

Strategies to Address Leakage/Competitiveness Concerns

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**Symposium on Allocation and Leakage/Competitiveness Issues of Emissions
Trading Schemes, IGES, 12 March 2009, Tokyo International Forum**

SWP
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12 March 2009

Outline

- Background
- Competitiveness studies
- Results on costs and trade intensity
- Some results on leakage potential from the EU ETS
- Addressing carbon leakage

Background

The EU's Approach on Carbon Pricing

- EU Emissions Trading Scheme (ETS) as part of climate policy to meet Kyoto target
- EU carbon pricing – early mover, Phase III 2013-2020 decided in Climate Package 2008 with an increasing share of **auctioning** and a **decreasing cap**
- For a global climate deal post2012 the EU suggests an **OECD-wide carbon market** by 2015 (plus major emerging economies until 2020)

International Climate Policy and Different Regional Carbon Pricing

■ Mid- to Long-term means to level carbon costs:

- a **global climate deal** on carbon constraints
- a **global allowance market** (see ICAP)
- **sectoral agreements**

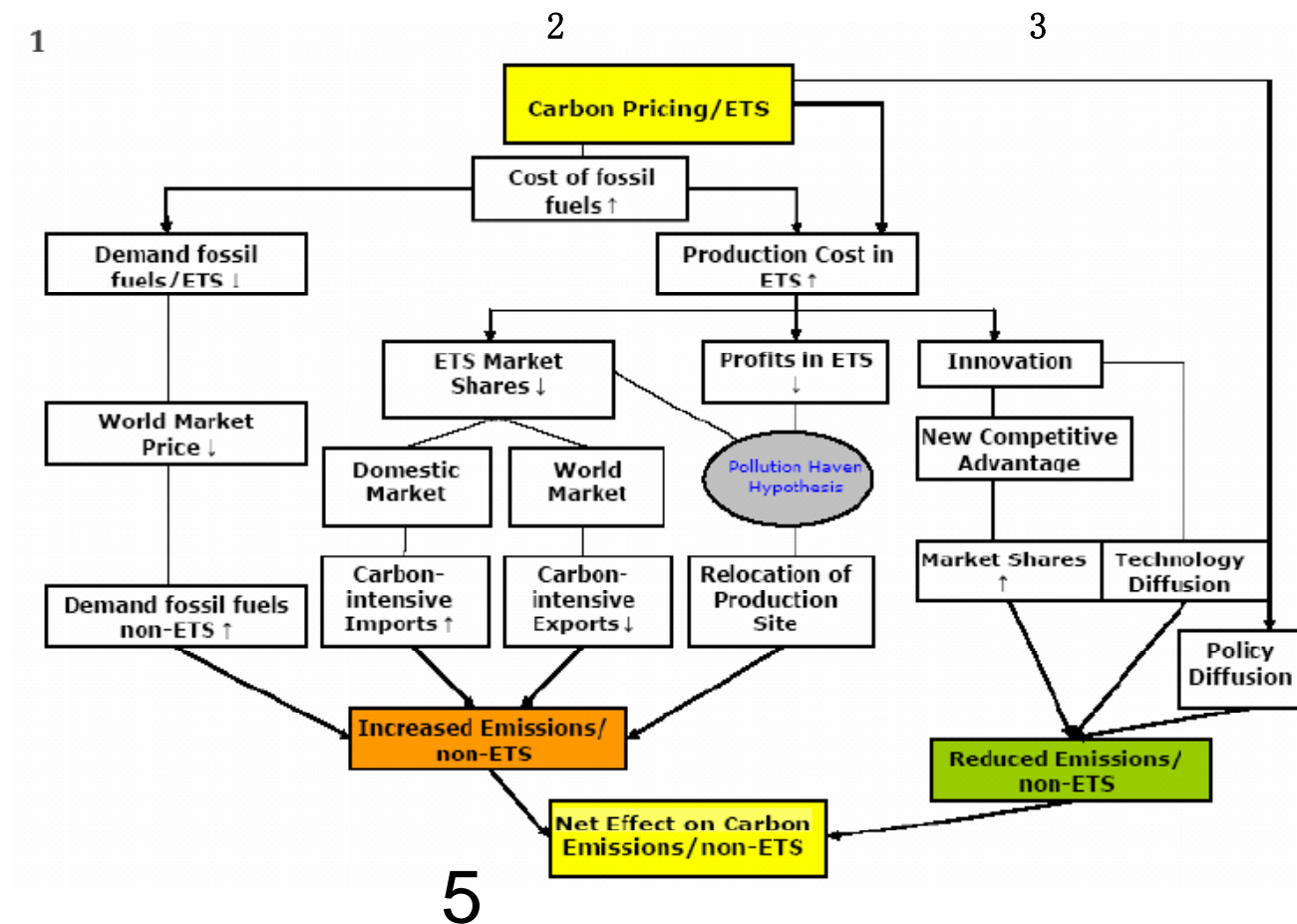
■ **Short-term:** cost equalisation for actors contributing to the leakage phenomenon

- within the ETS design: **free allocation**
- within or outside the ETS design: **subsidies/state aid/other cost reductions**
- at the border: **tariffs, allowances rules**

The Issue: Environmental Effectiveness

- **Carbon leakage** – rising global emissions due to unilateral climate policy? Rate: $\frac{\Delta \text{GHG outside EU ETS}}{\text{GHG reduction within EU ETS}}$
- **Analyses:** CGE (Kyoto Protocol) or sectoral (**competitiveness**)

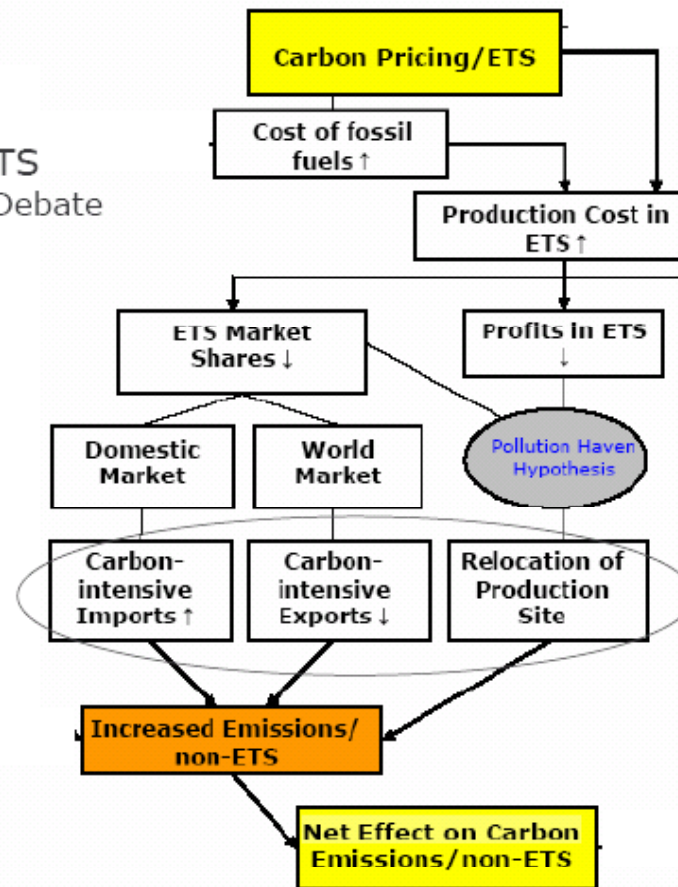
Leakage channels



The EU ETS Leakage Debate: Potential Effects from Unilateral Carbon Pricing

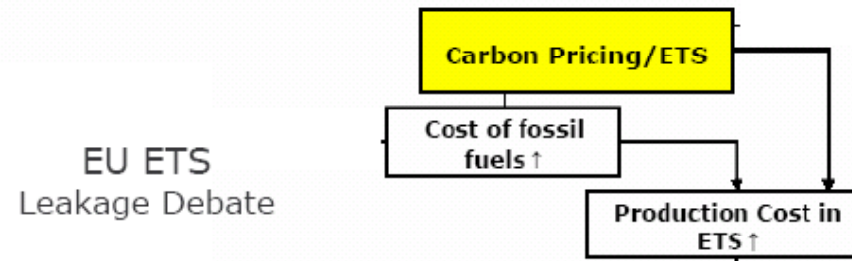
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EU ETS
Leakage Debate

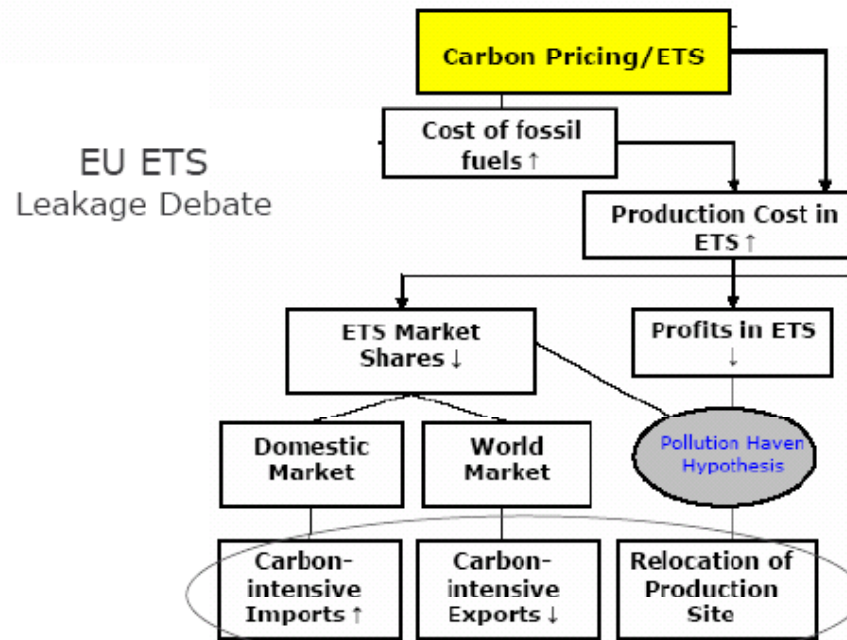


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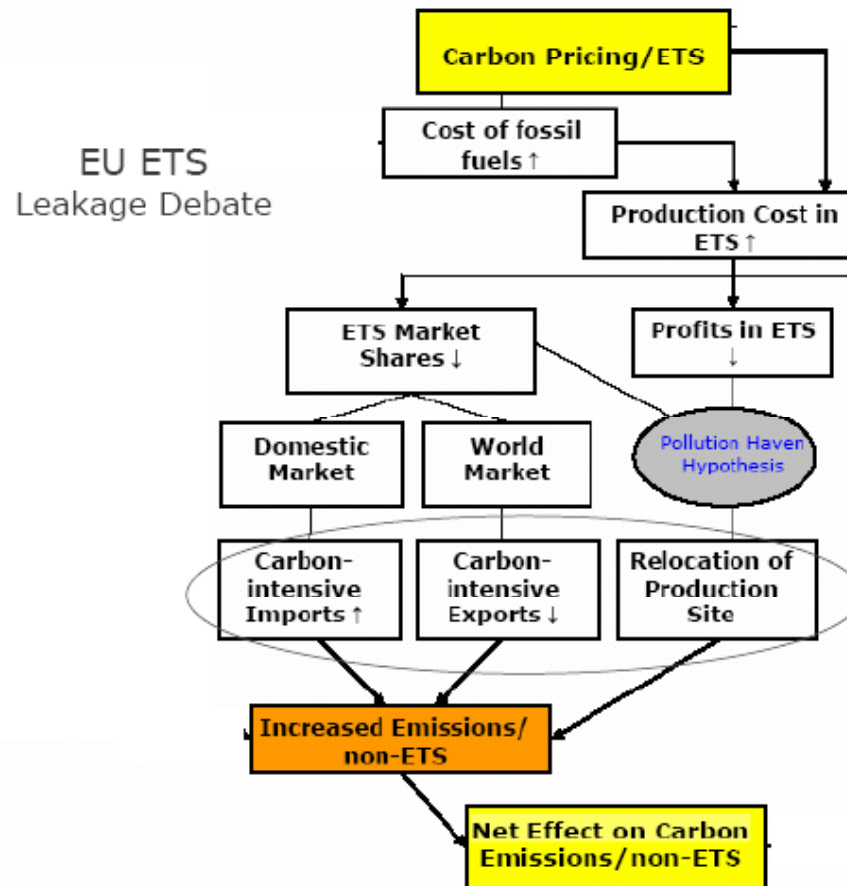
The EU ETS Leakage Debate: Potential Effects from Unilateral Carbon Pricing



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EU Climate Package – Identification of Sectors „significantly at risk“

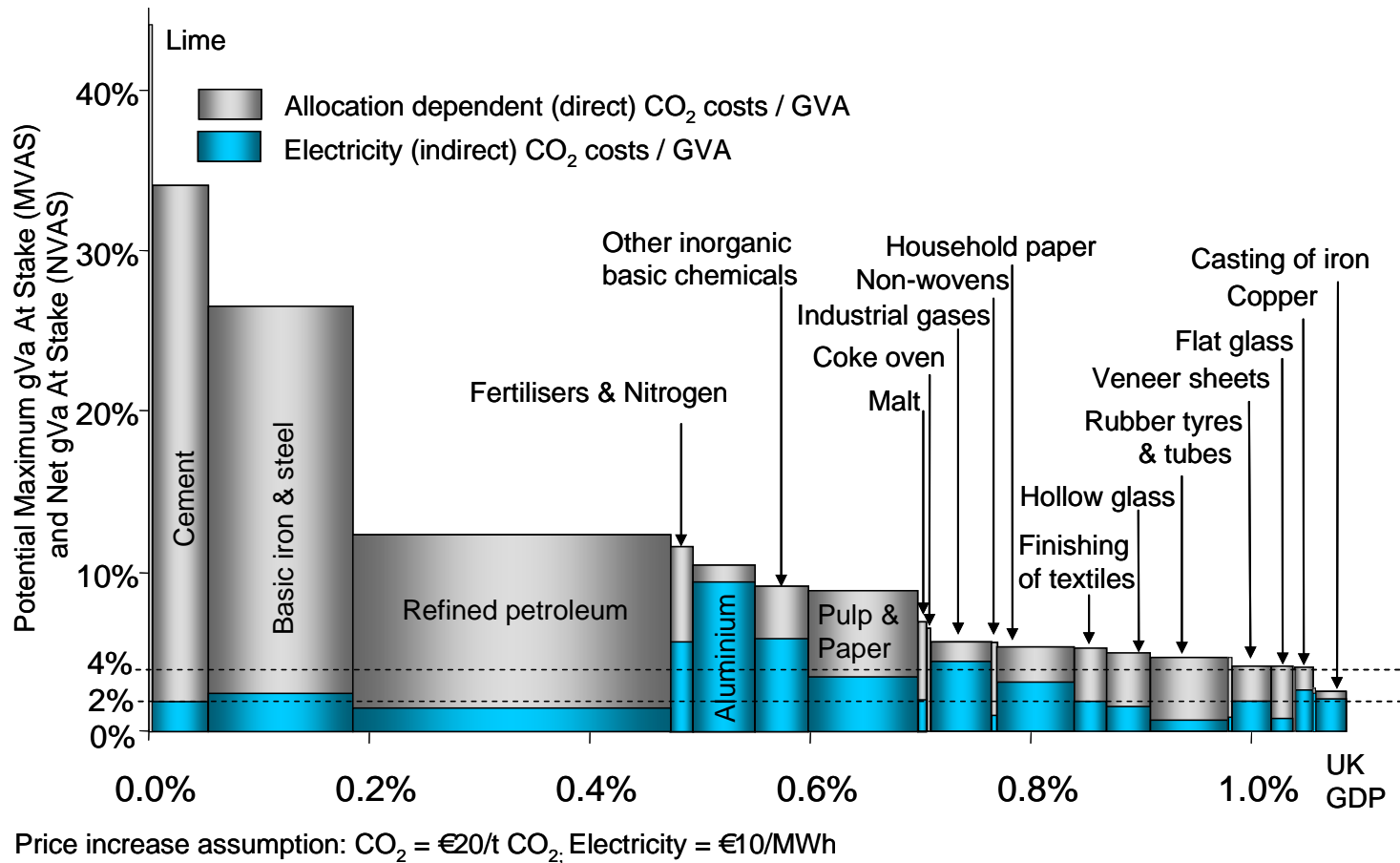
- How big is 'significant'? – $\geq 5\%$ **cost impact** on GVA (direct and indirect) **and** $> 10\%$ **trade intensity** (non-EU), $\geq 30\%$ cost impact **or** $> 30\%$ trade intensity
Compensation for **indirect costs** allowed at state level
- **Criteria** (and benchmarks) apply only at EU **aggregate** level.
Implications for different EU member countries? Different dependencies (e.g. power sources)? Different facilities (e.g. geographical location)? NACE 3 or 4, Prodcom8?
- **At what carbon price?**
 - at $\text{€}20/\text{tCO}_2$, list confined to small no. of sectors, but might expand rapidly at much higher carbon prices
 - Carbon price will inter alia hinge on share of **auctioned** allowances and **benchmarking**
- How to adjust to **international climate process?**

Competitiveness Studies

Impacts of the EU ETS on Industrial Cost Structures

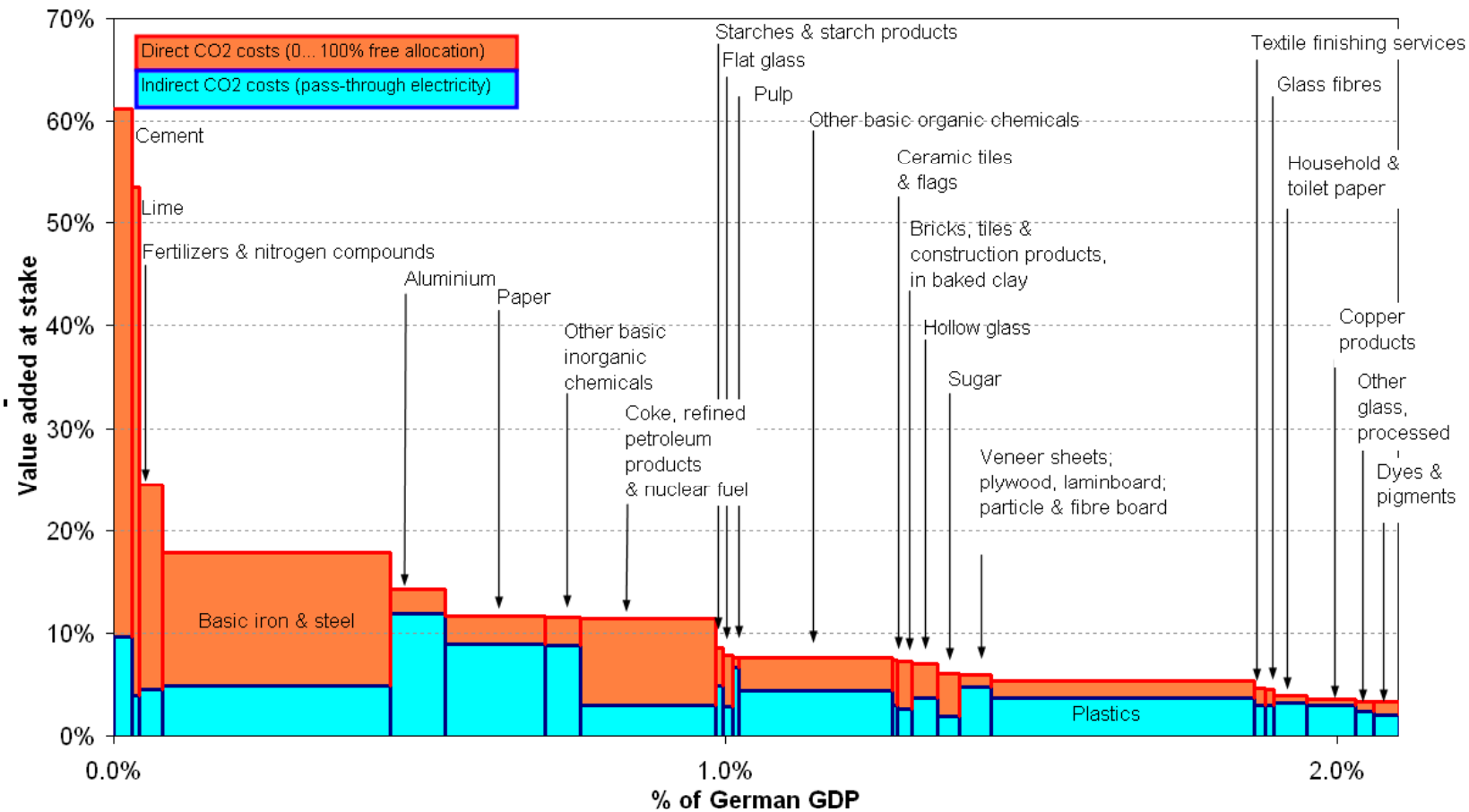
- Effects from carbon pricing:
direct and **indirect** operation cost increase
- Cost recovery depends on ability to **pass** them **through**
- Pass-through depends on:
 - International/national **competition**
 - Regulation (indirect costs)
 - **Market structures**
 - **Abatement** costs → reducing emissions or electricity consumption
 - **Share** of carbon costs in overall cost structure, elasticities (demand, substitutes)

Cost screen: Sectors potentially exposed to unilateral CO₂ pricing (€20 t/CO₂) - UK



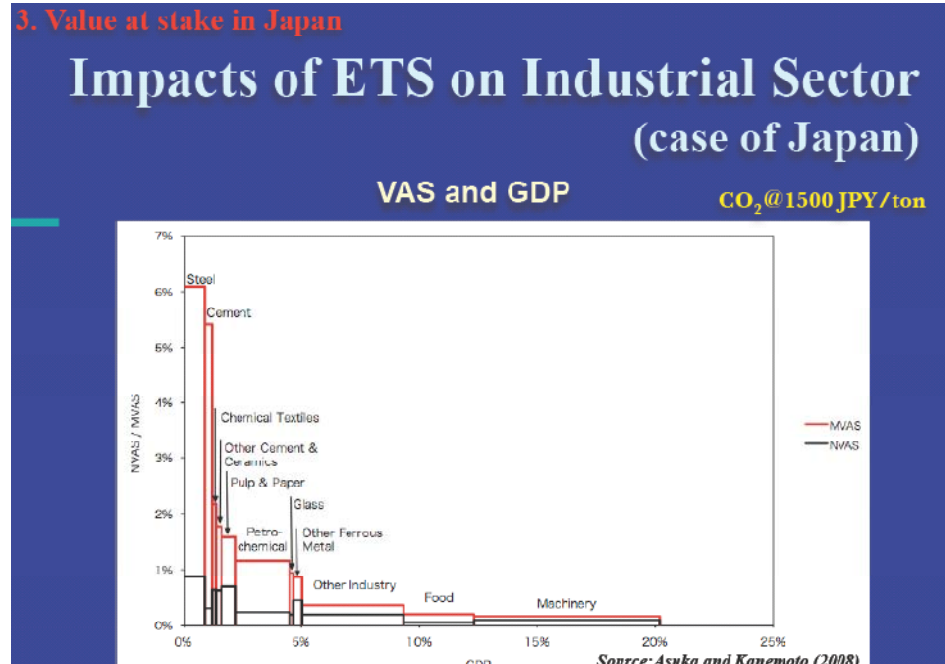
Source: Hourcade Demailly, Neuhoﬀ and Sato:
Differentiation and dynamics of EU ETS industrial competitiveness impacts. 2007. Data: 2004

Cost screen: Sectors potentially exposed to unilateral CO2 pricing (€20 t/CO2) - Germany

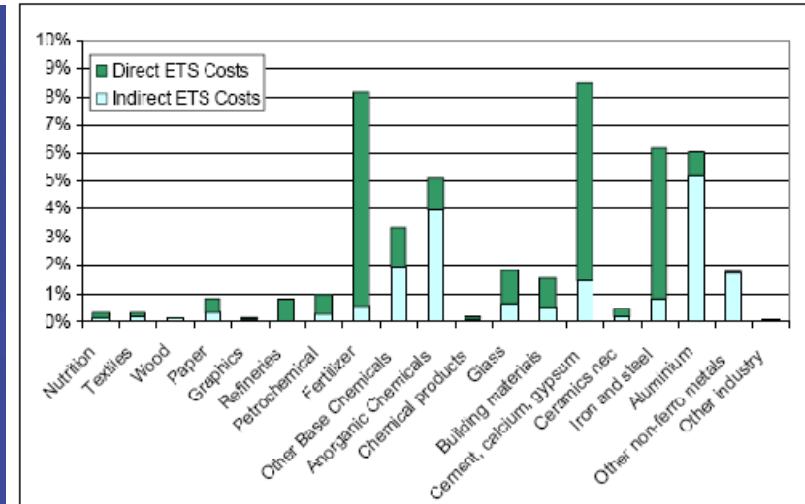


Source: Graichen et al. 2008, Data Base: 2005

Other Studies: Japan, Netherlands



Japan: Asuka and Kanemoto 2008



Netherlands: De Bruyn et al. 2008

Summary: National Competitiveness Studies

- Some sectors cannot recover carbon costs in their resp. markets (home and abroad) as this would impact demand, profitability, market shares → **loss of competitiveness**
- This is potentially contributing to carbon leakage due to **operational** and **investment** decisions
- Other factors for competitiveness/pass-through position:
 - Capacity utilisation (+/-)
 - Transport cost and other barriers (-)
 - Quality and product differentiation (-)

→ **not all factors work in the same direction!**

From Competitiveness to Carbon Leakage

- Competitiveness effects determined by **profits** and **market shares** of producers
- Translate into **investment and production** decisions under carbon pricing

Leakage follows from:

- (A) **Relocation** potential of carbon-intensive producers
- (B) **Substitution** of production through imports

- (C) **International markets**, mainly energy markets, depending on substitution elasticities → feedback loops

Results on Cost Impact and Trade Intensity

Measuring the Cost Impact

- **Concept** of 'value at stake': The sum of potential direct and indirect costs in relation to gross value added (GVA)

- **Indirect costs**: Electricity \cdot estimated pass-through of CO₂ purchase costs to electricity prices

- **Direct costs**:
 - emission intensity of production
 - energy emissions: fuel input \cdot emission factors
 - process emissions: based on data from the GHG inventory

Challenge: Evaluating Cost Structures

- **Data** issues: lack of European data on cost structures in industries identified
- Energy/CO2 intensity as a **proxy** for CO2-price cost impact?
- **Value** of analysis **limited**, analysis on physical units instead on expenditure needed for cost structures

Trade Intensity

- Measure applied relates all exports and imports from the region to overall market volumes (turnover and imports)

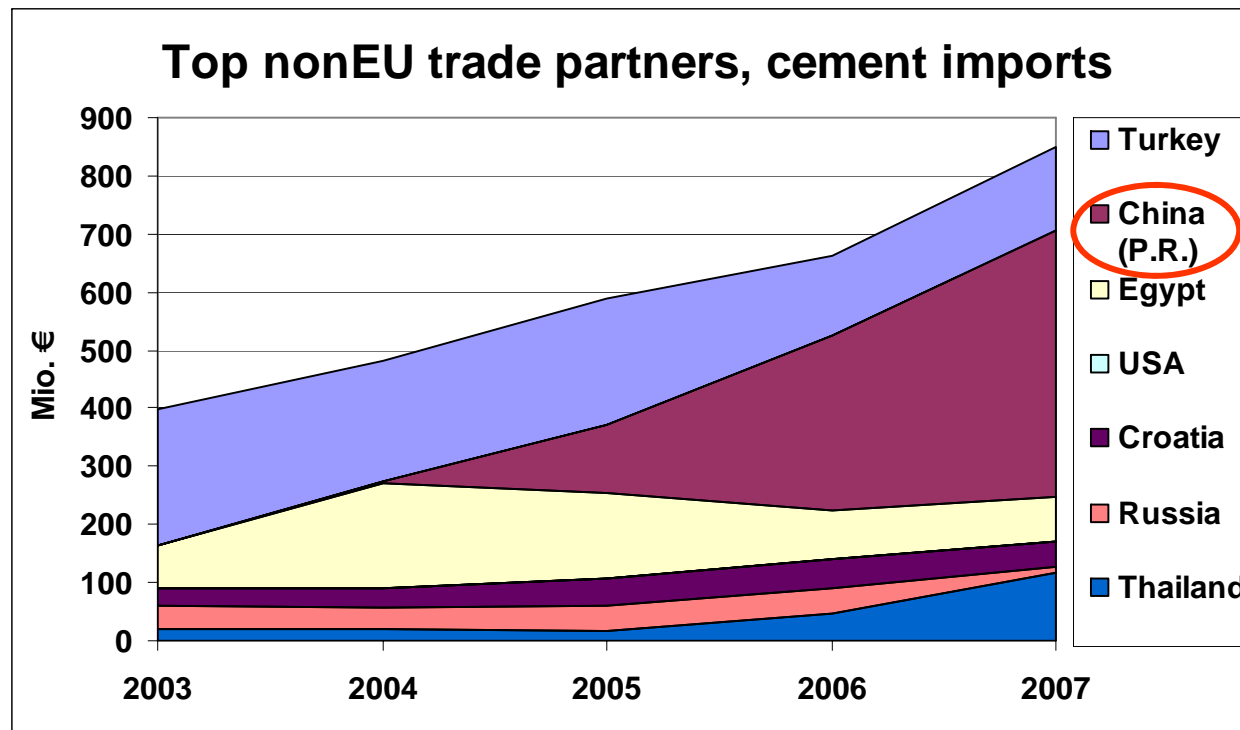
$$\text{TradeIntensity} = \frac{\text{Exports}_{\text{regional}} + \text{imports}_{\text{regional}}}{\text{turnover} + \text{imports}_{\text{total}}}$$

Ranking by trade volume of main trading partners of EU-27

	NACE	USA	Russia	China	Norway	Switzerland	Turkey
Aluminium	27.42	4	2	6	1	3	
Basic iron & steel and ferro-alloys	27.10	4	2	3		6	1
Other basic inorganic chemicals	24.13	1	4	2	3	(7)	
Fertilizers & nitrogen compounds	24.15	3	1		2		
Paper & paperboard	21.12	1	3	5	4	2	6

Source: Mohr; Graichen; Schumacher (2009)

Top non-EU import partners of EU-27 for Cement 2003 - 2007



Source: Mohr; Graichen; Schumacher (2009)

Results for trade interaction of 5 energy-intensive EU sectors

- Shares of intra-/extra-EU trade have been rather **stable** (2003-2007)
- Import/export relation of non-EU partners: major **change** in basic iron & steel (imports 2003: 44% to 2007: 57%)
- Main trading partners of the EU-27 are similar across the 5 sectors investigated
- Six main trading partners in each sector account for half of non-EU trade
- ETS-partners (Norway, Iceland, Liechtenstein) have to be excluded from further analysis

Some Results on Leakage Potential

Analyses of Energy-Intensive Industries under the past EU ETS

- IEA: output growth in heavy industry 1981 – 2005 took place **outside** Europe
- *Simulations on **Cement**: 40 – 70% at 20€/t Co₂;
*Simulations on **Iron and Steel**: 0.5 – 25% at 20€/Co₂
- **Aluminium**: affected through electricity prices, given long-term contracts with power suppliers and booming demand during the last years – forecast of Co₂ pricing difficult
- *Sources: Gielen et al 2000, Demailly et al 2006, 2008, Ponssard et al 2008, Reinaud 2008; Reinaud&Quirion (forthcoming), Walker&Quirion (forthcoming).

Potential Carbon Leakage from EU ETS Phase III

EU ETS analysis on Cement, Aluminium, Steel, Electricity:

- **Model CASE II** (2012→2016) with **full auctioning and no carbon pricing abroad**: Average leakage rate from the four sectors in EU: **10%**, but high variations
- Leakage scope is **limited**, even in „extreme“ case (auctions and unilateral action). Investment decisions are key, but subject to information gap

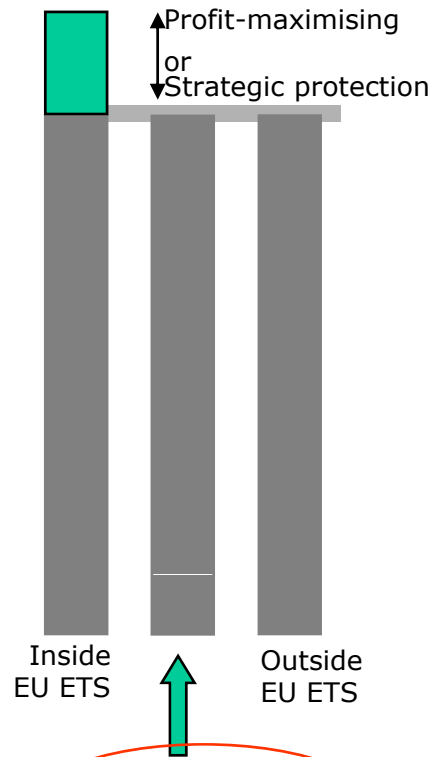
Addressing Carbon Leakage

Best Case

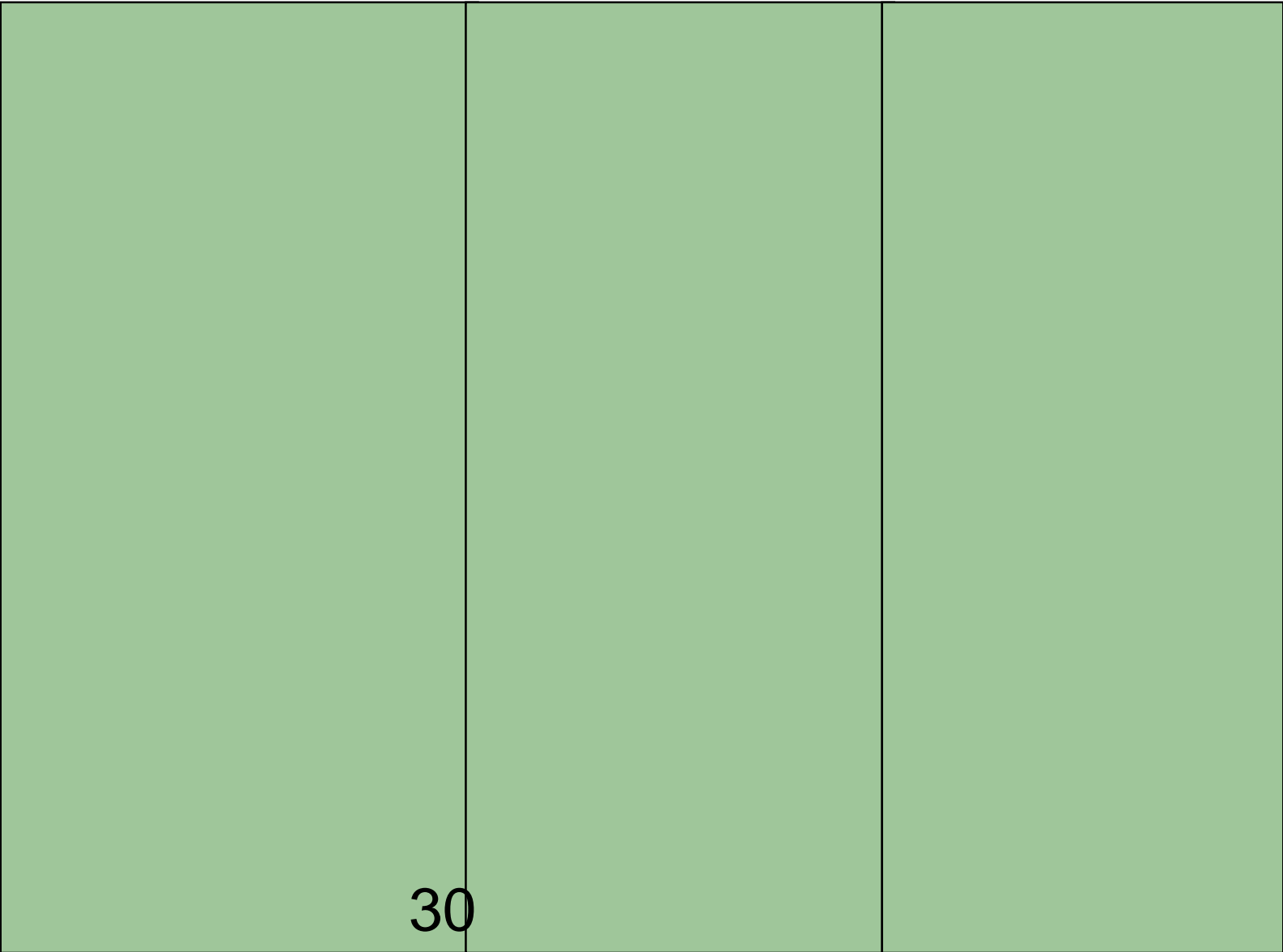
- **Tayloring** cost compensation along leakage channels and along sectoral characteristics
- Regular **revision** in the light of technological advancements, trade flows, international efforts esp. in trade partner countries
- **Available tools** could address sector-specific structures and exposure:
 - **(a) free allocation**
 - **(b) direct compensation/state aid**
 - **(c) border adjustment**
 - **(d) reduction of non-carbon location costs** (taxes, labour)
 - **(e) international agreements** (countries, sectors)

Options for Addressing Leakage Concerns

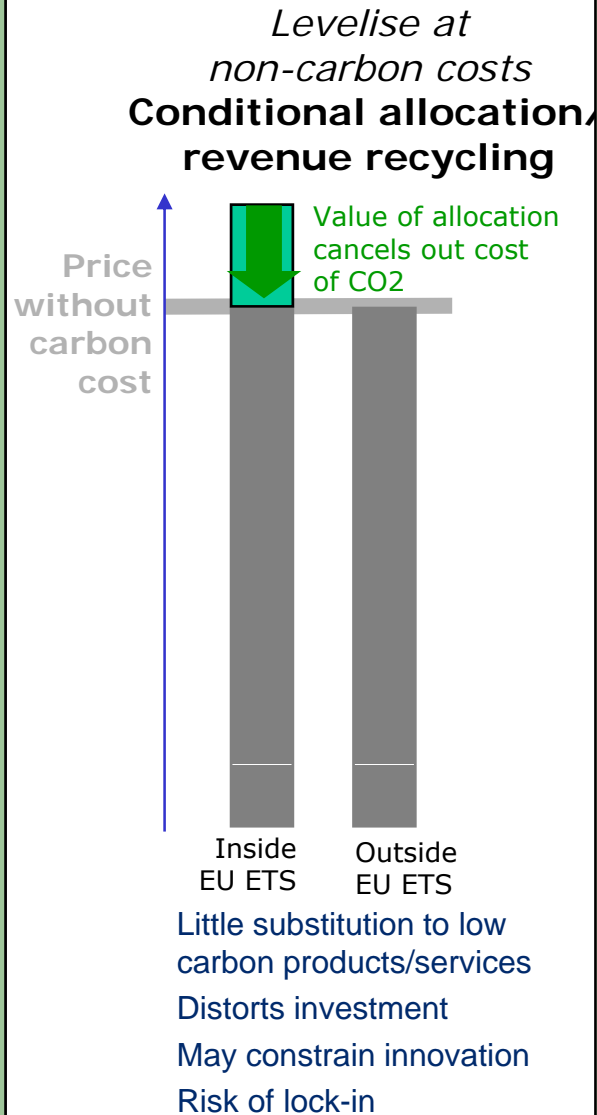
**No mechanism
(fixed free allocation)**



Uncertain trade-off
between profits
and leakage

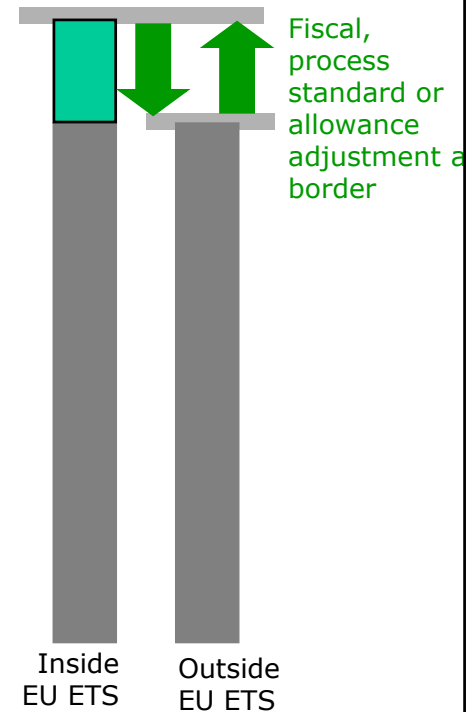


Options for Addressing Leakage Concerns



Options for Addressing Leakage Concerns

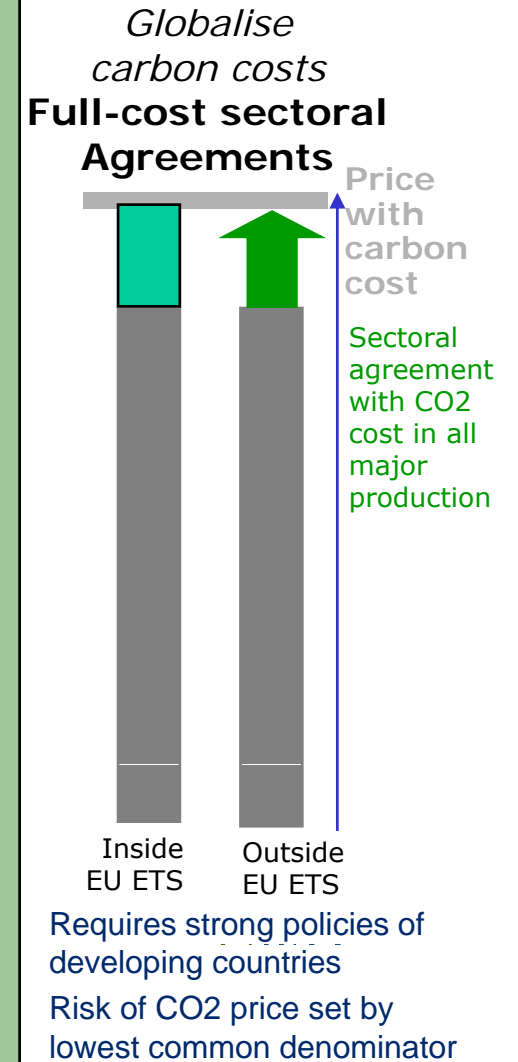
Levelise according to climate standards
Border adjustments



Potential problems with WTO
Not allowed for safeguarding competitiveness
Requires at least informal international cooperation

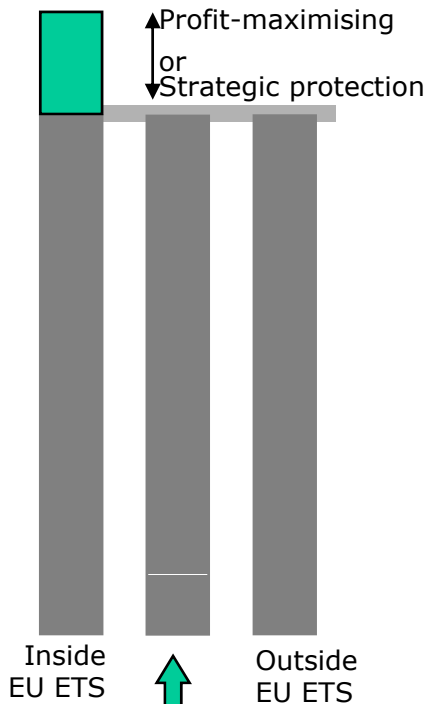
Options for Addressing Leakage Concerns

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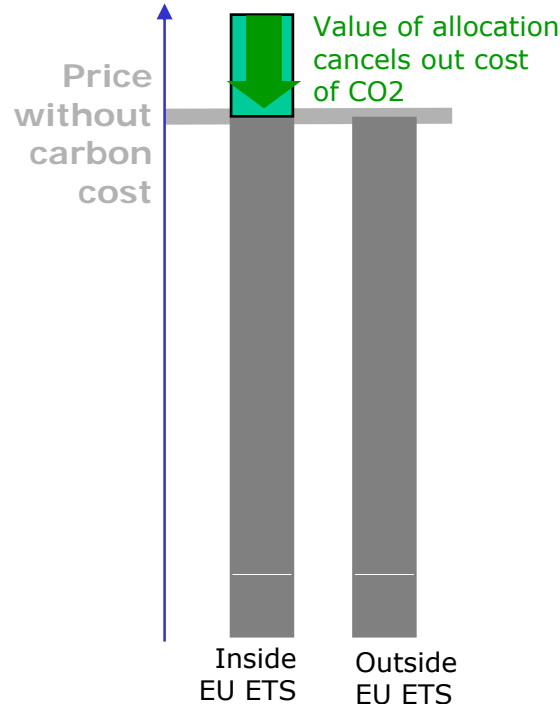
Options for Addressing Leakage Concerns

No mechanism (fixed free allocation)



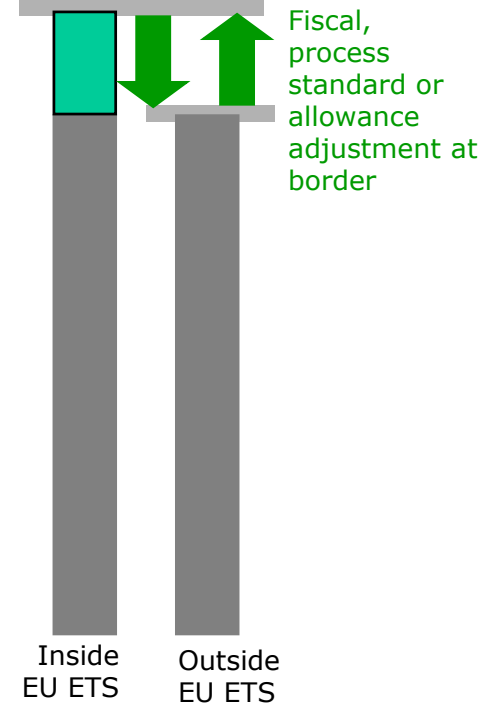
Uncertain trade-off between profits and leakage

Levelise at non-carbon costs Conditional allocation/ revenue recycling



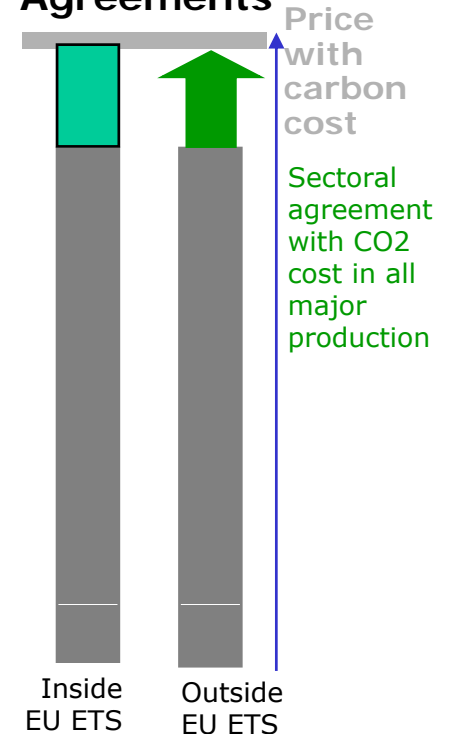
Little substitution to low carbon products/services
Distorts investment
May constrain innovation
Risk of lock-in

Support consistent differential Border adjustments



Potential problems with WTO/trade relations
Requires at least informal international cooperation

Globalise carbon costs Full-cost sectoral Agreements

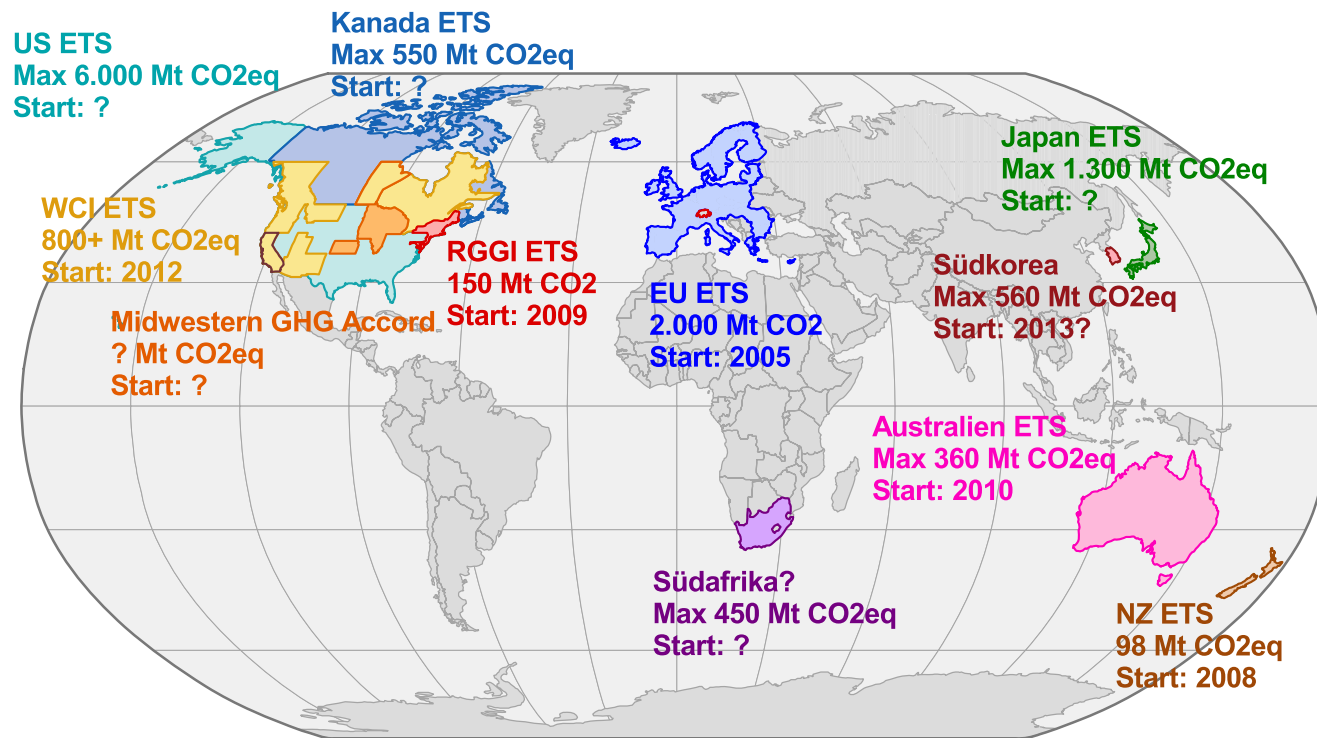


Requires strong policies of developing countries
Risk of CO2 price set by lowest common denominator

Carbon Pricing in Other Regions

- New ETS established by **Australia** and **New Zealand**, starting 2010
 - Regional and national ETS in the **US** (and **Canada**): RGGI, WCI
 - **Japan**: a switch from voluntary to mandatory ETS
 - Debates in other regions **emerge**: S-Korea, S-Africa
 - **Linking** of schemes: EU and Norway, EU and Switzerland; (International Carbon Action Partnership - ICAP Initiative)
- **long-term goal**: international carbon trading

Emerging Emissions Trading Schemes



ETS Design and Competitiveness/ Leakage in Other Regions

- **United States:** Cap and Trade Bill under discussion, past debates showed strong bias for border adjustment (job leakage, competitiveness), currently unclear to what extent it will be included
- **New Administration:** Strong record on climate policy, likely to push for cap-and-trade
- **New Congress:** Broad support for cap-and-trade, divided over design details, especially regarding competitiveness concerns and cost-containment
- **New legislation in 2010?**

ETS Design and Competitiveness/ Leakage in Other Regions

- **Japan:** JETS 2008, test phase as a voluntary ETS, no inclusion of competitiveness concerns
- Discussions on Border Adjustment have appeared, linked with the deliberation of carbon tax/ eco tax and domestic emissions trading scheme.
- **Industry's concerns** (from interviews by Ryukoku University): carbon cost pass through reduces competitiveness, actual carbon leakage from import competition does not occur. However, as carbon cost is covered by companies' profits, this weakens financial capacity and would eventually cause carbon leakage through exit/loss of market share/ investment abroad. Other cost factors and product quality seen as important.
- Preference for international agreement (sectoral)

Thank you very much for your attention!

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Project: Tackling Leakage in a World of Unequal Carbon Prices:

Work Package	Team Members	Affiliation
I: Illustrating Leakage		
Illustrating leakage and framing the EU ETS debate	Susanne Dröge, Manuel Graf Roland Ismer Stéphanie Monjon	SWP - German Institute for International and Security Affairs, Berlin LMU - University of Munich CIRE - Centre for Research on the Environment and Development, Paris
II: Measures to address leakage		
1 Sectoral analysis for EU and other regions*		
1.1 The Polish power sector	Wojciech Suwala, Mariusz Kudelko	MEERI - Mineral and Energy Economy Research Institute of the Polish Academy of Sciences, Cracow
1.2 A multi-sectoral analysis for aluminium, cement, electricity, steel	Philippe Quirion, Stéphanie Monjon	CIRE
1.3 CO2 price impact on industrial cost structures	Katja Schumacher, Lennart Mohr	Oeko - Oeko-Institut, Berlin
2 Border tax adjustment for EU-China trade	Tancrede Voituriez Xin Wang	IDDRI - Institut du developpment durable et des relations internationals, Paris
3 Legal and institutional analysis of border tax adjustment	Roland Ismer Karsten Neuhoff Matthieu Wemaere	LMU Cambridge University , Electricity Policy Research Group IDDRI
III: Political analysis of using border adjustments to address leakage		
1 US-EU Relations	Harro van Asselt Thomas Brewer Michael Mehling	IVM Institute for Environmental Studies, Amsterdam Georgetown University , Washington University of Greifswald
2 Japan	Yukari Takamura Yasuko Kameyama	Ryukoku University Kyoto National Institute for Environmental Studies , Japan
3 Implications for the Post 2012 global climate regime	Susanne Dröge Anne Koch	SWP
* associated research groups:	Pedro Linares Jean-Pierre Ponssard	Instituto de Investigación Tecnológica , Madrid Ecole Polytechnique , Paris