Linking ETSs in East Asia:

Process, Alignments and Management.

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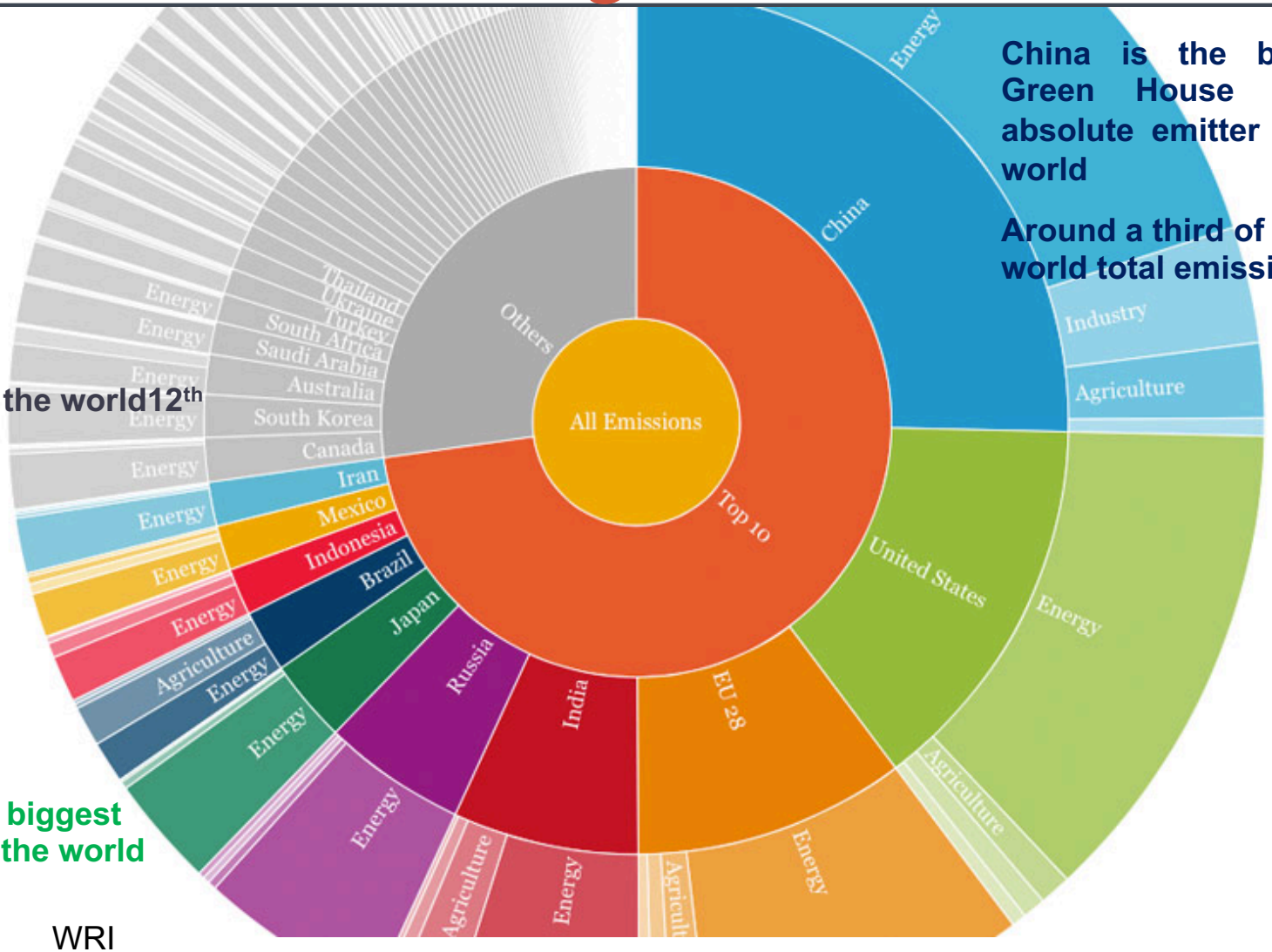
East Asia & Climate Change

China is the biggest Green House Gases absolute emitter in the world

Around a third of the world total emissions

South Korea is the world12th biggest emitter

Japan is the 6th biggest GHG emitter in the world



WRI

East Asia & Climate Change : Emissions profiles

	Total absolute emissions of CO_2 per year (2017) in $GtCO_2$	percentage of the total human induced GHG emissions (2017)	CO_2 Emissions per capita (2017) in tones CO_2/cap/year	CO_2 Emissions per GDP (2017) in tones of CO_2E/million USD of GDP
China	10.9	30.18%	7.7	512
Korea	0.673	1.7%	13.2	364
Japan	1.320	3.6%	10.36	267

East Asia & Climate Change– INDCs

	China's NDC	Korea's NDC	Japan's NDC
Reduction target	Reduction of 60-65% of CO2 emissions per unit of GDP (Intensity target).	Reduction of 37% of all GHG emissions by 2030 compared to Business as Usual.	Absolute reduction of 26% of all GHG emissions by 2030 compared to 2013
Peak	To peak for 2030 or earlier if possible. GHG emissions can continue to grow but China has to improve its emissions-efficiency per unit of production until 2030.	Peak year not mentioned but will not exceed 0.85 $GtCO_2$ by 2030.	Reduce emissions to around 1.042 $GtCO_2$ by 2030.
Energy	Energy intensity reduction of 15% per unit of production by 2020 (From 2015 levels).	Raise the share of Renewable Energies (vague).	Raise to 22-24% the share of Renewable Energies by 2030.
Sectors concerned	Not specified but mostly energy sector.	Energy, Industrial processes and product use, agriculture and waste.	Economy-wide (all sectors)

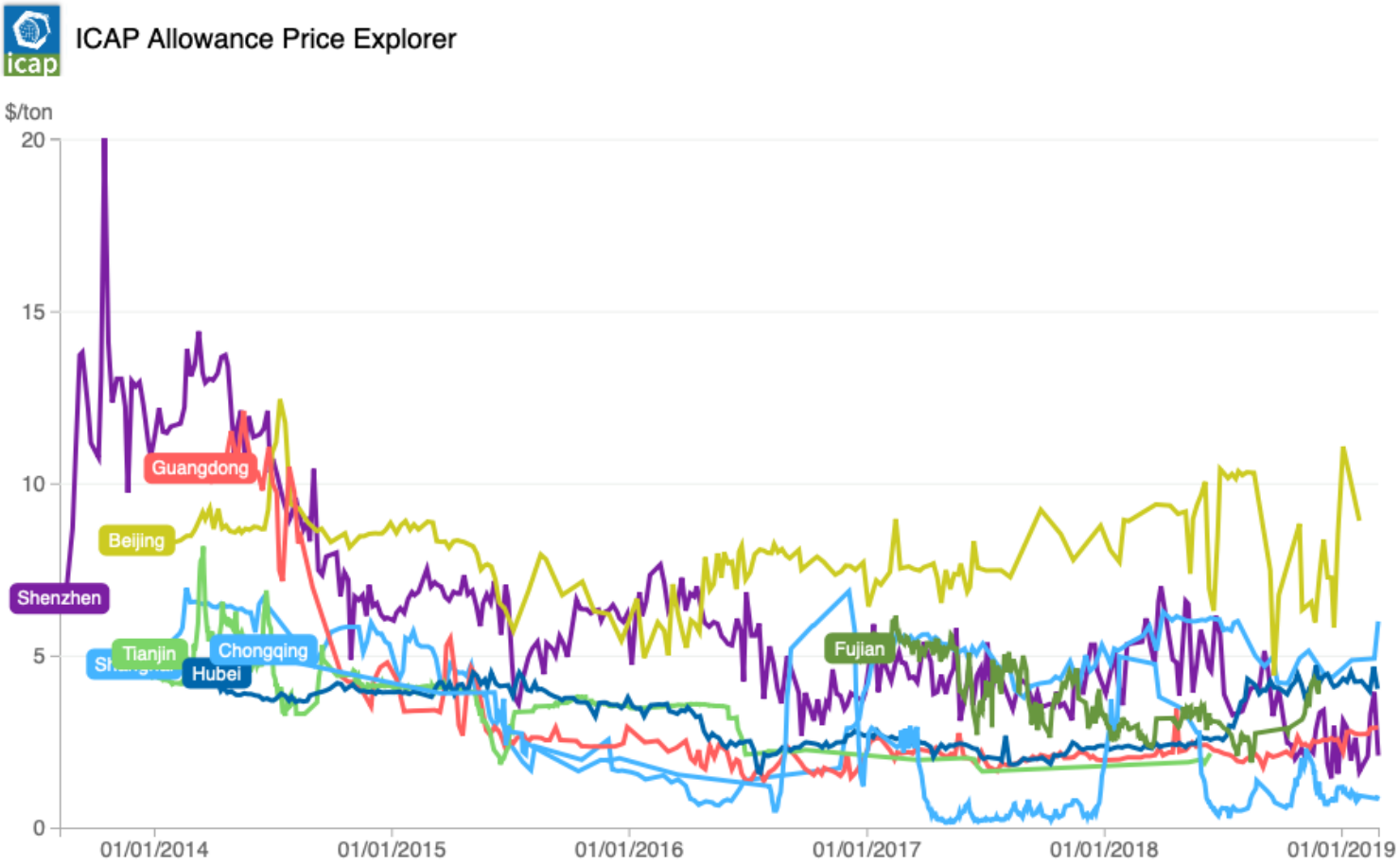
East Asian Carbon Pricing History : China

Year	Events	Comments
2011	Beginning of the 12th Five Years Plan (2011-2015)	Commitment to establish an ETS policy
2012	Pilots policy development	Establishment of data references for Pilots and National ETS
2013	Launch of 5 pilots ETS in Shanghai, Shenzhen, Beijing, Guangdong and Tianjin	
2014	Launch of 2 extra Pilots ETS in Hubei and Chongqing	
2015	NDC to the Paris Agreement	
2016	13th Five Years Plan (2016-2020) Launch of Fujian Pilot ETS	Includes the NDC to the Paris agreement and the Launch of a National ETS
2017	December: Launch of the National Scheme	Actually a Work Plan shaping the development of the CN ETS
2018	CN ETS: Development period	Current phase : MRV Rulebook, Offset rules etc…
2019	CN ETS: Development period + Trading simulation	First allocation
2020	CN ETS: Real Trading	

East Asian Carbon Pricing History : China

	Shenzhen	Shanghai	Beijing	Guangdong	Tianjin	Hubei	Chongqing	Fujian
Total Volume covered (tons)	169,386	3,051,866	928,480	4,619,265	76,000	455,378	10,433	384,265
% of volume of all pilots	1.75%	31.48%	9.58%	47.65%	0.78%	4.70 %	0.11%	3.96%
Total value (US$)	701,163	4,334,926	3,737,416	9,846,923	149,576	1,153,874	24,959	2,097,066
% value of all pilots	3.18%	16.76%	16.95%	44.66%	0.68%	5.23%	0.26%	9.51%
Average price (US$/ton)	4.14	1.42	4.02	2.13	1.97	2.53	2.39	5.46
Total historical volume (million tons)	18.22	19.92	13.53	35.36	2.49	36.88	0.75	1.01
Total historical value (million US$)	87.40	33.03	72.67	77.43	5.94	119.80	1.54	5.25
Historical average price (US$/ton)	4.80	1.66	5.37	2.19	2.38	3.25	2.06	5.21

East Asian Carbon Pricing History : China



East Asian Carbon Pricing History : China

- Big differences of **Carbon Prices** (Beijing is the most successful)
- A bigger **Market volume** does not mean a higher **Trading value** (Beijing is smaller in volume but equal in value to Guangdong)
- **Market activity** has varied a lot among the pilots (Hubei is 10 times bigger than Guangdong)

Why these differences ?

- Seriousness of provincial governments about their ETSs
- Market actors implication in the process
- Punishment for non-compliance
- Economic competitions between provinces
- Legal strength of the regulatory framework

East Asian Carbon Pricing History : Japan (Summary)

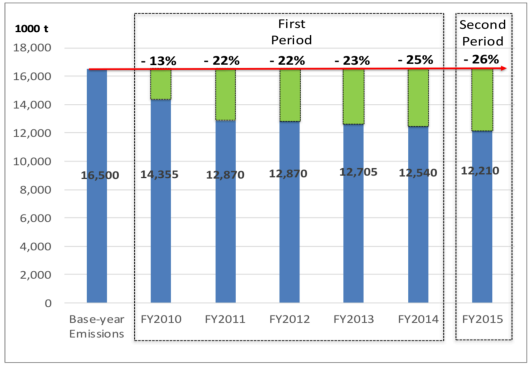
Year	Events	Comments
2008	Action Plan for Achieving a Low-carbon Society	GHG emission reduction goals in the Copenhagen Accord to reduce GHG emissions 25% below 1990 levels by 2020.
2010	Basic Act on Global Warming Countermeasures	Decision to implement an Emissions Trading System in an overall climate change policy framework. Decision finally deferred.
2010	Launch of the Tokyo Emissions Trading System (Cap-and-Trade)	The Tokyo metropolitan area launched its own mandatory cap-and- trade system.
2011	Launch of the Saitama Prefecture Emissions Trading System (Cap-and-Trade)	Saitama, the fifth largest prefecture in Japan, will become the second Japanese prefecture to implement a mandatory emissions trading system.
2011	Linking agreement between the TMG ETS and the Saitama ETS	pact to link their cap-and-trade programs.
2012	Introduction of the first East Asian Carbon Tax	
2015	NDC to the Paris Agreement	No decision for a national scheme but use of ”International Market Offsets”

East Asian Carbon Pricing History : Japan

- Over the counter trading between covered Entities of the two markets make it difficult to have on time data on carbon price:
- ➢ Price in 2019 survey is around **6$/TCO$_2$**
- ➢ Japanese covered firms trade **Excess Credits**, not Allowances
- National Carbon Tax price rate is of **2.60$/TCO$_2$**

Carbon prices are currently low in Japan and have a tendency to fall in the two Japanese subnational ETSs since their launch…

Figure 2: Result of GHG emission reduction in Tokyo ETS.



Source: TMG, 2017a. The achievement of first year in second period (in Japanese), TMG.

However, the first phase of the TMG ETS has been very effective to promote GHG emissions mitigation

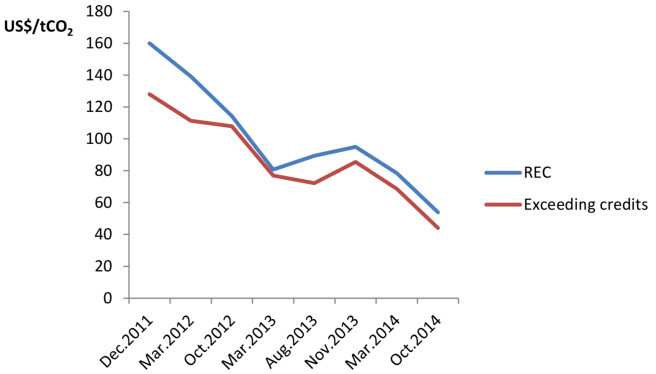


Figure 2: Credits price trends from December 2011 to October 2014

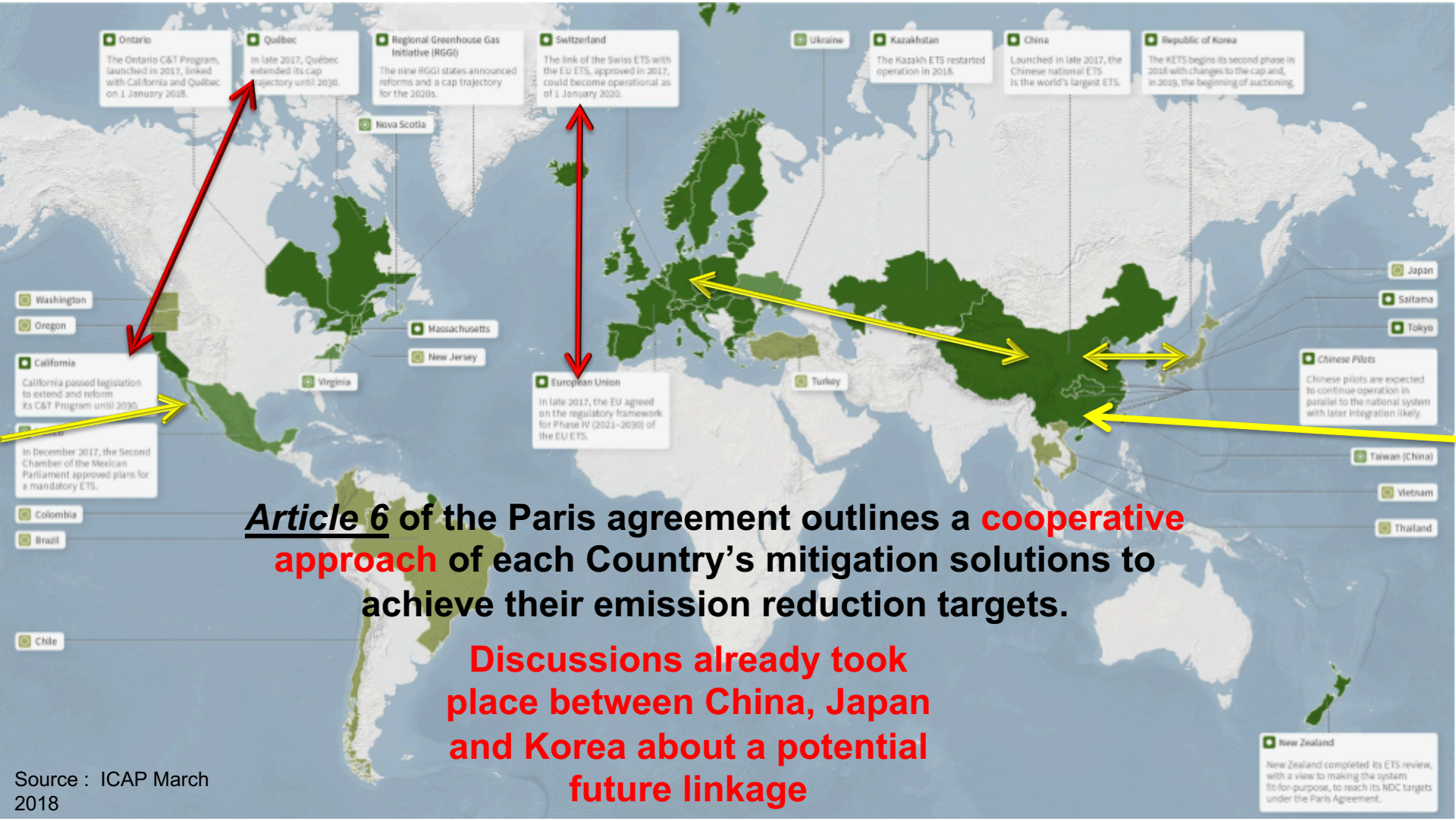
Source: Tokyo Metropolitan Government, 2014. Available at: kankyo.metro.tokyo.jp

East Asian Carbon Pricing History : Korea (Summary)

Year	Events	Comments
2009	Climate Conference in Copenhagen	GHG emission reduction goals in the Copenhagen Accord to reduce GHG emissions of 30% below BAU level by 2020.
2012	ETS ACT - *Act on the Allocation and Trading of Greenhouse Gas Emission Permits*	Enforcement of an ETS policy.
2014	Launch of the K-ETS institutions	First East Asian nationwide mandatory ETS and at the time, the second largest ETS in the world.
2015	NDC to the Paris Agreement	
2015	Beginning of the first phase of the Korean ETS	First phase = 2015-2017.
2018	First reform of the K-ETS	
2018	Beginning of the second phase of the Korean ETS	Second phase = 2018-2020.

East Asian Carbon Pricing History : Korea

Process to Linking

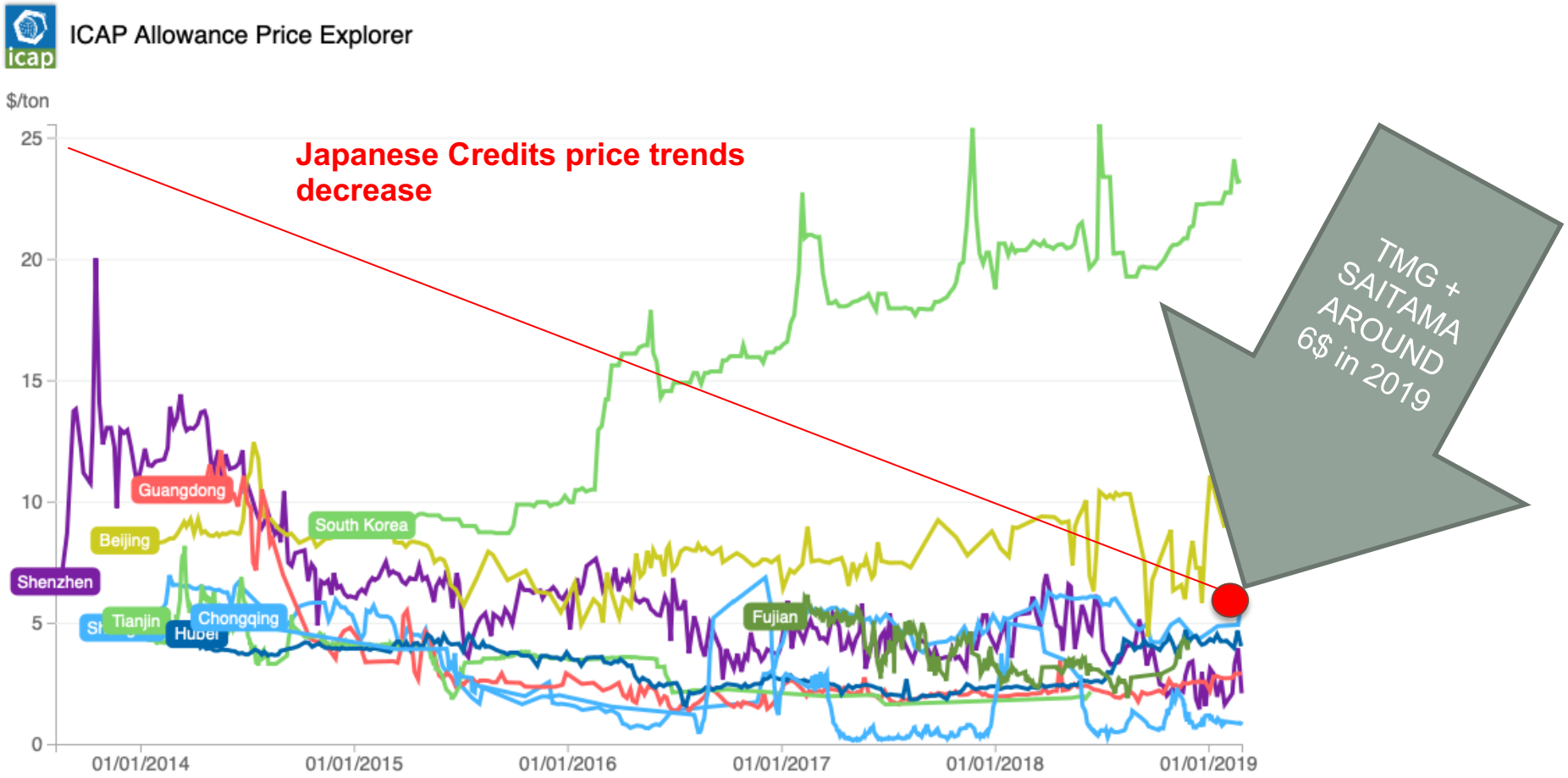


Article 6 **of the Paris agreement outlines a cooperative approach of each Country's mitigation solutions to achieve their emission reduction targets.**

Discussions already took place between China, Japan and Korea about a potential future linkage

Source : ICAP March 2018

Process to Linking: Comparison



Process to Linking

- **China** is by far the biggest **absolute** emitter in East Asia and in the world.
  - Emissions per capita are **smaller in China** than in its other East-Asian counterparts, especially compared to Korea.
  - **Energy efficiency in China is weak**, with an emissions per Unit of GDP 2 times bigger than Japan.
  - Prices on the pilots system is on average less than **5$/TCO$_2$** (Weak)
- **Japan** is an emissions-efficient country and has an **absolute reduction target** of 26% for 2030.
  - Japan has currently developed two sub-national ETSs in Saitama and Tokyo where **prices are declining to around 6$/TCO$_2$**
  - The country **lacks of a nation-wide policy.**
- **Korea** is an heavy per capita emitter and has **an intensity (BAU) reduction target.**
  - But the country has developed an absolute national **Cap-and-Trade system** with allowance prices currently around **23 $/TCO$_2$**

Process to Linking

- According to its NDC and emissions data, **China** needs **gains in emissions/Energy efficiency**.
  - Gains in emissions efficiency are **relatively cheap** because technologies already exist.

- **Japan** needs to reduce absolute emissions, & **Korea** had set an absolute Cap-and-Trade system.
  - Reducing absolute emissions in already efficient country is **more expensive** because new technologies have to be developed and change of habits takes time.

On the Cost-Efficiency aspect, Linking the three countries carbon pricing policies makes sense

Design Alignments and Reforms: Double methodology

1. A comprehensive **Comparative analysis** of the three ETS designs and regulatory frameworks:

- **Korean ETS** design and regulations
- **Chinese National ETS** draft design and regulation
- **Tokyo Metropolitan Government and Saitama ETSs** design

2. An **Impacts analysis** of Linkage based on three sustainability criteria (ICAP, 2018), (Dellatte et al., 2019):

- **Economic Efficiency**: Will linkage affect cost-efficiency ?
- **Environmental Effectiveness**: Effects of linkage on Environmental ambition.
- **System Robustness**: Stability of the system after linkage.

Outcomes: Alignments and Reforms recommendations to enable a potential future linkage in East Asia.

Design Alignments and Reforms : Cap

Aspects	CN ETS	TMG-SG-ETS	Korea ETS
CAP	~ **45000** $MtCO_2e$/Year (projection only)	*Tokyo* with 66 million tons of GHG emissions in 2016 aims at a reduction of 25% below 2000 levels by 2020. *Saitama* with just below 37 million tons in 2016 intends to lower emissions by 21% below 2005 levels. Total: **103** $MtCO_2e$/Year.	**694.1** $MtCO_2e$/Year (2016). The total amount of emissions currently on the market is around 1777 $MtCO_2e$ (2018-2020: 548 $MtCO_2e$/Year) including 14 million allowances for market stabilization, 5 million for market markers, and 134 million for new entrants and other purposes.

- Differences in **Size of the Cap** does not affect any of the criteria
- Issue = Linking ETSs with different **Cap trajectory :**
  - CN ETS Intensity Cap target VS Korean and Japanese decreasing Cap
  - Chinese cap trajectory cannot be anticipated (adjusted each year to GDP)
  - It implies that the Japanese and Korean ETS Cap become unknown by **propagation**
  - = Threat to the **Environmental Ambition** of the Korean and Japanese Schemes

Adjustment proposal :

- **Absolute target** in the CN ETS, or…
- Establishment of an **Exchange rate** that reflect the real value of the allowances coming from the intensity-based Chinese system…

Design Alignments and Reforms : Cap

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- … But this exchange rate need a functional **Cap setting** procedure in the three countries to be established:
  - Data transparency issue in China could endanger the Cap setting procedure
  - It could create a flow of allowances from less controlling China on the linked market
  - …And affect the **System Robustness** of the entire linkage

Regulation alignment proposal :

- Establish **Common/Similar rules for cap setting** that allow the three parties to have full access to the same level of quality of verified emissions data (MRV)

Design Alignments and Reforms : Coverage

Aspects	CN ETS	TMG-SG-ETS	Korea ETS
Coverage & proportion	10975,50 $MtCO_2e$ (2012) (45%) (Current state of planning)	A share of 21% of Tokyo's total CO_2 emissions. Saitama ETS covers around 70% of the prefecture total emissions.	A share of 68% of Korea's total GHG emissions.
Gas coverage	CO_2 only.	CO_2 only.	6 Kyoto protocol gases: CO_2, CH_4, N_2O, PFCs, HFCs, SF_6.
Sector coverage	**First Power generators** only. Will be later followed gradually by petrochemicals, chemicals, building materials, iron and steel, non-ferrous metals, paper production, domestic aviation, and new energy vehicles (electric and hybrids). Both Direct and Indirect emissions are covered. (Current state of planning)	Tokyo took a unique approach and focused its ETS on the end-use of energy in **large office buildings**, while also including a **few industrial emitters** (20% of covered facilities), the same approach was taken by the Saitama scheme however around 70% of emitters coming from the manufacturing sector.	The current phase of the Korea ETS covers **six sectors**: heat and power, industry, building, transportation, waste sector, and public sector. Both Direct and Indirect emissions are covered.

- In case of linkage, the **Proportion covered**, or the **Type of gas covered** do not affect any of the criteria studied
- Significant divergences in **Sector coverage** is currently not an issue for East Asia
- ➢ It could be an issue for the **Economic efficiency** and the **Environmental effectiveness** in the future if some EITE sectors are covered in one ETS but not in the other

Regulation alignment proposal :

- **Sectorial coverage alignment** for EITE sectors

Design Alignments and Reforms : Compliance

Aspects	CN ETS	TMG-SG-ETS	Korea ETS
Liable entities	Beginning: around 1700 entities. Later at least 7000 to 10000 (Current state of planning).	Tokyo ETS covers around 1200 facilities; Saitama covers around 600 facilities in total.	Around 610 covered entities.
Compliance	Mandatory for entities that fall within the inclusion threshold. Inclusion Threshold: Entities with annual emissions of **~26000 t/CO_2** (energy consumption of more than 10000 TCE) in any year over the period 2013–2015 are covered by the national ETS.	Mandatory for entities that fall within the inclusion threshold. Inclusion Threshold: Facilities with energy consumption ≥ 1,500kL crude oil per year **(~3000t/CO_2/Year)**.	Mandatory for entities that fall within the inclusion threshold. Inclusion Threshold: Company >125,000 tCO2/year, Facility >**25,000 tCO2/year**.

- **Quantity of Liable entities** do not affect any of the criteria studied
- Same mandatory participation in the three countries: Secure **System Robustness**
- **Inclusion Threshold**: High in China and Korea, Lower in Japan
  - Differences of size of covered firms: Industrial in Korea and China, mostly Urban in Japan
  - Could theoretically generate a risk of emission leakage to the entity with the largest inclusion threshold = Threat to the **Environmental effectiveness**

Regulation alignment proposal :

- Creation of a **national scheme in Japan** covering industrial sectors
- **Convergence of inclusion thresholds per sector** between the three partners

Design Alignments and Reforms : Allocation

Aspects	CN ETS	TMG-SG-ETS	Korea ETS
Allocation	Free allocation (**Benchmarking**), later a part of the allocation is going to be auctioned (Current state of planning).	Free allocation (**Grandfathering**). Instead of distributing allowances for all emissions under the cap, both jurisdictions only issue **excess reduction credits** (ERC) for reductions beyond the reduction obligations.	2018-2020: 97% freely allocated and 3% **auctioned**. From 2021: Less than 90% freely allocated and more than 10% auctioned. EITE sectors received 100% free allocation.

- **Allocation methodology** plays a role in the establishment of the carbon price and is currently divergent in the three jurisdictions:
  - Could give a competitive advantage to firms in freely allocated ETSs (Japan & China)
  - Benchmarking updated annually in China creates an even greater competitive advantage towards both Japan and Korea
  - Both are a threat to the **Environmental effectiveness** and the **Economic efficiency**

Regulation alignment proposal :

- The three jurisdictions could move to auction based allocation and organize **Joint auctions**
- If joint auctions are not feasible then **separate domestic platforms** should be established and organize auctions with **at least similar allocation methodologies**

Design Alignments and Reforms : Flexibility mechanisms

Aspects	CN ETS	TMG-SG-ETS	Korea ETS
Temporal flexibility	Banking allowed (Expected from the article 3 of the Work Plan), Borrowing not allowed.	Banking is allowed only between consecutive compliance period, Borrowing is prohibited.	Banking is allowed with limitations between phases. Borrowing is allowed only within a single trading phase.
Phase and compliance period	Trading period: **Annual** Compliance deadline: No information available yet.	Bilateral trading of ERC and offset credits has been allowed since 2011. **No use is made of stock exchanges** but supply-demand-matching fairs are organized frequently to facilitate trading.	Trading period: **Three years, Five years from 2021**.

- A flexibility mechanism implemented in one system impact the other one by **propagation**
- **Banking** issue will happen if there is no Banking limitation in the CN ETS design
  - ➢ It could have a serious effect on **market price** and on the **System robustness** if big amounts of banked Chinese allowances are released on the linked market
- Some cases of **Borrowing** are allowed in Korea and it could endanger the **Environmental effectiveness** and the **System Robustness** of the East Asian Linkage
  - ➢ It could trigger covered firms to report their mitigation efforts to the future and jeopardize the future cap of the three linked systems by propagation

Regulation alignment and reform proposal :

- **Banking limitation** in China + **remove Borrowing** in the Korean design (or adaptation)

Design Alignments and Reforms: Price management mechanisms

Aspects	CN ETS	TMG-SG-ETS	Korea ETS
Provision for price management	(Art. 12 of the Work Plan) The NDRC and the Ministry of Ecological environment in cooperation with sectors' related ministries have to develop adjustment mechanism to prevent abnormal price fluctuations and risk prevention & control mechanism to prevent market manipulations. The regulator would **set aside a certain amount of allowances** that could be used to manage price volatility.	The regulator offers offset credits for trade in case of excessive price management. However, the regulator **does not control carbon prices** since covered entities trade over-the-counter.	Auction Reserve Price that is determined by this formula: [Average price over the previous three months + Average price of last month + Average price over the previous three days] / 3. **Allocation Committee** is in charge to implement a set of market stabilization measures when it is needed.
Transaction ceiling & price floor	No information available yet.	No control on price.	Taken in consideration by the price management mechanisms.

Korean Allocation Committee **potential price stability measures that could be extended to the entire EA linked market :**

(1) Additional allocation from the reserve (up to 25%);
(2) Establishment of an allowance retention limit: minimum (70%) or maximum (150%) of the allowance of the compliance year;
(3) An increase or decrease of the borrowing limit; (Danger for future Cap)
(4) An increase or decrease of the offsets limit; and
(5) Temporary set-up of a price ceiling or price floor.

Design Alignments and Reforms: Penalties for non-Compliance

Aspects	CN ETS	TMG-SG-ETS	Korea ETS
Punishment for non - Compliance	1) Non complying firms will be fined 3 to 5 times the average market price of permits in the 12 months prior, in addition to a corresponding number of allowances that will be deducted from the firm's allocation for the following year. If the penalty is not paid after a certain deadline, an extra 3% per day fine will be added to the previous fine. The regional authorities are responsible to issue the fine. 2) 1 million Yuan of fine for companies that miss the annual deadline for reporting emissions. 3) Non-complying entities will also be included in the National Credibility Information Sharing Platform.	Tokyo applies fines of up to 500,000 ¥ and a 1.3 times ex-post surrender of excess emissions in case of non-compliance. There are no penalties for Saitama facilities if they fail to hold an adequate number of allowances in their accounts to cover respective emissions. However, both jurisdictions publish companies' names, which in Japan has traditionally been an effective enough means for deterring facilities from non-compliance with regulations. Both programs realized an almost 100% compliance rate in their 1st compliance periods	Penalty that does not exceed three times the average market price of allowances of the given compliance year or KRW 100,000 (USD 90.85) / Tone.

- The three designs require **significant penalties in case of non-compliance** which secure sustainability
- The three partners just need to ensure than all failure to comply in one of the ETS is pursued to secure the **Robustness** of the policy

Regulation reform proposal :

- **Public disclosure of non-complying entities** that would send a positive message for the transparency of the linkage and confidence between the three partners

Design Alignments and Reforms: Offsetting

Aspects	CN ETS	TMG-SG-ETS	Korea ETS
Offsets/ Credits	**Domestic only using**: *Chinese Certified Emission Reduction Credits* (Expected from the third phase, from the article 3 of the Work Plan)	Offsets are accepted from non-covered small-and-midsize facilities, renewable energy projects, and installations outside of the two jurisdictions but **inside Japan**; and Saitama additionally allows Forest Absorption Credits.	Offsets are accepted **with limits**: Qualitative limit: CERs generated after 1st of June 2016 from international CDM **projects developed by domestic companies are allowed**. CDM projects operated by Korean companies are allowed with restrictions. Quantitative limit: Up to 10% of each entity's compliance obligation (of which up to 5% for international offset credit).

- Offsetting **affects the three criteria used**
  - If bad quality Offset credits are accepted in one scheme, it will affect the partners' ETSs by **propagation**
- The potential size of the Chinese Offsets system could be problematic and **flood the linked market** in case of non-regulation
  - The Korean design and its quantity and quality restrictions is a good base for the future reform

Regulation reform proposal:

- Establish **common/similar standards** of Offsets projects in terms of **credits quality** and **MRV**
- Create a **Quantity restrictions** of Offsets accepted in each design
- **Openly disclose information** about the Offset projects in each jurisdiction

Design Alignments and Reforms: Outcomes summary

Aspect	Risk	Kind of risk	Alignment or Reform
Cap	V	System Robustness + Environmental ambition	Absolute Target OR Exchange rate + Common rules
Coverage & proportion	X		
Gas coverage	X		
Sector coverage	V	Economic Efficiency + Environmental ambition	Sectorial Alignment
Liable entities	X		
Compliance	V	Environmental ambition	National Scheme + Convergence
Allocation	V	Economic Efficiency + Environmental ambition	Joint auctions OR Methodologies alignment
Temporal flexibility	V	System Robustness + Environmental ambition	Banking limitation and Borrowing restriction
Phase & compliance period	X		
Price management	V	System Robustness + Environmental ambition + Economic Efficiency	Common rules + Extension of the Korean Committee
Penalties	X		Public disclosure of non-complying entities
Offsetting	V	System Robustness + Environmental ambition + Economic Efficiency	Alignments + quantity restrictions + information sharing

Management: The Registry issue

New institutions, or old one reformed to fit the new linked system, have to be established to manage the new East Asian linked ETS: The **Registry**

- = Database collecting information on markets actors and markets transactions
- Some common features in EA:
  - Electronic platforms
  - Mandatory participation
- Current divergences among the three East Asian cases compared are on information gathered in the registry…

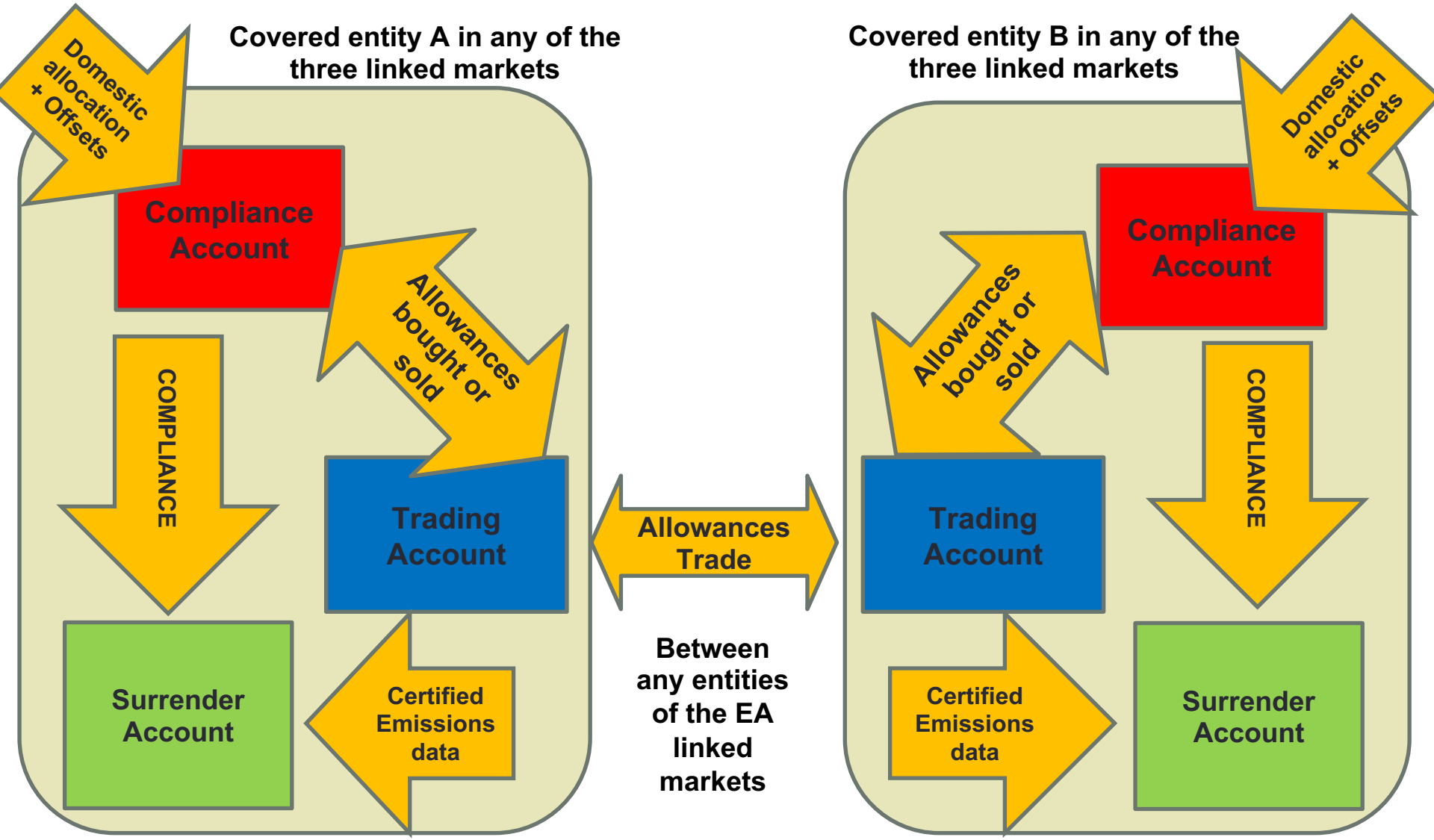
Management: The registry issue

CN ETS (tentative)	TMG-SG-ETS	Korea ETS
• Identity information on who is trading what on the Chinese ETSs • Supposed to enable tracking permits back to the original owner • information from the registry to be accessible only for developers and traders • Plan to open it to all participating entities probably after 2020	• Allocations • Transactions • Surrender of the credits (compliance) • Offsets • Credits transfer with the two linked ETSs. • A Compliance Account • A Trading Account • A Surrender Account	• Allocation • Transactions • Total number of emission permits per commitment period and compliance year • GHG emissions of each business entity covered and certified by MRV certification bodies • The amount of emission permits each market actors hold and the account of emission permits in reserve

Two reforms possible that secure system Robustness:

- **Connections between three different national registries** with same standards of information available: Higher risk of fraud, double counting or no counting at all…
- Implementation of a **common registry** based on the current Tokyo ETS Registry linked with Saitama: Stronger confidence between partners

Management: EA linked Registry scheme proposal



Conclusion

- Very different **domestic environmental ambitions**
- Very different **stage of implementation:**
  - Mature national system in Korea
  - New national ETS in China
  - Only subnational level in Japan
- **The major difference between the three ETSs is the Cap**: Intensity VS Absolute
- Current carbon prices are significantly divergent
- **Allocation and Offsetting regulations** needs to be seriously considered before any linkage to safeguard the environmental pledge of the three countries
- **Need serious registry reforms and alignments**
- **Currently no harmonization** exists between the potential partners
  - **No** shared carbon accounting standards
  - **No** common permits-exchange system

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Thank You !

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