

Allocation based on benchmarks under the EU ETS

**Symposium on allocation and leakage/competitiveness
issues of emissions trading scheme**

The Institute for Global Environmental Strategies (IGES)

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The EU Emissions Trading Scheme

Some background information (1)

- **The EU ETS is a multi-national ETS**
 - 27 EU Member States, 2.2 (2005) → 2.4 bn t CO₂e (2013)
 - Linking: CDM & JI, Norway, Iceland, Liechtenstein, etc
- **The EU ETS is a downstream ETS**
 - Power generation
 - Combustion installations > 20 MW
 - Other installations in energy-intensive industries (cement, iron and steel, glass, ceramics, refineries, etc)
 - From 2013: N₂O emissions from large industrial point sources
 - From 2011: aviation included
- **The EU ETS is a multi-period scheme**
 - Pilot phase 2005-2007
 - Second phase 2008-2012
 - Third phase 2013-2020

The EU Emissions Trading Scheme

Some background information (2)

- **The real world EU ETS is different from textbook-style ETS**
 - Multi-period
 - Allocation more complex than pure auctioning and simple ex-ante (lump-sum) allocation
 - Thus allocation is not only relevant for distribution but also for the efficiency of the scheme
- **The EU ETS includes a series of updating components**
 - Updating of base periods between the phases
 - for production
 - for emissions
 - Free new entrant allocation from the New Entrant Reserve (NER)
 - Plant closure provisions

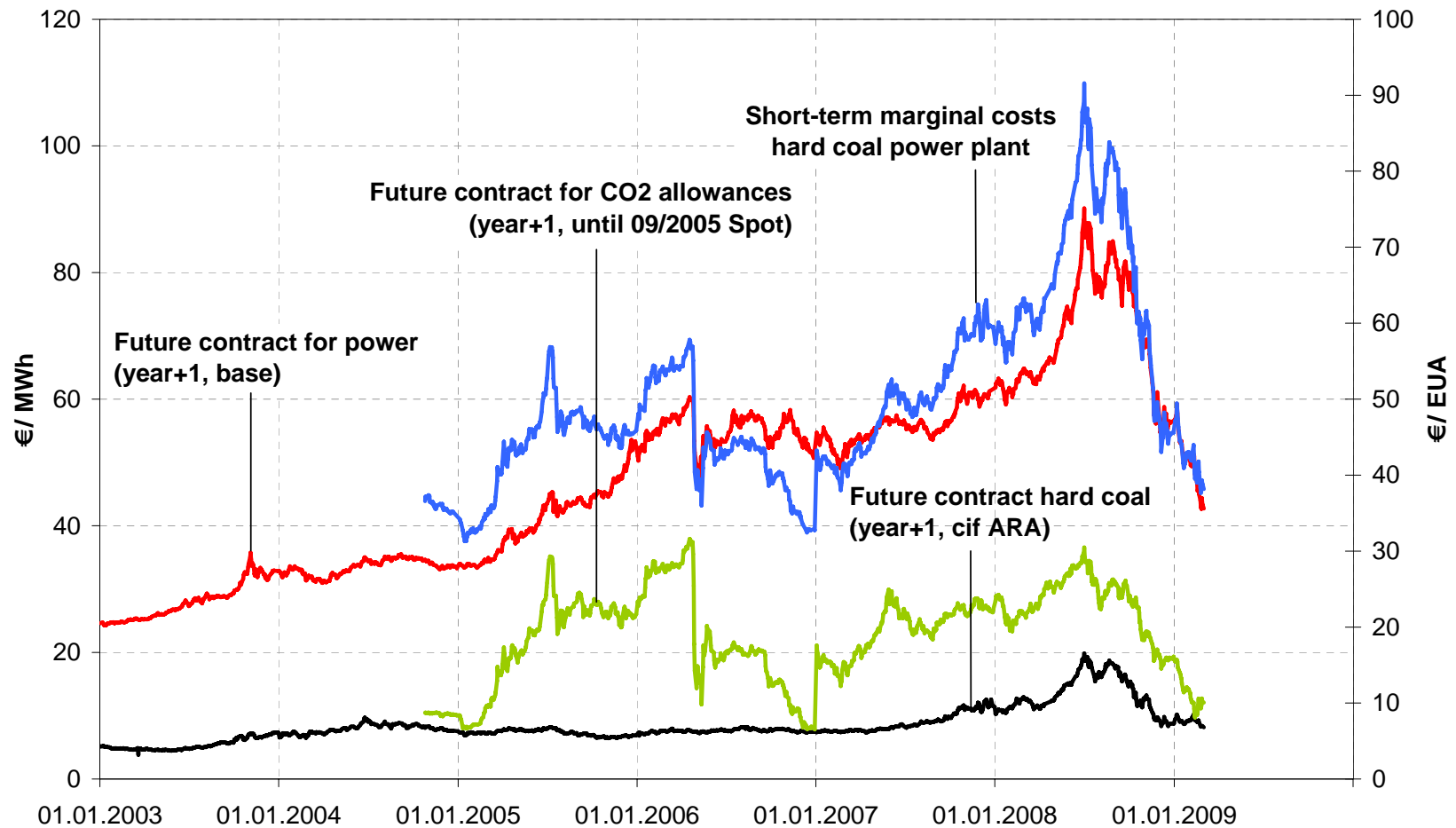
The EU Emissions Trading Scheme

Some background information (3)

- **Free allocation under the EU ETS is strictly based on ex-ante allocation**
- **Only participants of the EU ETS can receive free allocation**
- **The allocation approach within the EU ETS changed significantly**
 - 2005-2007: >95% free allocation
 - mostly based on historic emissions
 - 2008-2012: >90% free allocation
 - increasing share of benchmarking
 - 2013-2020: <40% free allocation
 - No free allocation for power generation
 - Free allocation (based on benchmarks) for sectors which face significant problems from carbon leakage
 - Continuous phase-out of free allocation for other industrial sectors by 2027 (based on benchmarks)

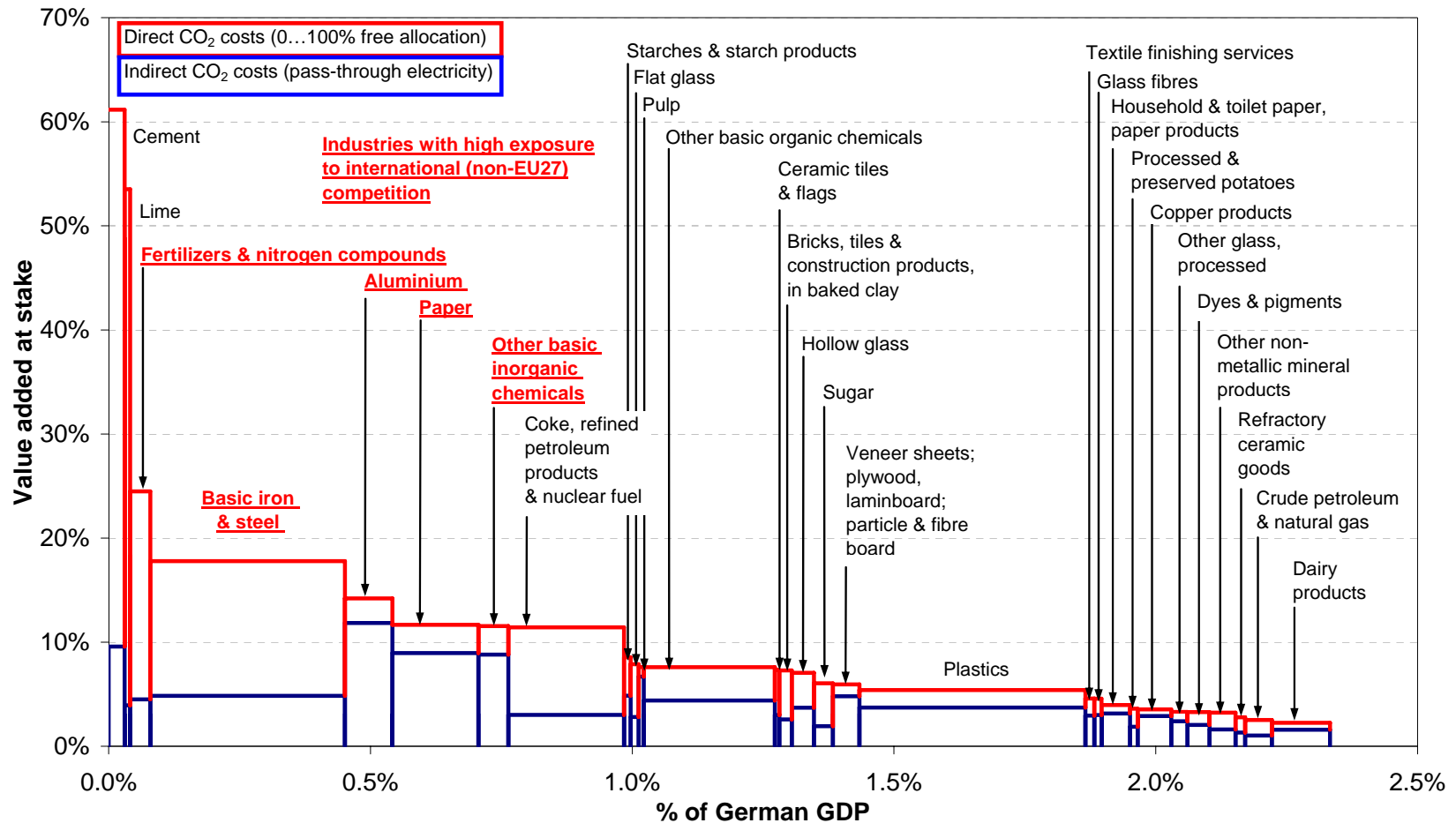
CO₂, coal and power future contracts

Pass-through of full CO₂ costs



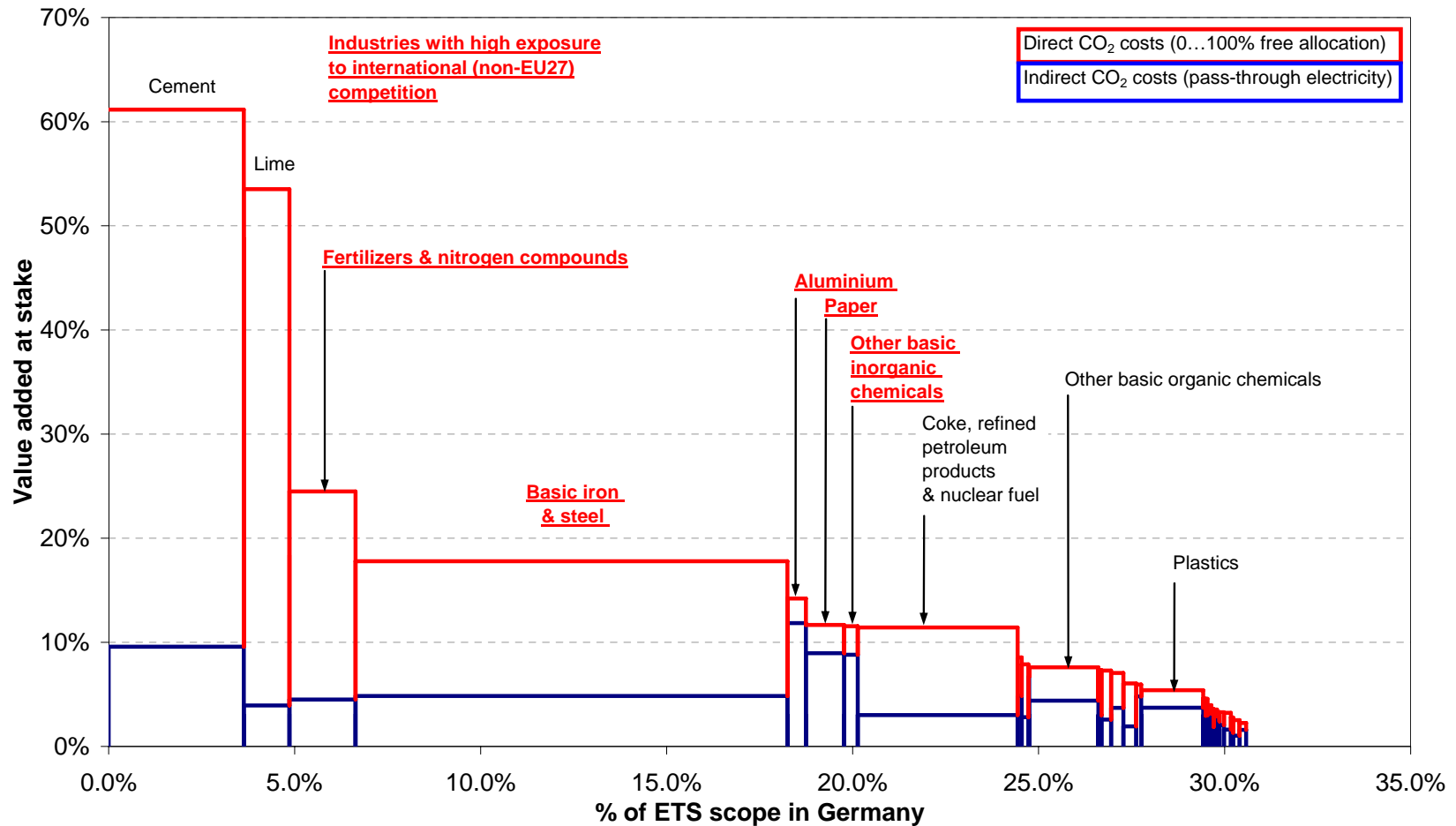
Different competitiveness effects

Direct and indirect CO₂ costs in DE (1)



Different competitiveness effects

Direct and indirect CO2 costs in DE (2)



Free allocation under EU ETS

The role of benchmarking

- **Free allocation is an approach to deal with carbon leakage**
 - Not for all potential leakage problems and probably not the most appropriate
 - However, it (still) exists under the EU ETS
- **Benchmarking (BM) is an approach for free allocation**
 - BM can reward early action
 - BM can avoid (some) distortions of the CO2 price signal
 - BM adds complexity to the EU ETS
- **(Free) allocation/ BM is not only a distributional problem**
 - Impact on dynamic and allocation efficiency
 - Limiting the potential of distortions is important
- **The focus is on Europe-wide benchmarks**
 - To limit distributional and efficiency problems
- **The EU ETS is about carbon pricing and not on technical standards**

Conceptual issues of benchmarks within the EU ETS (1)

- Allocation is more than one benchmark

Allocation formula

$$A = BM_e \times C \times CF \times AF$$

A free allocation [EUA]

BM_e emission benchmark [t CO₂/t product]

C capacity

CF capacity usage (historic or standardized)

AF adjustment factor (to adjust allocation to the cap,
from 2013 system-wide – Art 10a, Nr. 5)

Benchmarking within the EU ETS

Past and future

- **Applications for benchmarking which are not longer on the agenda of the EU ETS**
 1. For the determination of sector caps
 2. For the distribution of sector caps
- **Applications for benchmarking after the revision of the EU ETS Directive (December 2008)**
 3. For (bottom up) free allocation to incumbent installations
 4. For (bottom up) free allocation to new entrants
 5. For the assessment of direct compensations (for indirect costs from the EU ETS)

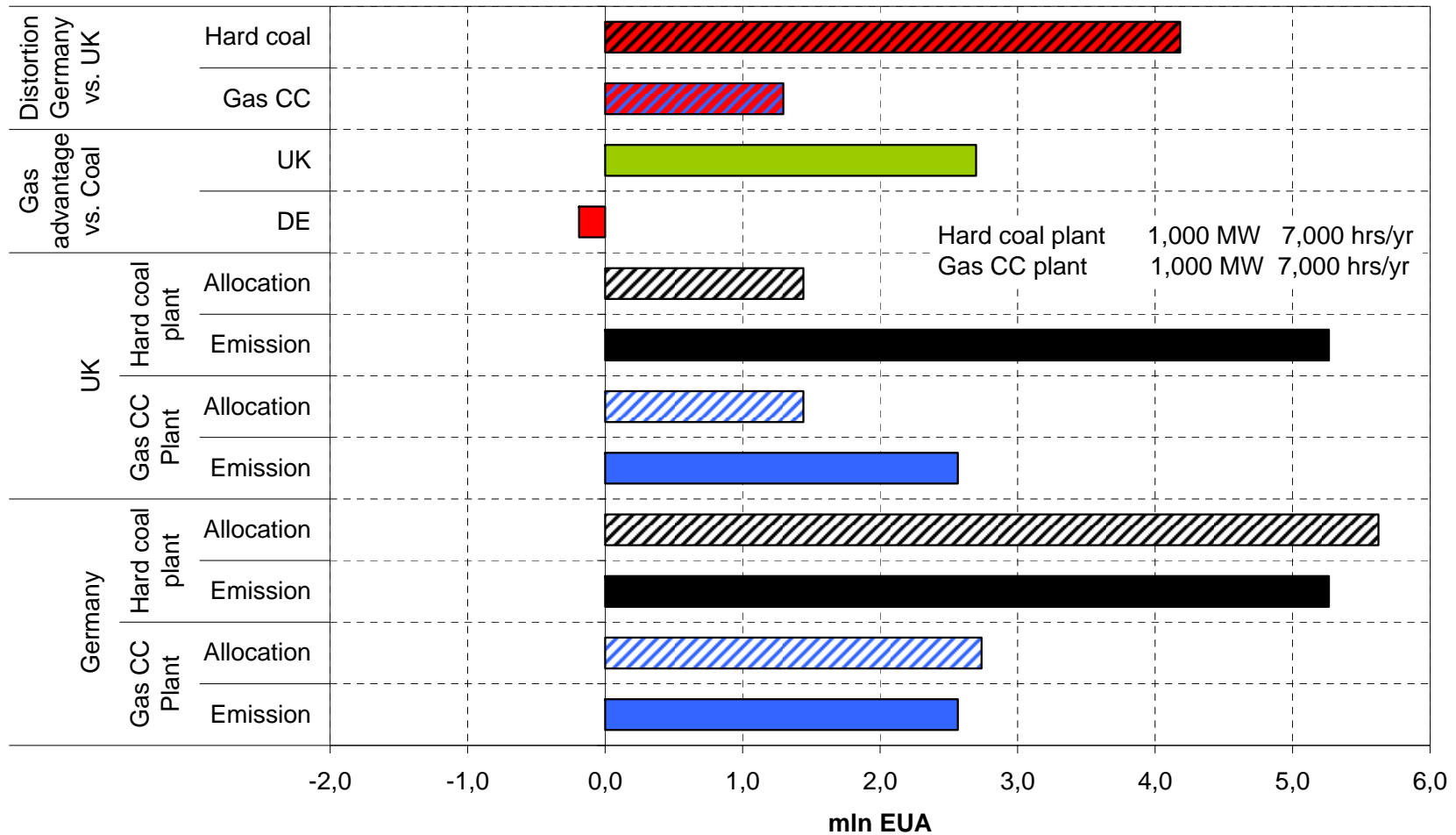
A key target is to make no difference between #3 and #4
- **A clear and precise vision on the application of benchmarking is essential for the design of the benchmarking scheme**

- **Benchmark types**
 - Average level (not under EU ETS post-2012)
 - Best available level (not under EU ETS post-2012)
 - Best achieved level (could play a role, see below ...)
 - Top percentile (10% - language of the rev EU ETS directive)
 - Hybrid (real implementation of the rev EU ETS directive ...)
- **Different dimensions of Benchmarking**
 - Simple & transparent
 - Consistent to the point of regulation under the EU ETS
 - Maintaining a non-distorted CO₂ price signal
 - with regard to updating
 - with regard to new entrants & plant closures
 - No ex-post adjustments
 - EU-wide harmonized (ore even with a wider scope)

Benchmarking and the carbon price signal

CO ₂ price signal creates incentives for			Optimal level of		Optimal intensity for		
			demand/ product innovation	production	CO ₂ (energy, fuel, other inputs)	Energy	
Incentivized optimization is			System-wide		Plant-specific		
Distortion of CO ₂ price signal = loss of economic efficiency = higher allowance prices in future			Comprehen- sive price signal. Least distortion	Price signal for optimal production at given demand	Price signal for optimal specific CO2 emissions at plant level	Price signal for optimal energy efficiency at plant level	
Auctioning			X*	X	X	X	
Free Allocation	No updating	Historic emissions	(X)	X	X	X	
		Updating (incl. new entrant allocation)	Benchmarks based on	All parameters (products, technology, inputs and/or fuels)	(X)	X	X
	Capacity only			(X)	(X)	X	X
	Product-specific only			O	(X)	X	X
	Product- and technology-specific			O	O	(X)	X
	Product-, technology- and input-/fuel- specific			O	O	O	X
	Historic emissions	O	O	O	O		
O - not ensured. X - ensured. (X) - ensured in general, but depends also from other factors. X* - ensured in general, if no carbon leakage can be assumed							

New entrant allocation matters for distribution & efficiency (power 2005/07)



Conceptual issues of benchmarks within the EU ETS (3)

- **BM must be easy to implement at the point of regulation**
 - Cement clinker facility vs. final product cement (output of grinding plant which is not regulated by the EU ETS – and possibly imports cement clinker)
 - Product throughput of refineries vs. benchmarking of a broad range of final products from refineries
- **BM must maintain a non-distorted CO₂ price signal and BM must avoid distortions within the EU**
 - Strictly based on products (cement clinker, EAF steel, oxygen steel, at least <<100)
 - No consideration of process, raw material, country, regional or other specifics, only exception: potential perverse incentives
→ value chain adders
- **BM should not allow operators to optimize allocation by choosing between provisions or outsourcing of installations**

- **Limiting the number of benchmarks for certain product categories**
 - Cement clinker
 - Glass(es)
 - Paper(s)
 - Ceramics
 - Iron and steel
 - etc. etc.
- **Managing benchmarks for complex installations**
 - Clustering of products (e.g. chemical industry)
 - Throughput-based benchmarks (e.g. refineries)
 - Solving the problem of indirect emissions beyond electricity
 - e.g. import of process heat from third installations
 - e.g. export of blast furnace gas to third installations
- **For all issues EU-wide harmonization is a key issue**

Guiding principles for the benchmarking exercise

- **Transparency for the political process, the operators, and the market**
- **As less distortion of the carbon price signal as possible and as less competition distortions as possible**
 - Strictly product-based as the general rule
 - No site-specifics with respect to technology, raw material/fuel, countries & regions, etc.
 - As simple as possible, as complex as necessary
- **In line with best available technology / 10% best, to avoid adjustments by other factors in the allocation formula**
- **Low (transactional) costs / practicability / simplicity**
 - For the development of the benchmark scheme, the operators, and the relevant authorities
 - Based on data from the respective installations
- **Acceptability**

**Thank you
very much**

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- Matthes, F. Chr. et al:

Pilot on Benchmarking in the EU ETS.

Öko-Institut / Ecofys Report for the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety and the Dutch Ministry of Economic Affairs. November 2008.

(http://www.dehst.de/cIn_099/nn_719154/SharedDocs/Downloads/EN/ETS/Perspectives__EN/BM__Pilot__OekoInst__Ecofys__EN,templateId=raw,property=publicationFile.pdf/BM_Pilot_OekoInst_Ecofys_EN.pdf)

- Neuhoff, K., Matthes F. Chr. (Coord.):

The Role of Auctions for Emissions Trading.

Climate Strategies Report. October 2008.

(http://http://www.climatestrategies.org/reportfiles/role_of_auctions_09_oct_08final.pdf)

Backup

Practical examples for benchmarking Past and future (1)

- **The process to develop benchmarks for the third phase (2013-2020) has just started, the framework for benchmarking changed significantly after the revision of the EU ETS Directive**
- **Case study: straight-forward benchmarking for cement**
 - Existing benchmarks show a wide range of differences
 - UK new entrants benchmark
0.856 t CO₂ per t clinker
 - German new entrants benchmark
0.805 ...0.845 t CO₂ per t clinker (depending on chosen technology)
 - Italian benchmark for incumbents
0.8197 t CO₂ per t clinker
 - Proposal from the DE/NL/IT pilot study
757 ... 795 t CO₂ per t clinker (depending on the – political – choice of fuel factor)

- **Case study: complex benchmarking for refineries**
 - Existing approaches show a wide range of methodologies
 - Lithuanian new entrants benchmark
46 t CO₂ per t oil product
 - UK new entrants benchmark
top 10% energy efficiency x 25 kg CO₂/kWh
 - One Proposal from the DE/NL/IT pilot study

$$A = \text{UBM} + a_{\text{crack}} + b_{\text{H}_2} + c_{\text{HFO-gas}} + d_{\text{coke}} + e_{\text{calcin}}$$

UBM	Uniform benchmark (t CO ₂ /t throughput, e.g. 0.1 t CO ₂ /t)
a_{crack}	Adder for crackers (FCCC & ethylene) (t CO ₂ /t throughput)
b_{H_2}	Adder for hydrogen production (t CO ₂ /t H ₂ production)
$c_{\text{HFO-gas}}$	Adder for heavy fuel oil gasification (t CO ₂ /t throughput)
d_{coke}	Adder for coking (t CO ₂ /t throughput)
e_{calcin}	Adder for calciner (t CO ₂ /t throughput)