

Carbon Pricing—How to Implement the Paris Climate Agreement

**The Seventh IMF-Japan High-Level Tax Conference
For Asian Countries in Tokyo
“Emerging Tax Issues in Asia”
(April 5-7, 2016 at La Rose I Room (5F), Daiichi Hotel Tokyo)**

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What is Carbon Pricing?

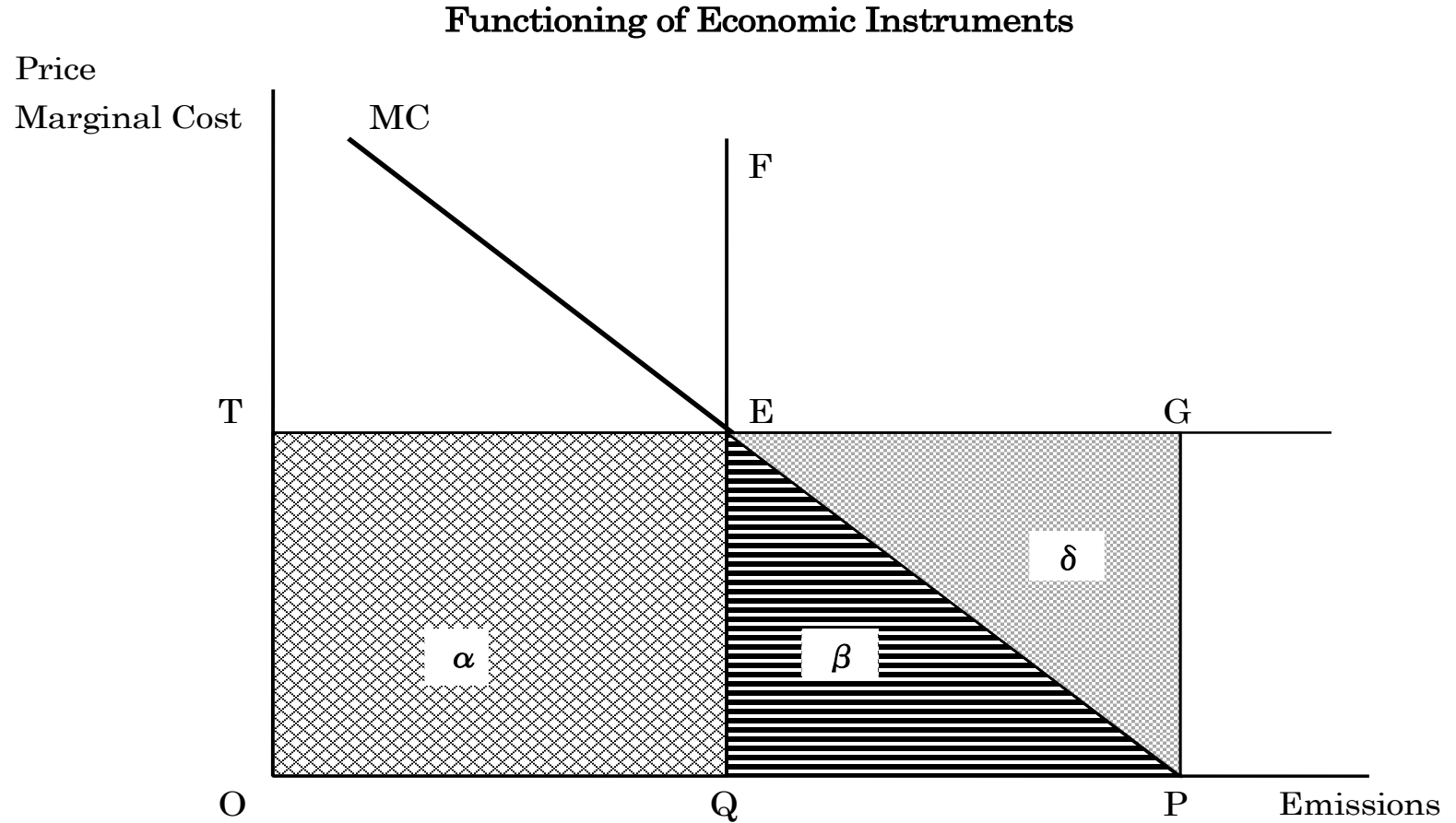
Environmental Policy Instruments

- Direct Control (Command & Control)
 - 1) Direct Regulation by the Government
 - 2) Agreement between the Government and the Firm
 - 3) Voluntary Agreement
- Economic Instruments (\Rightarrow Carbon Pricing)
 - 1) Environmental Tax
 - 2) Emissions Trading
 - 3) Subsidy

Economic Theory Background

- Pigou (1920), Externality, Pigouvian Tax
- Baumol and Oates (1971), “Standard & Price Approach”
- Direct Control vs. Economic Instruments
 - 1) Cost Efficiency
 - 2) Dynamic Efficiency (Innovation)
 - 3) Information Efficiency

Functioning of Economic Instruments



Environmental (Carbon) Tax

- Its Brief History

- 1) Waste Water Charge System since 1968
- 2) Its Extension to Air Pollution, Pesticide / Fertilizer, Climate Change
- 3) 1st Wave of Carbon / Energy Taxes since 1990 (Nordic Countries)
- 4) 2nd Wave: UK, Germany, Italy (Environmental Tax Reform) since 1999
- 5) 3rd Wave: Ireland (2010), Japan (2011) , Australia (2012, but repealed in 2014)

Revenue Recycling

- Two Part Tariff System: Combination of Tax and Subsidy
 - 1) Combination of Low Rate & Subsidy, 2) Promotion of Environmental Impact, 3) Distributional Effect
- Environmental Tax Reform (ETR)
 - 1) Revenue Neutral, 2) Reduction of Social Security Contribution, 3) Positive Macro Economic Effects

Macro Economic Effects of the German ETR

Macro Economic Effects of ETR (Difference to the Reference Scenario : %)

		1999	2000	2001	2002	2003	2005	2010
PANTA	GDP	-0.13	-0.24	-0.33	-0.48	-0.56	-0.61	-0.54
RHEI	Employment	0.10	0.23	0.31	0.34	0.42	0.47	0.51
Model	CO ₂ Emission	-0.42	-1.10	-1.52	-1.94	-2.30	-2.35	-2.21
LEAN	GDP	0.24	0.12	0.03	0.09	0.10	0.02	-0.10
Model	Employment	0.58	0.43	0.34	0.55	0.64	0.56	0.49
	CO ₂ Emission	-0.78	-1.80	-2.25	-2.49	-2.81	-2.85	-3.00

[Source] Bach et al. (2001), Table 4-10 & Table 4-35.

Macro Economic Effects of the UK ETR

Macro Economic Effects of UK ETR

Difference to Reference Case	2005	2010
GDP (%)	0.121	0.084
Employment (Thousand)	24.4	25.8
Export (%)	-0.041	-0.045
Import (%)	0.117	0.05
Unit Production Cost(%)	-0.165	-0.203

[Source] Ekins and Etheridge (2006), p.2085, Appendix 3.

The Japanese Existing Energy Taxes

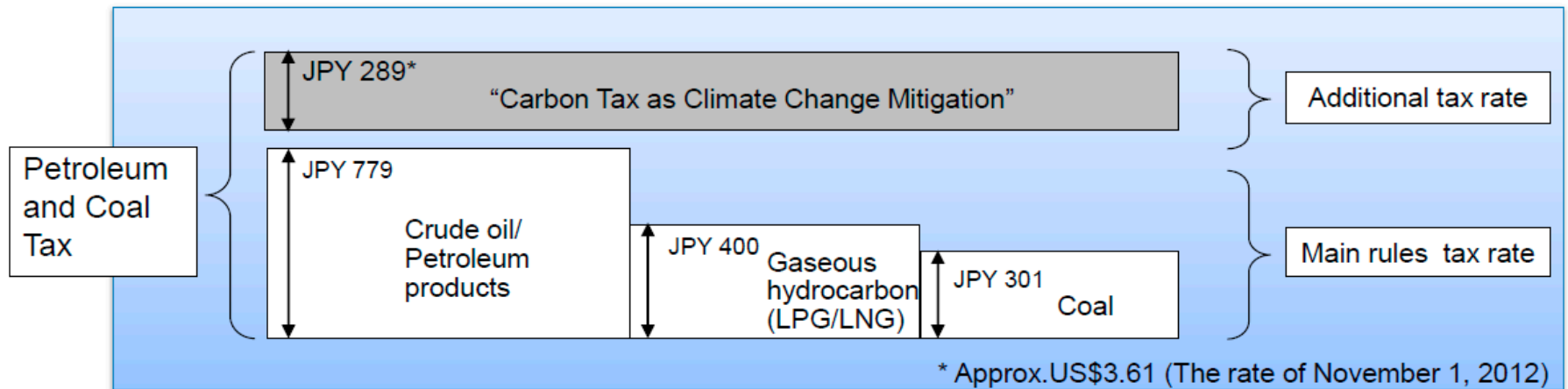
		Fossils Fuels and Energy Taxes								
Up- stream	Tax Base	Natural Gas	Petroleum						Coal	Electricity
	Tax	Petroleum/coal tax								
Down- stream	Tax Base	Natural Gas	Gaso- line	Light Oil	LPG	Kero- sene	Hea- vy Oil	Avia- tion Fuel	Coal	Electricity
	Tax		Gaso- line Tax	Light Oil Tax	LPG Tax			Avia- tion Fuel Tax		Electricity Tax

Carbon Tax (Tax for Climate Change Mitigation)

- Tax rate corresponding to the amount of CO2 emissions for all fossil fuels (JPY 289/t-CO2)
- Enforced from Oct. 2012 and increases in the tax rate gradually over 3 and a half years
- All the tax revenue will be allocated for curbing energy-oriented CO2 emissions

Tax Rate

Tax Rate per t-CO2 of “Carbon Tax as Climate Change Mitigation”



Enforcement Stage

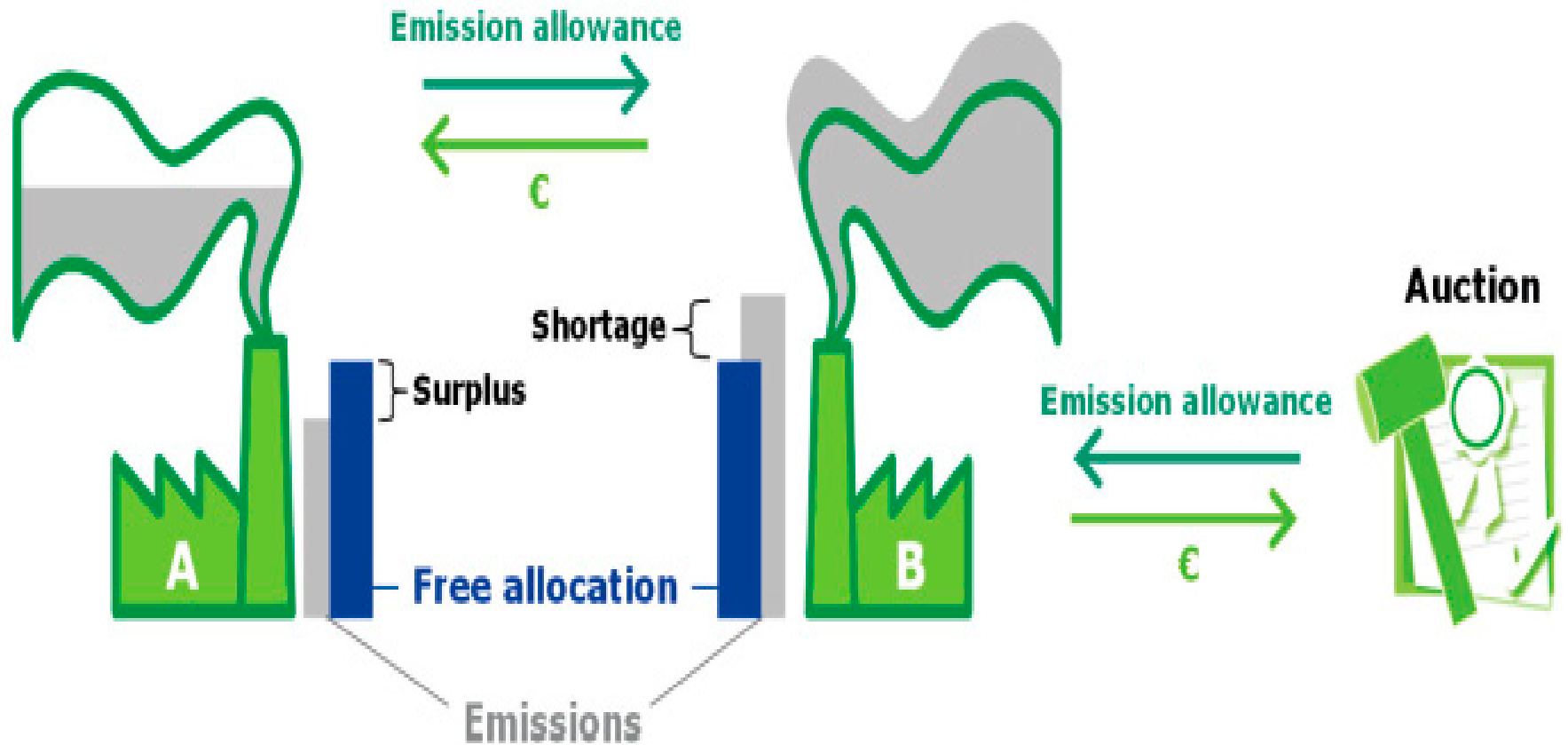
Object of Taxation	Main rules Tax Rate	From Oct. 1, 2012	From Apr. 1, 2014	From Apr. 1, 2016
Crude oil/Petroleum products [per kl]	JPY 2,040	+ JPY 250 (JPY 2,290)	+ JPY 250 (JPY 2,540)	+ JPY 260 (JPY 2,800)
Gaseous hydrocarbon [per t]	JPY 1,080	+ JPY 260 (JPY 1,340)	+ JPY 260 (JPY 1,600)	+ JPY 260 (JPY 1,860)
Coal [per t]	JPY 700	+ JPY 220 (JPY 920)	+ JPY 220 (JPY 1,140)	+ JPY 230 (JPY 1,370)

Tax Revenue

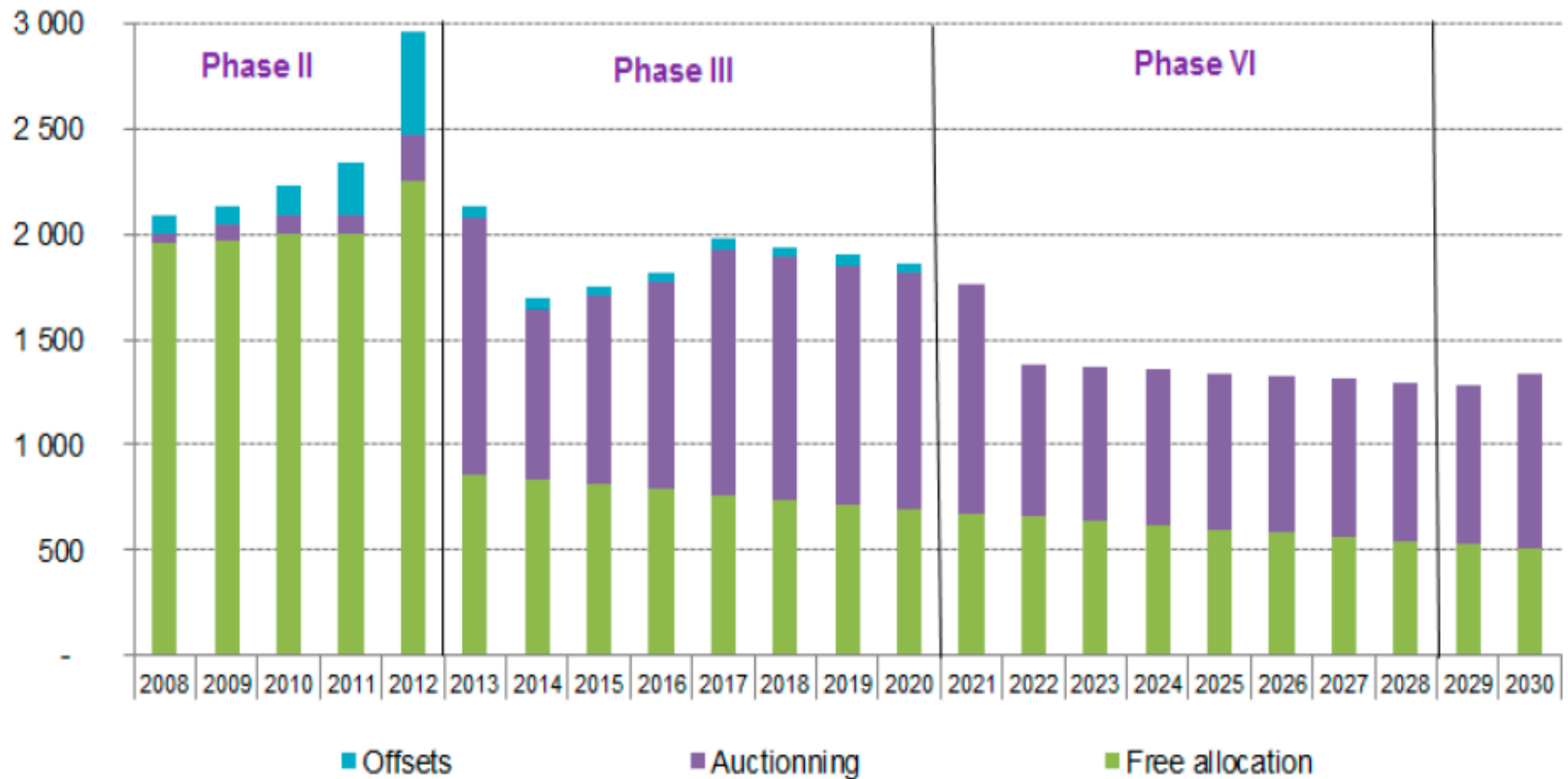
[1st year] **JPY 39.1 billion** ; [Normal year] **JPY 262.3 billion** (about US\$3.27 billion)

➔ To be used for introduction of renewable energy and enhancement of energy-saving measures, etc.

Emissions Trading System



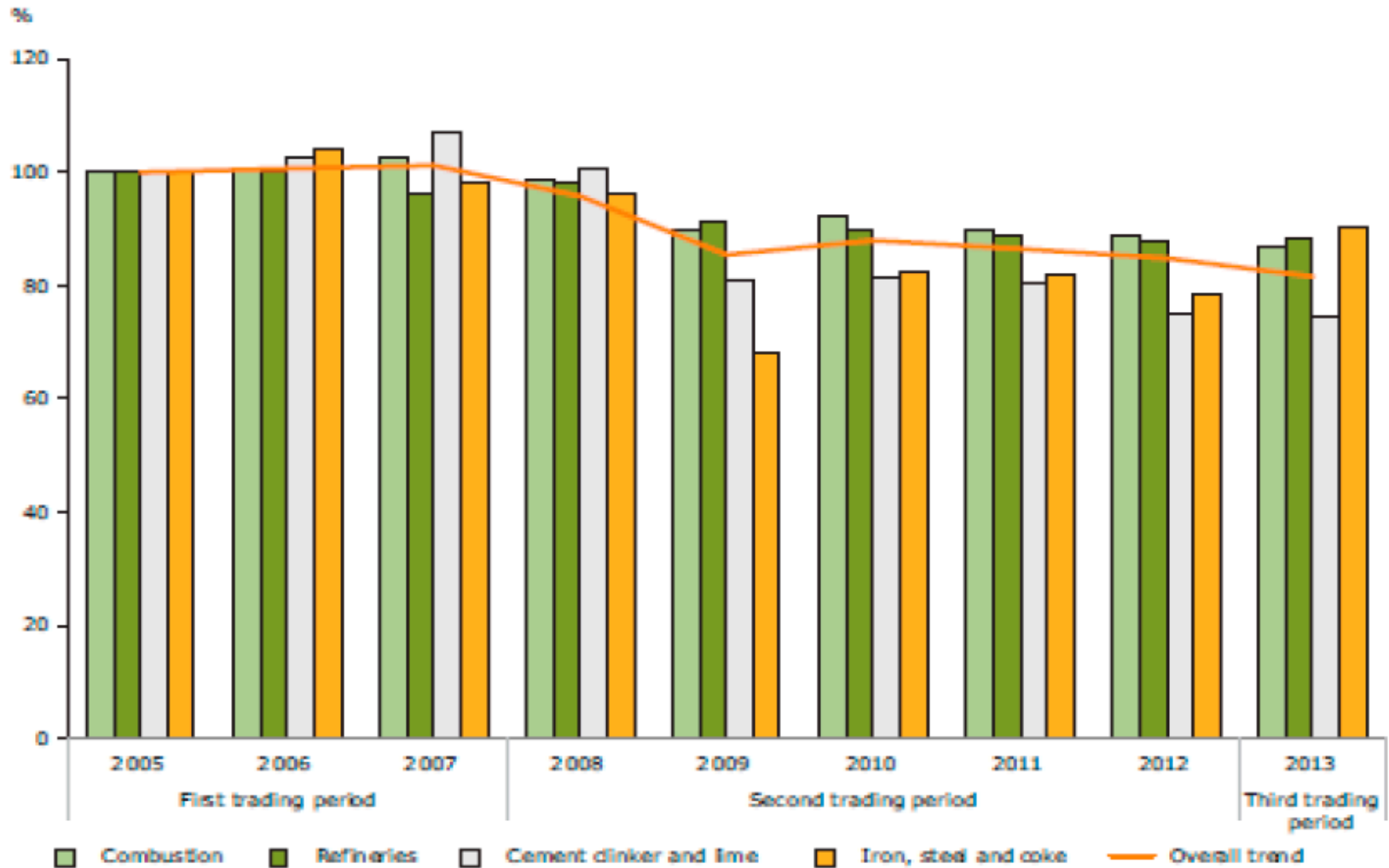
Historical Development of the EU ETS CAP



EUA Price Development



CO₂ Emissions Trend by EU ETS Sectors

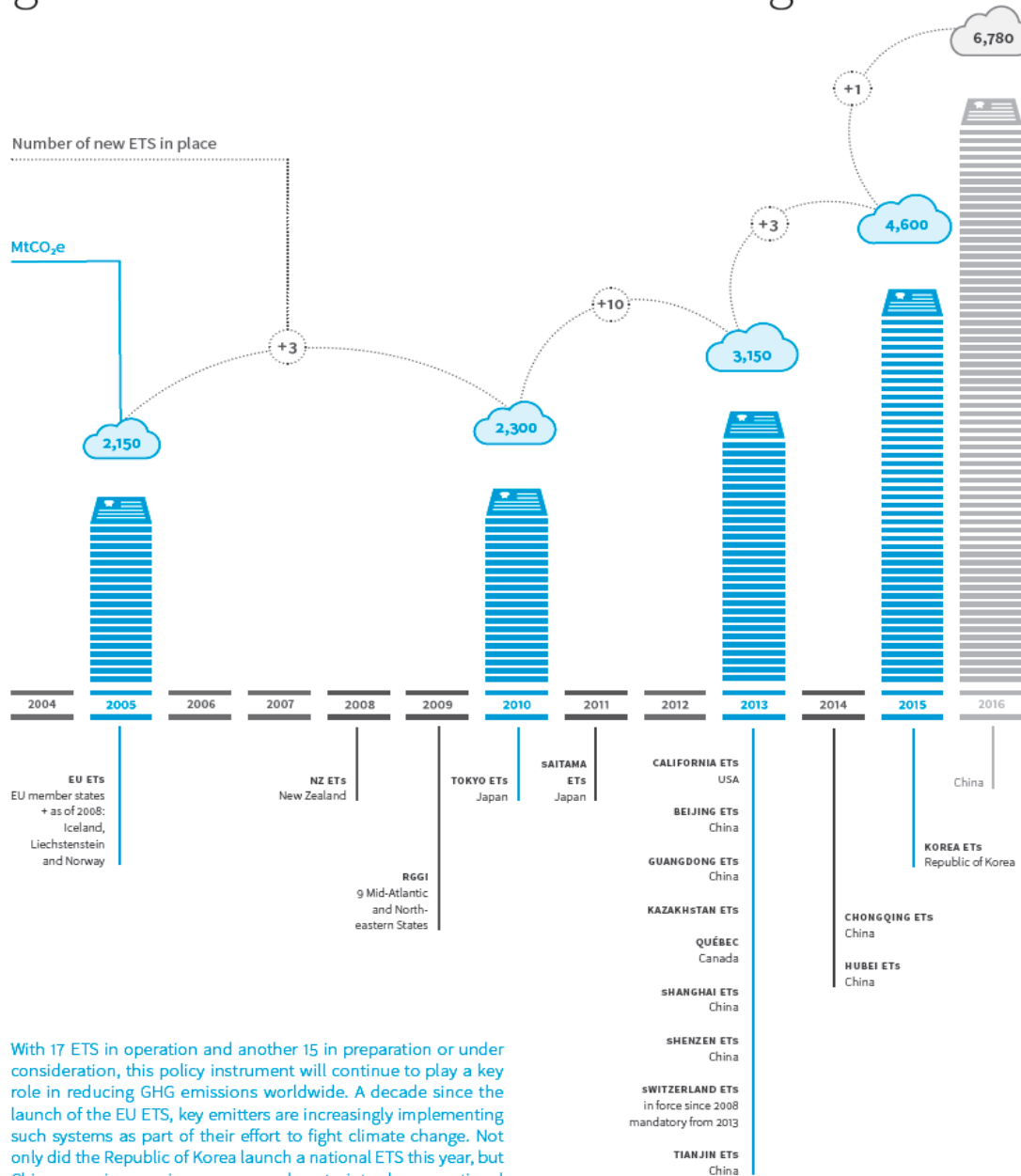






At a Glance

global trends in emissions trading



With 17 ETS in operation and another 15 in preparation or under consideration, this policy instrument will continue to play a key role in reducing GHG emissions worldwide. A decade since the launch of the EU ETS, key emitters are increasingly implementing such systems as part of their effort to fight climate change. Not only did the Republic of Korea launch a national ETS this year, but China, a major growing economy, plans to introduce a national

References

- Baumol, W.J. and W.E. Oates (1971), “The Use of Standards and Prices for Protection of the Environment”, *Swedish Journal of Economics*, **3**, pp.1-44.
- Bach, S. et al. (2001), *Die ökologische Steuerreform in Deutschland: eine modellgestützte Analyse ihrer Wirkungen auf Wirtschaft und Umwelt*, Physica-Verlag.
- Ekins, P. and B. Etheridge (2006), “The Environmental and Economic Impacts of the UK Climate Change Policy”, *Energy Policy* **34**, pp.2071-2086.
- Pigou, A.C. (1920), *The Economics of Welfare*, Macmillan.