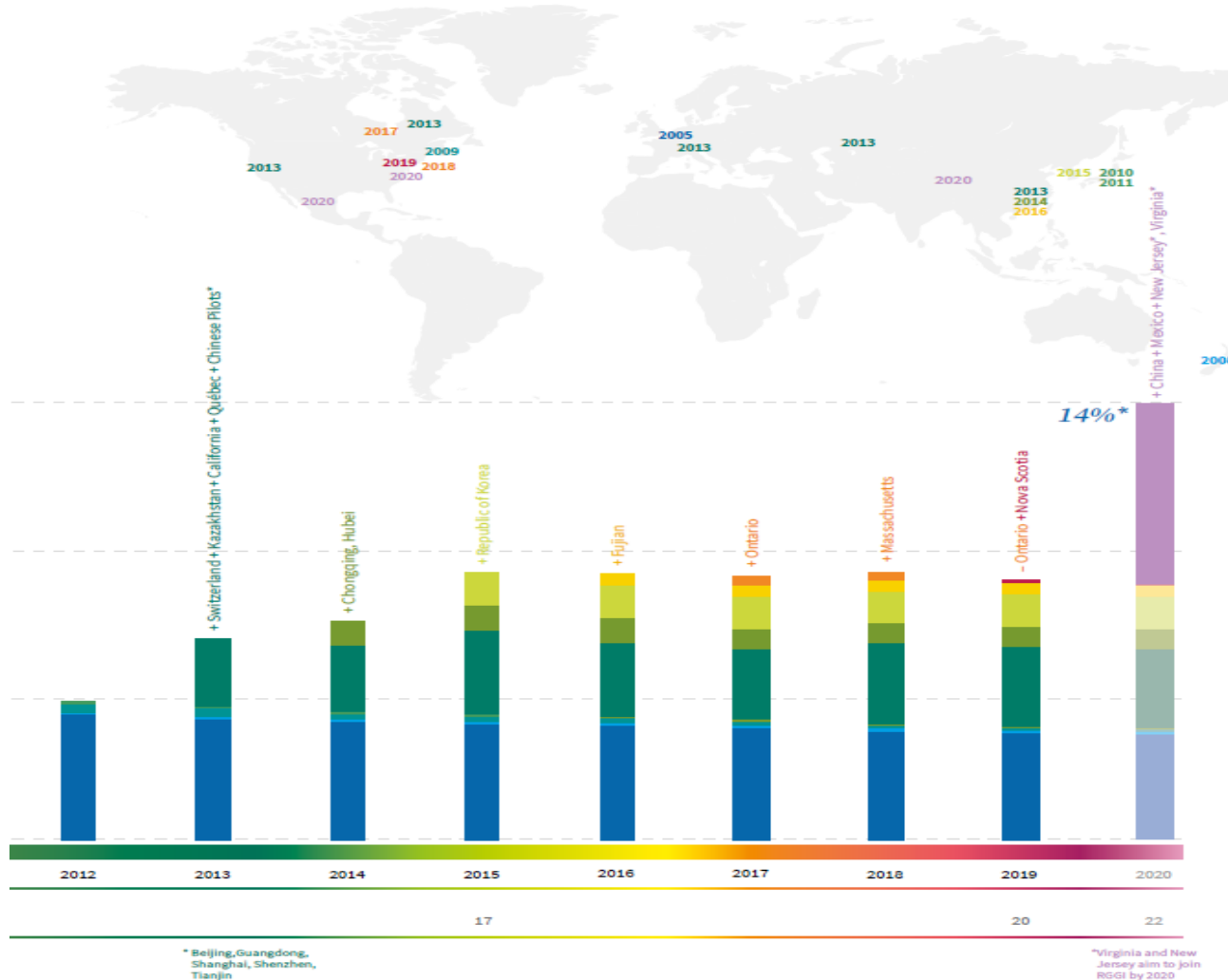
TOGETHER.
TOMORROW.
EWhA

IV. Looking to the Future



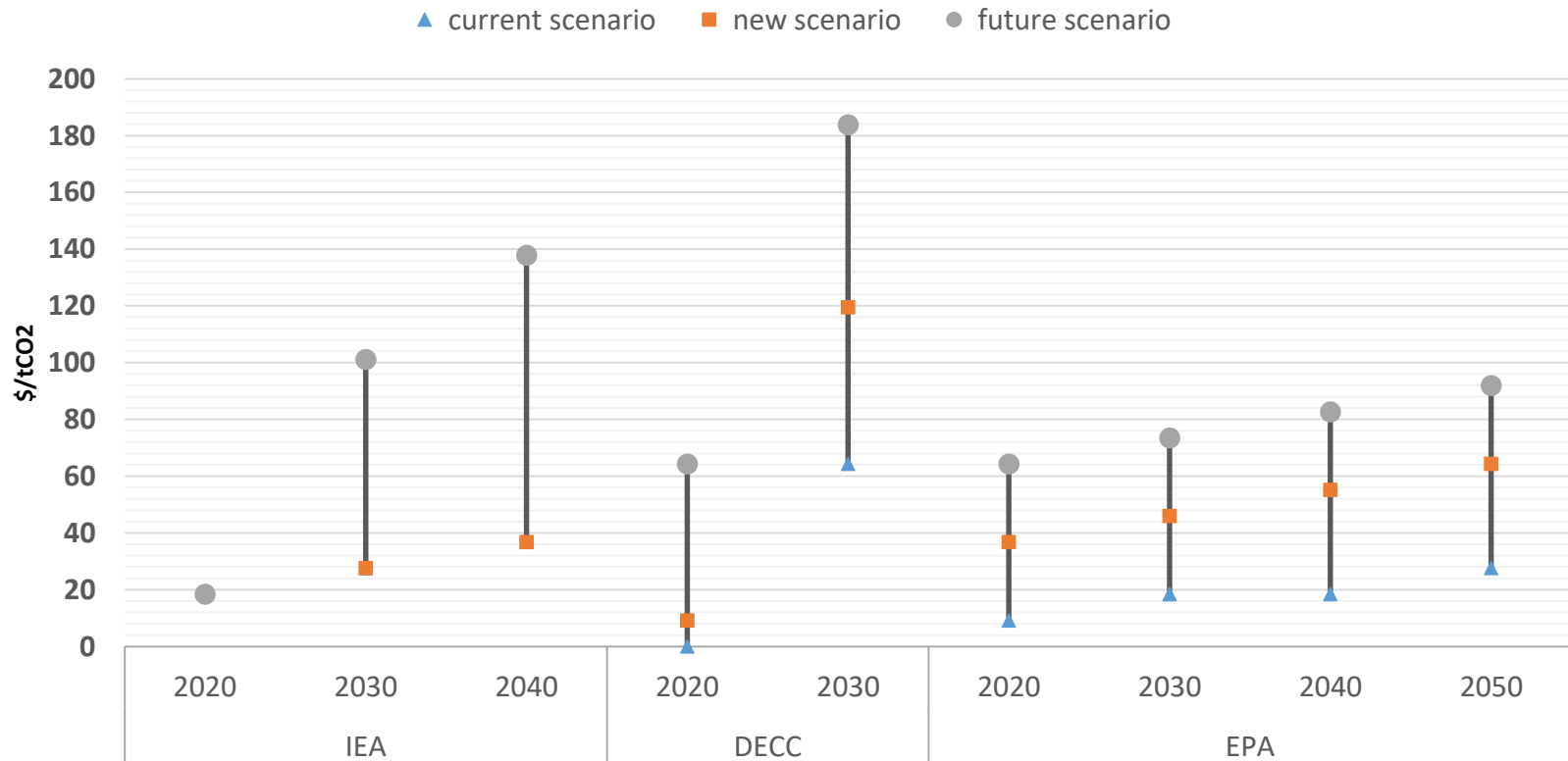
이화여자대학교
EWhA WOMANS UNIVERSITY

Looking to the Future :global expansion of emission trading



Looking to the Future :Prediction of Carbon Price

Prediction of Carbon price



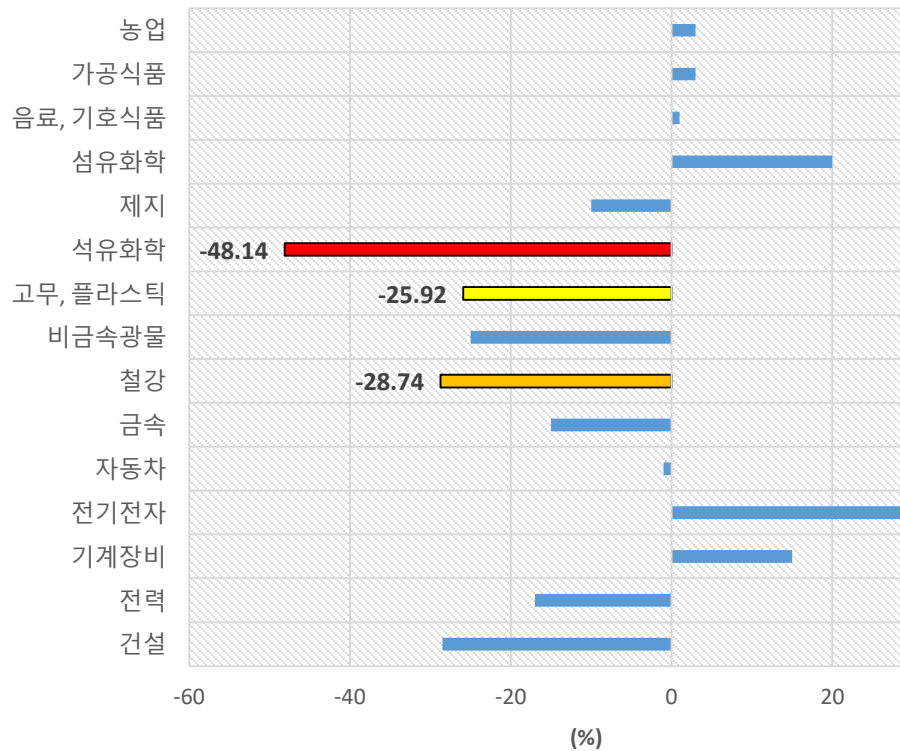
International Energy Agency(IEA), World Energy Outlook 2015, 2015

Department of Energy & Climate Change(DECC), Updated short-term traded carbon values used for UK public policy appraisal, 2015

United States Environmental Protection Agency(EPA), SOCIAL COST OF CARBON, 2015

Looking to the Future :Emissions Trading System

Impact of EU Emissions Trading on Industry



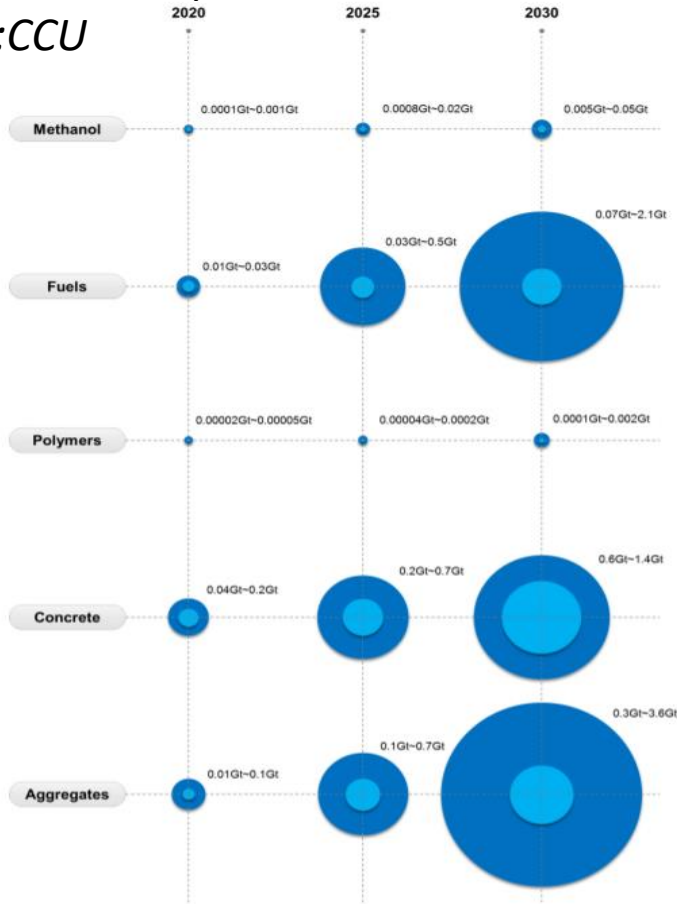
Ref: ECORYS(2009)

*Assumed that EU alone reduces 21% of the carbon emission.

**Analyzed the impacts of ETS to each industrial production increases and decreases from 2004 to 2020.

Looking to the Future :Negative Emission Technology

Carbon Capture Utilization :CCU



출처: The Global CO₂ Initiative, 2016

〈그림15〉 탄소자원화 기술 적용 제품별 이산화탄소 감축 기여량

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Carbon Capture and Storage :CCS

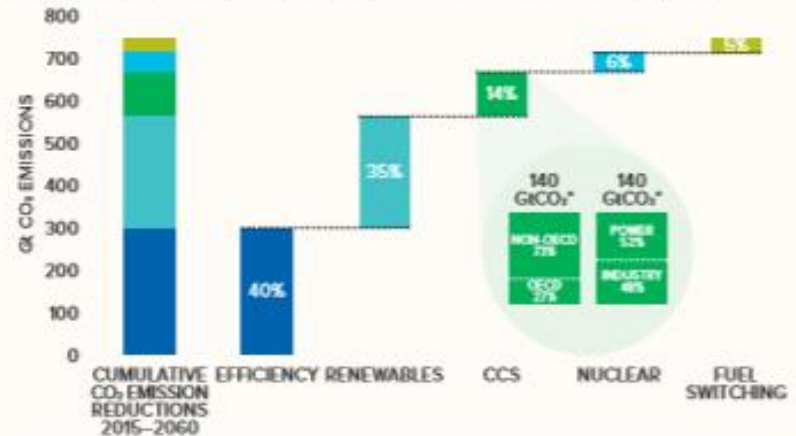
'It's complicated': EU offers political backing but no funding for CCS



<https://www.euractiv.com/section/climate-strategy-2050/news/its-complicated-eu-offers-political-backing-but-no-funding-for-ccs/>

CCS by sectors and regions in the 2DS

Cumulative CO₂ captured by sectors and regions by 2060 in 2DS (approximate values)



Source: Data sourced from International Energy Agency, "Energy Technology Perspectives 2017", Paris: OECD/IEA, 2017

* Note: the 140 GtCO₂ captured by CCS includes around 36 GtCO₂ in "negative emissions" from BECCS which act to compensate for emissions elsewhere in the energy system.

Looking to the Future :Linking

source: A Guide to Linking Emissions Trading Systems, icap, 2018



Reference

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Thank you!



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