

# Carbon Pricing: *Theory and Practice*

“Carbon Pricing for Net Zero/Utilizing Market Mechanism”

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# 1. Carbon Pricing in Theory

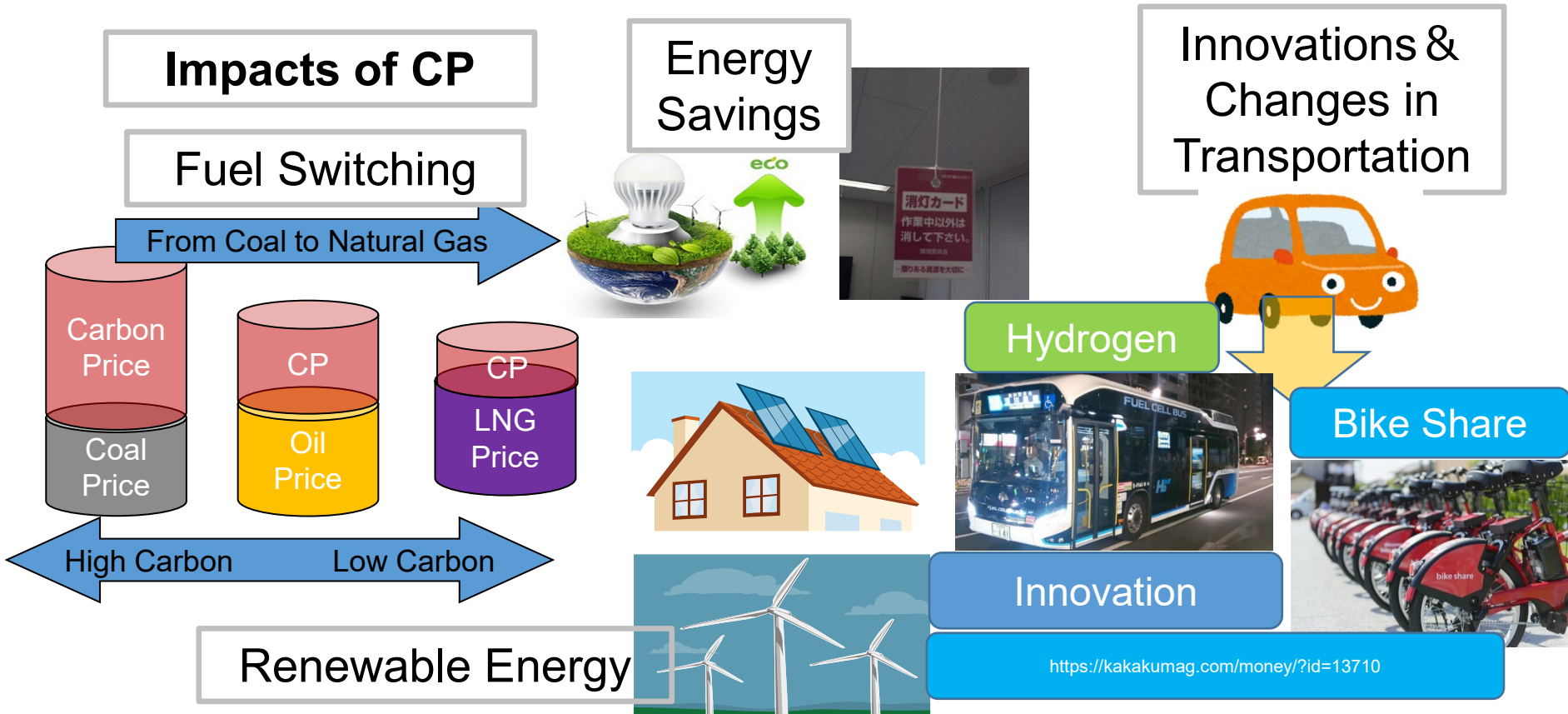
- Carbon Pricing (Putting price on CO2)

1. Carbon Tax
2. Emissions Trading Schemes (ETS)

Internalize the negative externality

- CP can minimize the cost for Society given the target

- Market mechanism works efficiently.
- Firms or consumers can just focus on prices of goods and service



# Carbon Neutrality in 2050

Emissions

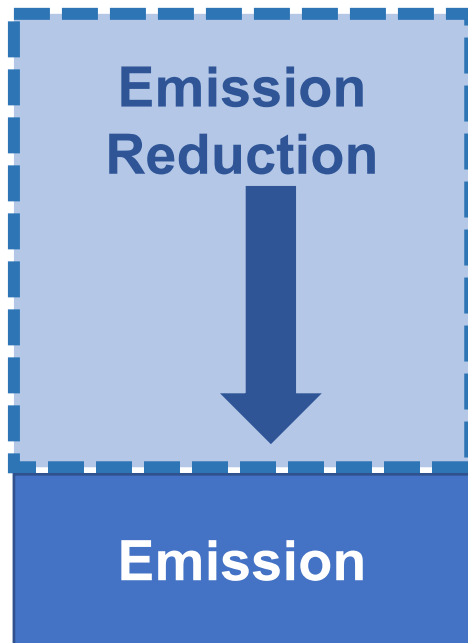
2019

1.21 billion ton

Other GHGs	
Energy Related CO <sub>2</sub>	Heat
	Electricity

2050

Emission + Removal: Net Zero



ETS in the Long Run?



Trading required in 2050

Sink & Removal

Net Zero because of the trading emitters and sink & removal players

Removal

Based on Ministry of the Economy, Trade and Industry

# 2.1 Effectiveness of Carbon Pricing (ETS)

Impacts of Tokyo ETS on CO2 Reduction (From 2009 to 2013)

		Office Buildings	University Buildings
CO2 Emissions	<b>ETS</b>	<b>6.8%</b>	<b>4.0%</b>
	Electricity Price Increase	6.2%	-
	Power Saving Order	-	7.3%

Power Price Increase by 12.4%

Tokyo ETS works!

Carbon Pricing in Japan Ch.8

More than half of the reduction from ETS

Carbon Pricing in Japan Ch 6

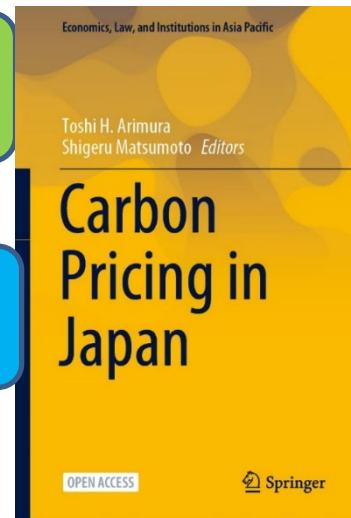
More than 10% reduction in the manufacturing sector (Yajima et al.2021)

Arimura & Abe (2021)

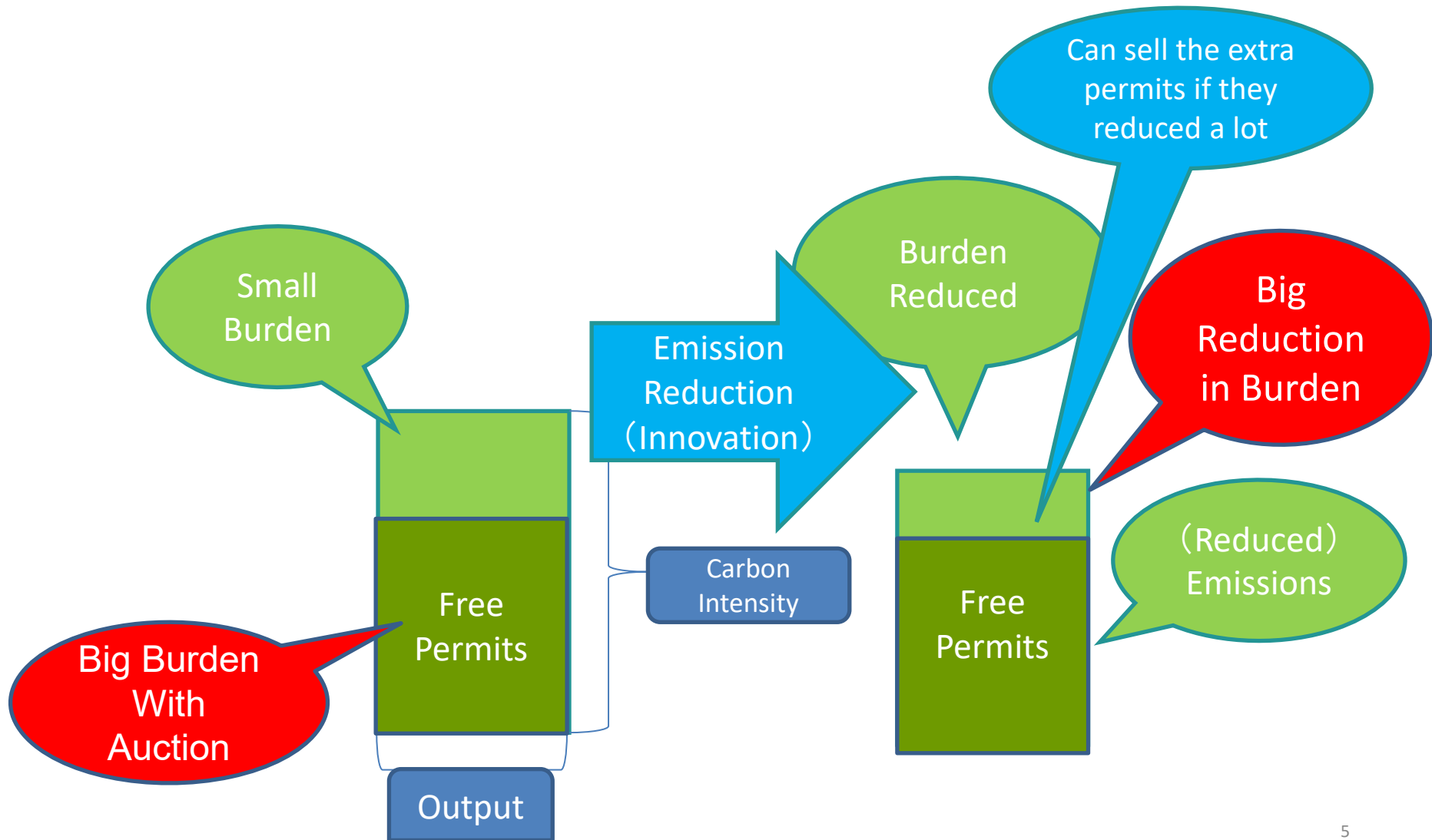
Arimura & Matsumoto ed.(2021)

Saitama ETS in Chapter 7 by Hamamoto

<https://link.springer.com/book/10.1007/978-981-15-6964-7>

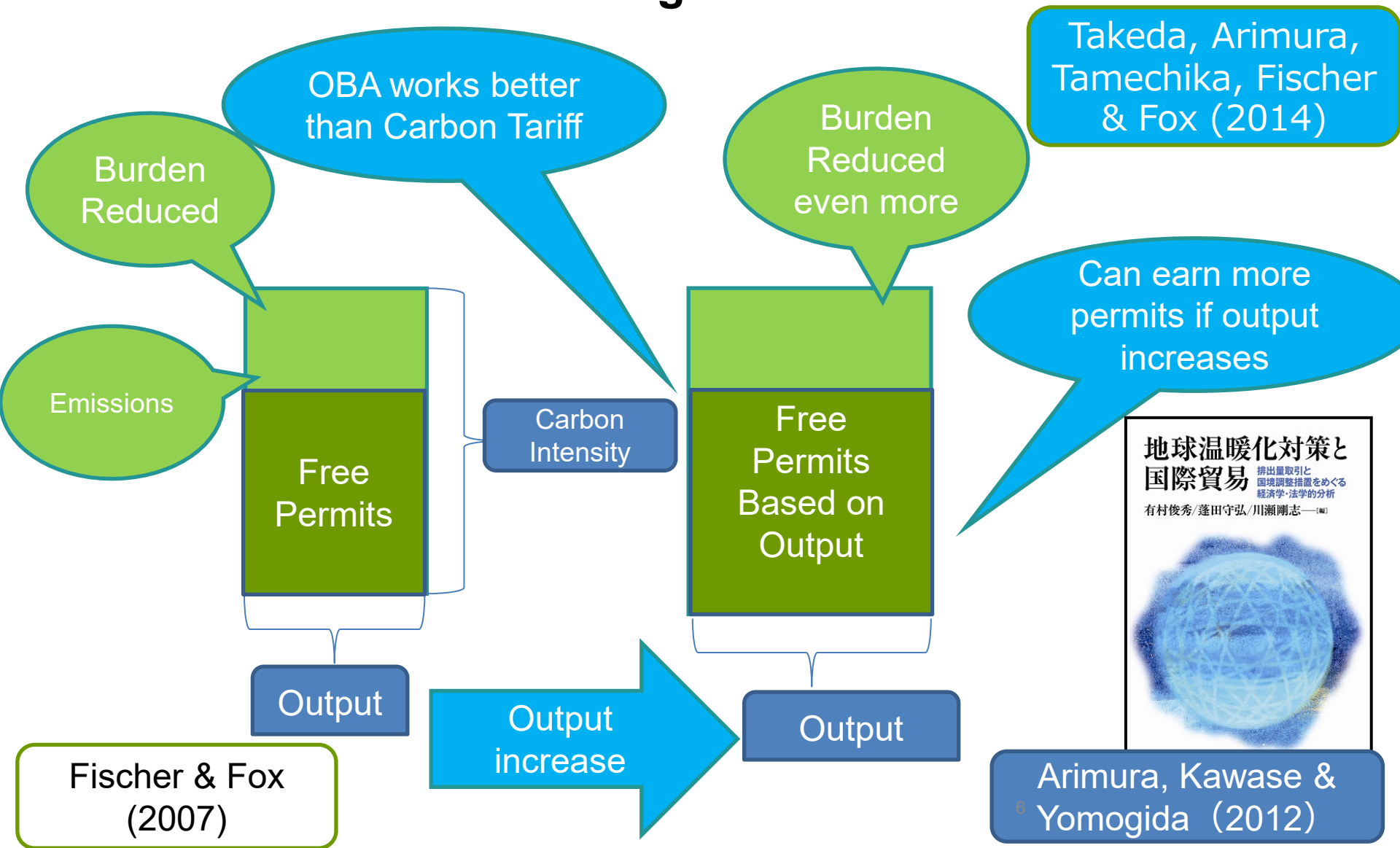


## 2.2. Competitiveness & Leakage (1) Grandfathering (Free Allowances)



# 2.2. Competitiveness & Leakage (2)

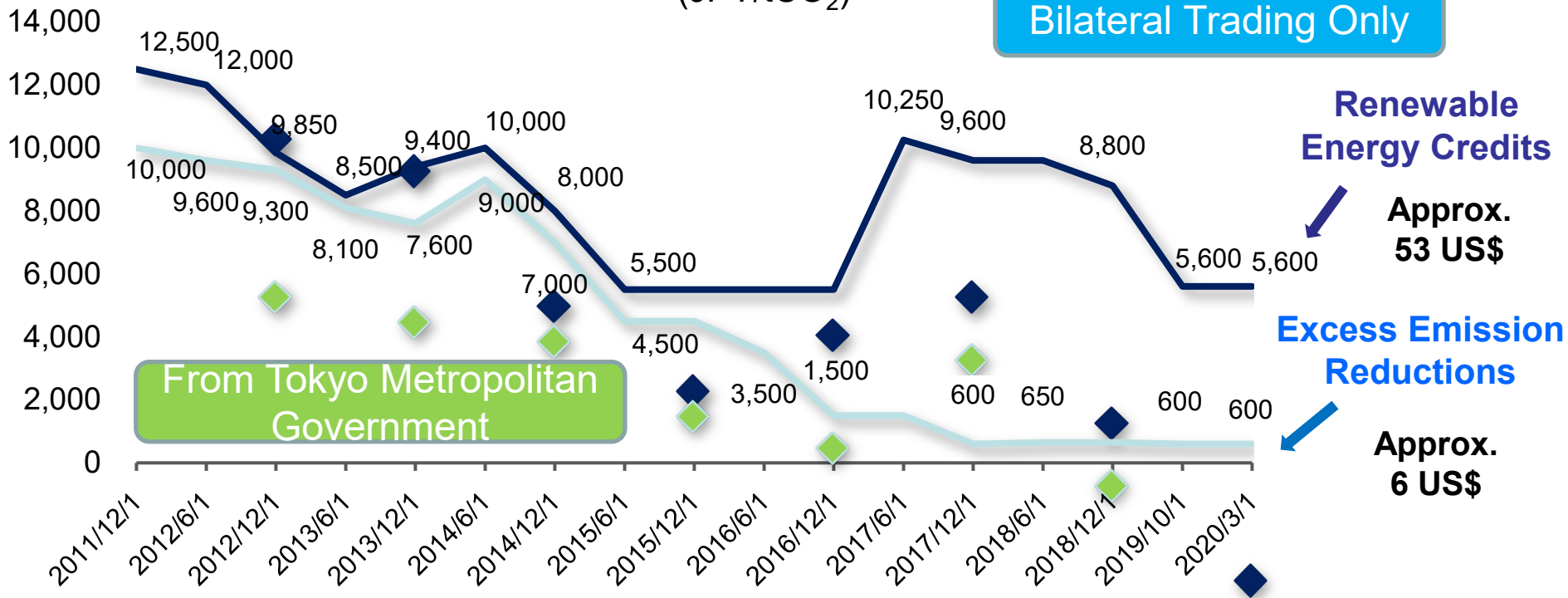
## Output Based Allocation for Sectors with Carbon Leakage Concerns



# 2.3 Uncertainty of Prices

## Transition of Permit Prices in Tokyo ETS

Change in prices of Excess Emission Reductions and Renewable Energy Credits (JPY/tCO<sub>2</sub>)

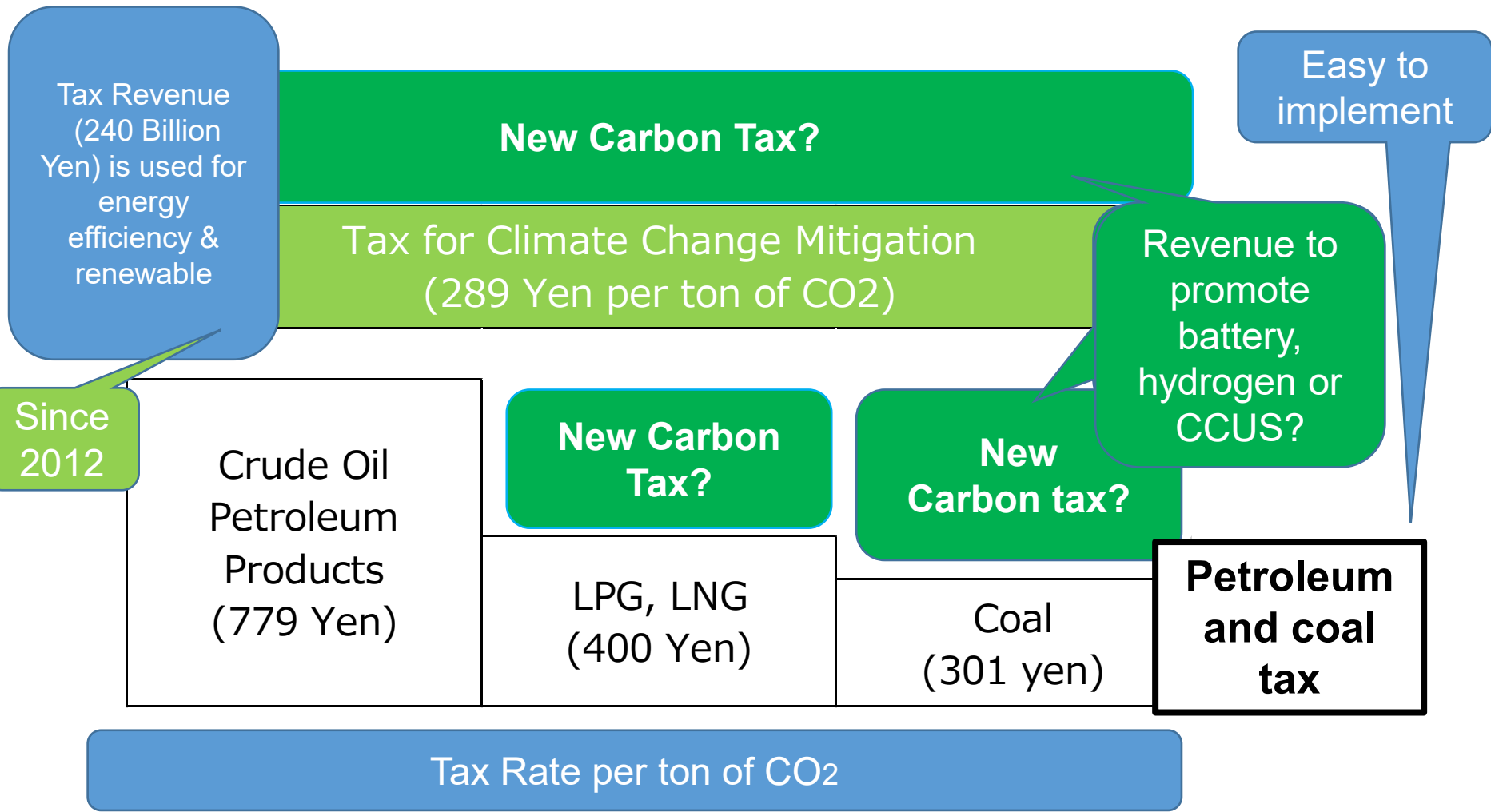


Price Floor

Safety Valve

Market Stability Reserve

# 2.4 Effective Carbon Rate: New Carbon Tax?



Based on the Carbon Pricing Committee under Ministry of the Environment, Japan



## 2.4. Voluntary Credit Market: *Discussion under METI*

ESG Investment &  
Financial Sector

Participation  
by individual  
firm (not by  
industrial  
associations)

**【GX League】**  
Firms with an ambitious GHG emission target  
can participate in this GX league. They pledge  
their goal/targets and deliver emission  
reductions.

If they cannot  
deliver the  
reduction, they  
may face CP?

Creation of Carbon Credits

Credit Purchase

**Carbon Credit Market**

Non Fossil Fuel Credits

JCM

J-credit

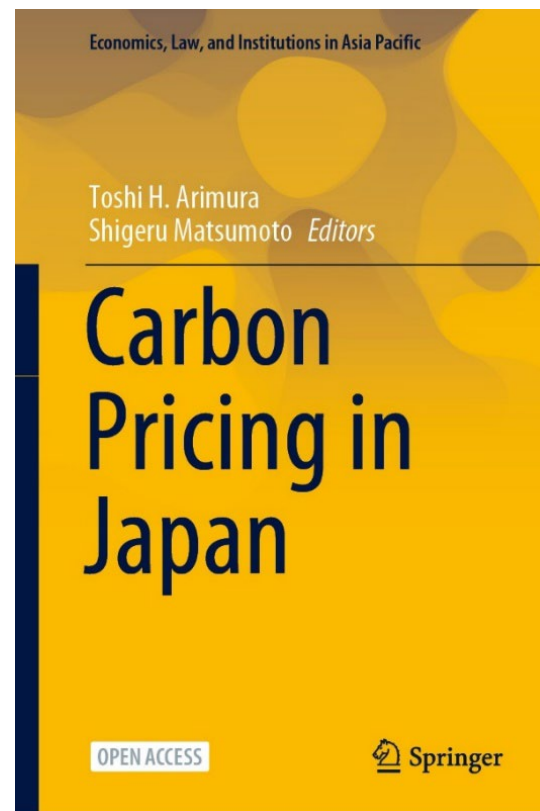
Voluntary credit

Create a single market of voluntary credits, which help to increase the supply of credits with quality.

**Based on METI's recourse.**

## 3. Summary

1. In theory, carbon pricing can reduce emission efficiently.
2. In practice, there are some practical issues. However, government can provide remedies for each issue.
3. Could the GX league and a voluntary credit market lead to the expansion of renewable energy or the long-term goal of CN?



Arimura & Matsumoto Ed.

# References

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