

## Basics of ETS and EU ETS Part 2: Carbon Leakage and Allocation

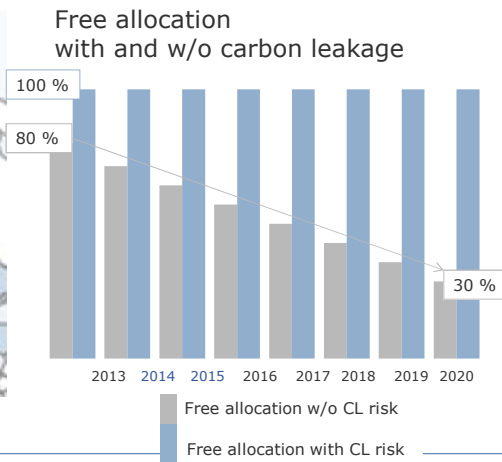
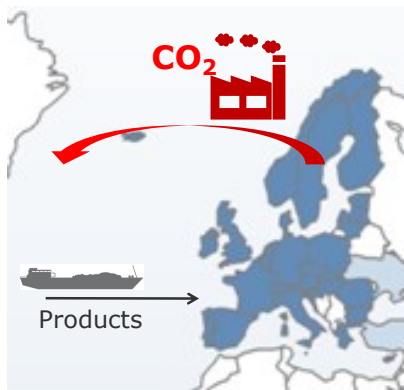


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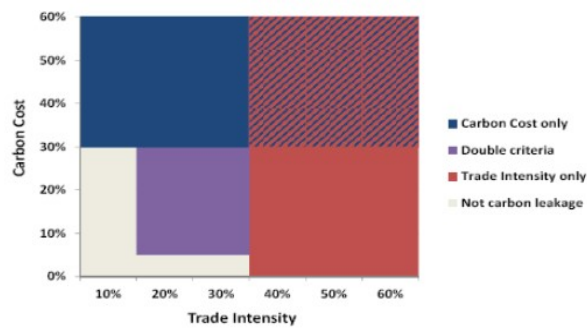
### Carbon leakage – production and emissions moving abroad

**Risk that production is moved abroad (outside the EU ETS)**

**How to assure level playing field?  
Grant free allocation...**



## Carbon leakage – general methodology for determination



## Summary of Allocation Methods

- = **Grandfathering** (for existing installations) based on historical emissions
- = **Benchmarking** (for existing installations and new entrants), e.g. as a relation between greenhouse gas emissions and unit of production.
- = **Auctioning** (for existing installations and new entrants) with a common or differentiated cap for installations covered by emissions trading
  - The selection of a method is a political decision
  - EU ETS Phase 1-3: Free allocation based on **ex-ante principle**
  - Allowances for a given period should be issued in equal tranches each year (**annual issuance of allowances**).
  - **Cost of allocation:**
    - free allocation
    - sales of allowances
    - auctioning costs

## Methods of Allocation – Grandfathering (I)

### = Free allocation based on empirical (historical) emission data.

#### = Several sub-variants are possible

- Length of base period: one year or several years
- Timeliness of base period: latest available or historical emissions
- Freedom of choice: predefined or selectable periods
- Period of validity: long-term unchanged base period or regular updating

## Methods of Allocation – Grandfathering (II)

### Allocation formula (historical emissions)

$$F = E * AF$$

<i>F</i>	<i>(Free) allocation</i>
<i>E</i>	<i>Emissions (base period/planned)</i>
<i>AF</i>	<i>Adjustment factor</i>

### Assessment

- Simple
- Significant distributional problems
- Lack of market transparency
- Major distortions of carbon price signal
- Recommendations: historical emissions are not the only approach

*(Source: Matthes (2009), adjusted)*

## Methods of Allocation – Grandfathering (III)

### Advantages

- Increases ETS acceptance esp. in initial phase due to limitation of cost effects

### Disadvantages

- Punishes companies that have already reduced emission level (early action)
- Lobbying/special interests may lead to overly complex allocation rules and over-allocation
- In case of over-allocation
  - \_ Competitive advantages for certain companies may be created
  - \_ Scope of trade may be small (illiquid market)
  - \_ Allowance price and thus incentive for GHG reduction may be too low
- In case of baselines significantly differing from emissions in the compliance year competitive distortions may occur
- Possible “windfall profits” – opportunity costs are passed on to consumers
- Significantly higher transaction costs compared with auctioning
- Allocation not related to abatement costs

## Methods of Allocation – Benchmarking (I)

### Free allocation based on emissions intensity per product unit.

== Benchmark can be based on

- Average performance of installations in sub-sectors or sectors
- Best available technology
- EU ETS: Average performance of the 10% most efficient (less emissions intensive) installations for 52 products (“top-ten-percentile” benchmark)
- ...

## Methods of Allocation – Benchmarking (II)

### Allocation formula

$$F = BM * AR * EF * RF$$

*BM* Benchmark  
*A* (Free) allocation  
*AR* Activity rate (historic/standardised/planned)  
*AF* Exposure factor (carbon leakage)  
*RF* Reduction factor  
 with  $AR = C * CF$   
*C* Capacity  
*CF* Capacity (usage) factor

### Assessment

- More complex
- Benchmarking is more than a benchmark
- Distributional problems depend on benchmark design
- Distortions of the carbon price signal depend on benchmark design
- Recommendations: take a careful look at the EU's benchmarking exercise

(Source: Matthes (2009), adjusted)

## Methods of Allocation – Benchmarking (III)

### Advantages compared to grandfathering

- Less potential for over-allocation
- Early action is rewarded (without special rules)
- Equal amount of allowances per product unit rewards efficient installations as they receive more allowances relative to their emissions
- Allows for differentiation between installations, also between coal and gas fired power plants, and thus helps to avoid competitive distortions
- More incentives to invest in low carbon technologies

### Disadvantages compared to grandfathering

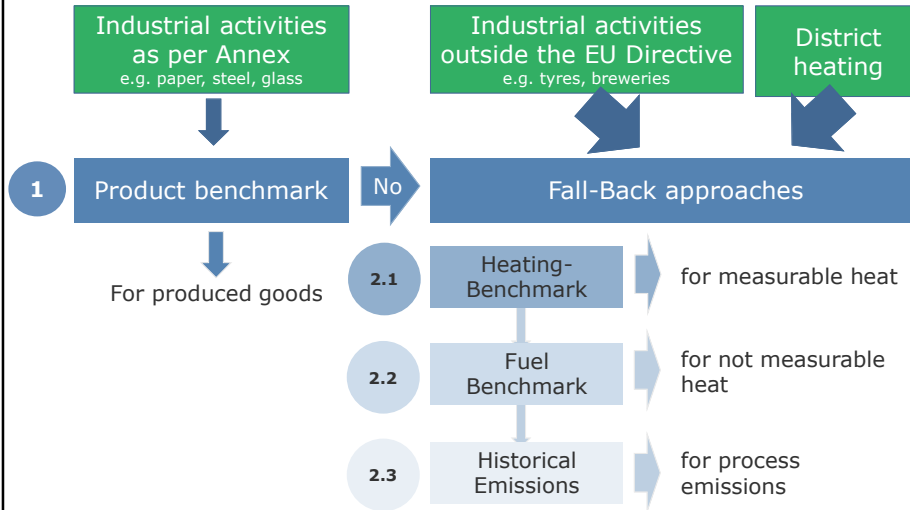
- For some industries with unique performance and specialisation the definition of product (specific) benchmarks may become difficult
- High transaction costs of "negotiating" benchmarks with respective industries due to information asymmetries.



Economically efficiency order:  
Auctioning > Benchmarking >> Grandfathering

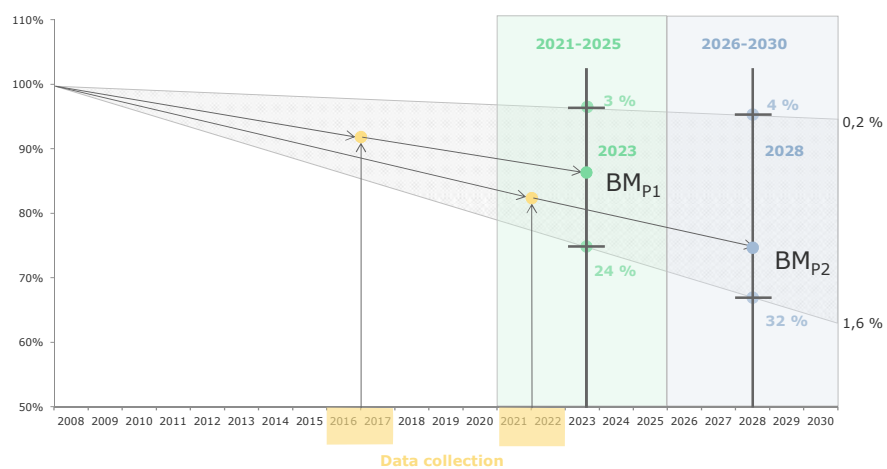
$$\text{Free allocation } F = \text{BM} * \text{AR} * \text{EF} * \text{RF}$$

### Benchmark Determination: Hierarchy



$$\text{Free allocation } F = \text{BM} * \text{AR} * \text{EF} * \text{RF}$$

### Benchmarks determination for EU ETS4 period (from 2021) 2 BM periods



$$\text{Free allocation } F = BM * AR * EF * RF$$

### Basis for activity rate

- \_ Two allocation periods
- \_ Historic activity rates from **2014-2018** and **2019-2023**  
(two 5-year-timeframes)
- \_ Data collection in **2019**
  - Activity rates
  - Related CO<sub>2</sub> emissions
  - ...
- \_ Additional free allocation in case there is a production increase
  - Dynamic
  - May lead to both reductions and extensions of the free allocation

$$\text{Free allocation } F = BM * AR * EF * RF$$

### CL Exposure Factor

- \_ Sectors w/o CL risk:
  - **0.3 for 2021-2025, thereafter linear phase-out until 2030!**
  - **Exception: District heating – here 0.3 throughout phase 4**
- \_ Sectors with CL risk: 1 throughout phase 4
- \_ CL status determined based trade and emissions intensities

### Allocation in the EU-ETS by phase in Germany

	Phase I 2005-2007	Phase II 2008-2012	Phase III 2013-2020
	SUBJECT TO NATIONAL LEGISLATION		EU HARMONIZED
ALLOCATION RULES	* Optional grandfathering or benchmarking * Up to 60 special rules	Energy: * benchmarking * auctioning (10%) Industry: * grandfathering	Energy: * auctioning (electricity, 100%) * benchmarking (heat) Industry: * Benchmarking Process emissions: *grandfathering
COMPLEXITY OF ALLOCATION RULES	High	Low	High
AVERAGE FREE ALLOCATION VS. EMISSIONS power sector	Surplus	Beginning shortage	Shortage
industry sector	Large surplus		Beginning shortage

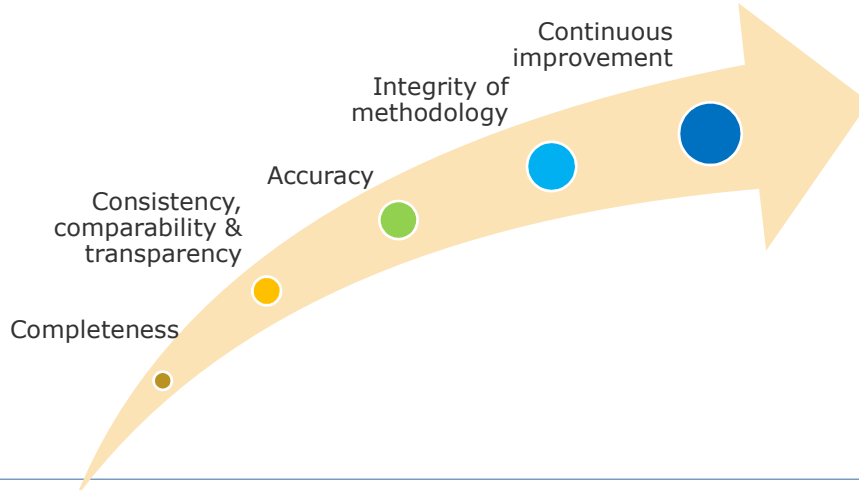
### Allocation in Phase I (2005-2007) – „special rules“

- = Operators could choose more than 60 combinations for free allocation, incl.:
  - Optional grandfathering or benchmarking
  - Early action
  - Double benchmark for combined heat and power (CHP)
  - Process emissions
  - Transfer of allowances in case of plant closure
- = High complexity and time pressure for all participants
- = Ex-post rules for adjustments if production levels turn out lower than expected

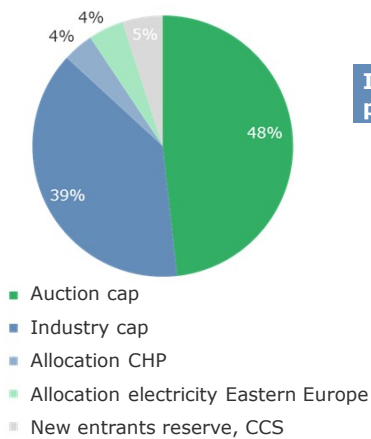


### Data for Allocation Application

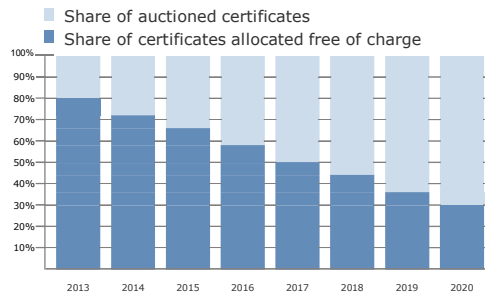
\_ General principles for monitoring (MRR, articles 5-9)



### Allocation: quantity structure in the 3rd trading period



#### Industry/heat w/o CL status: phase-down of free allocation



„a ton must be a ton“ → Monitoring and reporting

Are you familiar with the following terms/concepts now?

- Carbon leakage (CL)
- Grandfathering (=Grandparenting)
- Benchmarking
- Auctioning
  
- Benchmark (BM)
- Activity rate (AR)
- Carbon leakage exposure factor (EF)
- Reduction factor (RF)
  
- Hierarchy of BMs

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