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EU ETS: which free allocation mechanisms to sustain carbon leakage mitigation through to 2030?

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June 2015 – Carbon Market Forum - CEPS

1. **Free allocation and the EU policy objectives :
5 specifications for the EU ETS designer**
2. **Modelling free allocation until 2030**
3. **Phase IV : options for free allocation mechanism?**
 1. Scenario 1 - Ex ante allocation - extension of the current scheme until 2030
 2. Scenario 2 – Update of activity levels and benchmarks through to 2030
 3. Scenario 3 – A more tiered allocation
4. **Conclusion : which free allocation mechanisms are in line with Council’s conclusions?**

The tricky equation of free allocation through to 2030

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- ▶ **European Council stated policy objectives regarding the continuation of free allocation:**
 1. Free allocation will continue post 2020 so that most efficient installations do not face **undue carbon cost**;
 2. The **share of auctioned allowances should not decrease**;
 3. **Incentive to reduce CO2 emissions** and to innovate should be preserved;
 4. Free allocation should not give rise to **windfall profits and distortions**;
 5. **Indirect carbon cost** should be taken into account.
- ▶ **Which mechanisms respond to these 5 specifications ?**

Historical allocation unable to respond to specifications n° 1, 3 & 4

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- ▶ **Historical allocation has undermined incentives to abate emissions and given rise to windfall profits**
 - Historical allocation **is not efficient to combat carbon leakages** = it preserves the profitability of installations but does not incentivize to maintain domestic market shares;
 - Historical allocation **has given rise to windfall profits** resulting from over-allocation and pass through of carbon cost, even though they have declined with European harmonized rules;
 - Because of thresholds, historical allocation **has largely reduced the incentive to reduce CO2 emissions** in some sector. Gaming is thought to have led to a 6 MtCO₂e emission increase in 2012 because of higher clinker ratio to reach the 50% thresholds;
- ▶ **Need of enhanced flexibility to respond to specifications to combat efficiently carbon leakages and windfall profits, and to preserve a clear incentive to cut emissions**

Flexible allocation (Output based allocation) responds to 1, 3 and 5

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- ▶ A more flexible allocation (= Output based allocation, or more frequent updates) provides more targeted incentives :
 - At the margin, only the difference between the benchmark and the installation carbon intensity is taken into account, versus the full carbon cost in current historical allocation;
 - This constitutes a stronger incentive to produce in Europe, and therefore **is more efficient to combat carbon leakages**;
 - **No over allocation and less pass trough** = very limited windfall profits;
 - The **incentive to cut CO₂ emissions and to innovate** is preserved more clearly (no thresholds)
- ▶ **But need to update regularly the benchmark to preserve sufficient incentives at the margin for installations.**
- ▶ **Need of further complementary measures to pass on some price signal to consumers and lower the global cost of decarbonization (= need to use consumers' substitution lever as well as production efficiency)**

Spec. n°2 : the share of auctioned allowances should not decrease

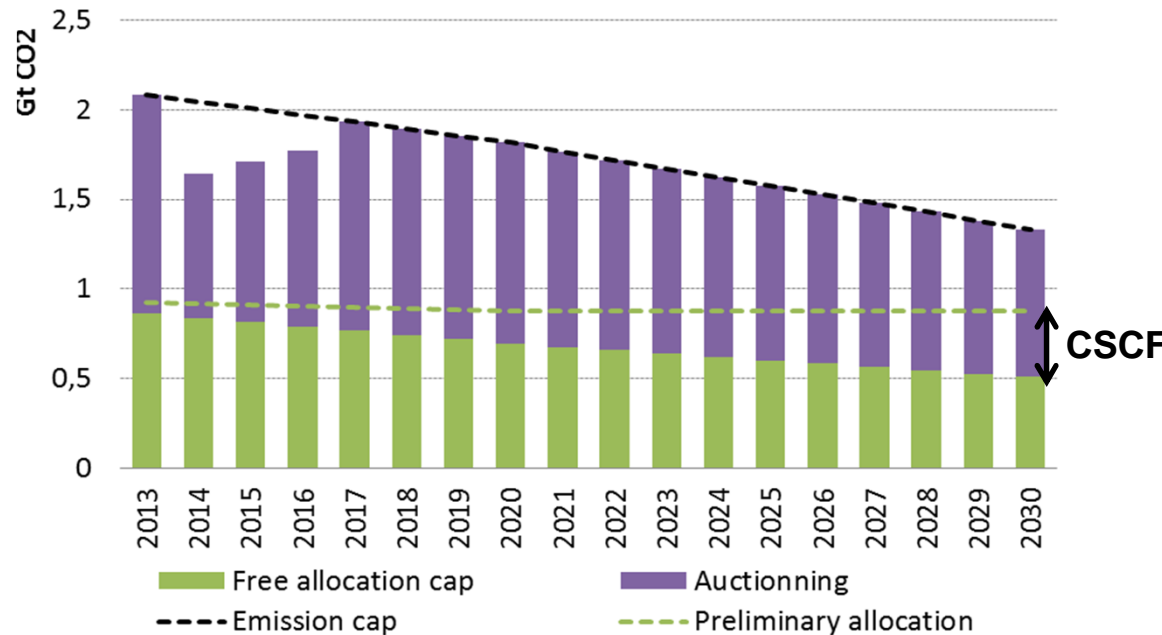
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► In a context of a dwindling emission cap, a fixed auctioning share entails a reducing free allocation budget

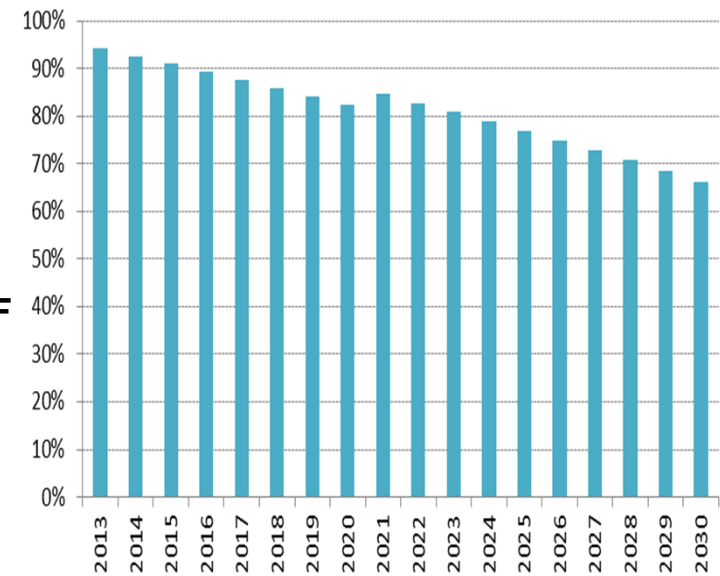
1. An ex post coefficient (CSCF) needs to correct the growing difference between the calculated preliminary allocation, and the declining free allocation cap

EU ETS cap in phases 3 and 4
if continuation of current rules



Source : CDC Climat Research (2015)

CSCF until 2030
if continuation of current rules



Source : CDC Climat Research (2015)

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Modelling methodology: A three steps calculations

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$$\text{Net carbon cost} = \left(1 - \frac{\text{Final Allocation}}{\text{Emissions}} \right) \times \text{Direct cost} + \text{indirect cost}$$

1. Calculation of preliminary allocation

$$\text{Preliminary Allocation} = \text{Benchmark} \times \text{Activity Level}$$

2. Calculation of CSCF

$$\text{Free allocation cap} = \text{CSCF} \times \text{Sum of preliminary allocations}$$

3. Calculation of final allocation

$$\text{Final allocation} = \text{CSCF} \times \text{preliminary allocation}$$

► Calculation of preliminary allocation with updates of activity levels

$$\text{Preliminary Allocation} = \text{Benchmark} \times \text{Activity Level} = \frac{\text{Benchmark}}{\text{Carbon Efficiency}} \times \text{Emissions}$$

- **Benchmark / Carbon Efficiency** can be computed for the year 2013 with EUTL database

$$\text{Preliminary Allocation (2013)} = \frac{\text{Benchmark}}{\text{Carbon Efficiency}} \times \text{Historical Emission}$$

- Final allocation in 2013 can be retrieved with EUTL database, and 2013 preliminary allocation can be computed with known CSCF value
- Historical emission levels are computed as being the maximum between the median of installation's emissions between 2005 and 2008 and the median between 2009 and 2010
- **Benchmark / Carbon Efficiency** values are aggregated by sectors (NACE 2)
- Sectoral **Benchmark / Carbon Efficiency** values are supposed constant over the period 2020 – 2030, equal to the 2013 value as benchmarks are to be updated accordingly (2014 Council)

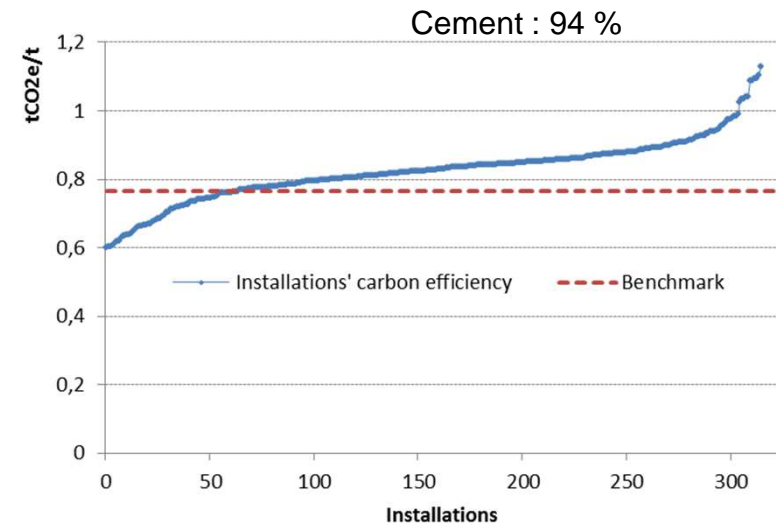
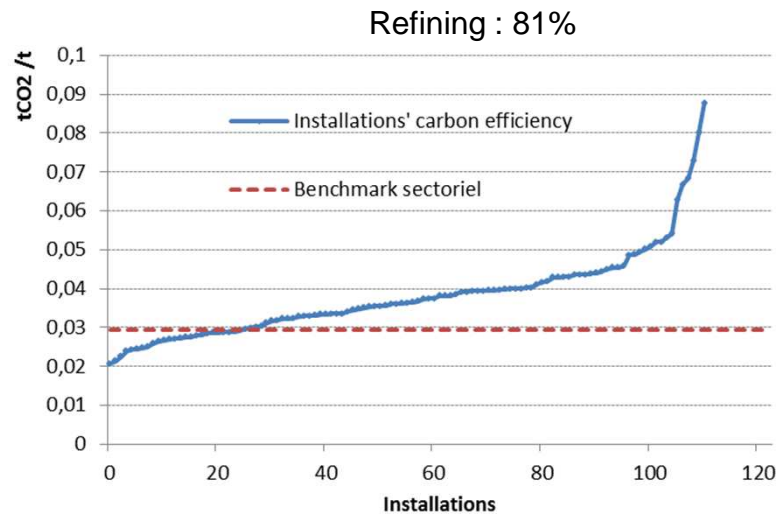
Preliminary allocation: benchmarks / Efficiency

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► Results of the calculation of Benchmark / Carbon Efficiency

$$\text{Preliminary Allocation} = \text{Benchmark} \times \text{Activity Level} = \frac{\text{Benchmark}}{\text{Efficiency}} \times \text{Emissions}$$



Preliminary allocation: Emissions forecasts

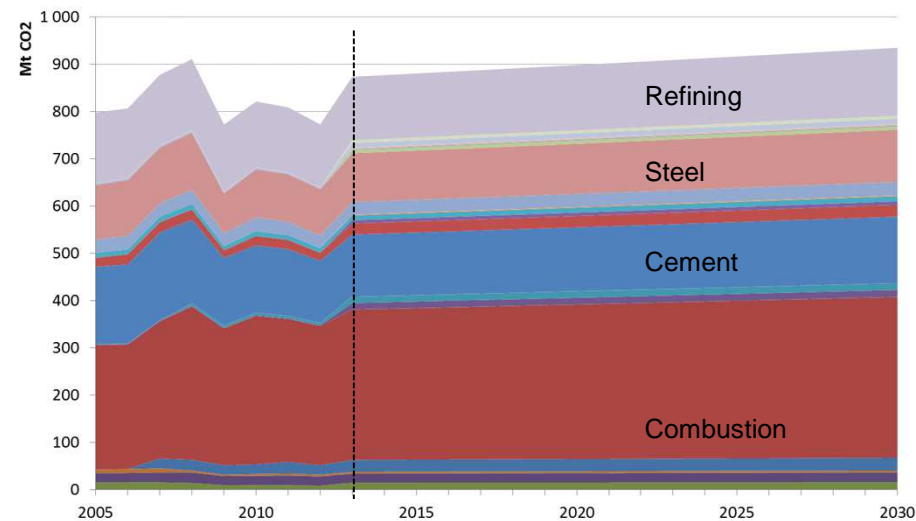
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$$\text{Preliminary Allocation} = \text{Benchmark} \times \text{Activity Level} = \frac{\text{Benchmark}}{\text{Efficiency}} \times \text{Emissions}$$

- Emissions from industrial installations assumed to grow in line with GDP growth (1,4%, Trends 2050) minus efficiency gains (1% per year).

Forecasts of CO2 emissions for industry sector by 2030
GDP growth : 1,4% per year



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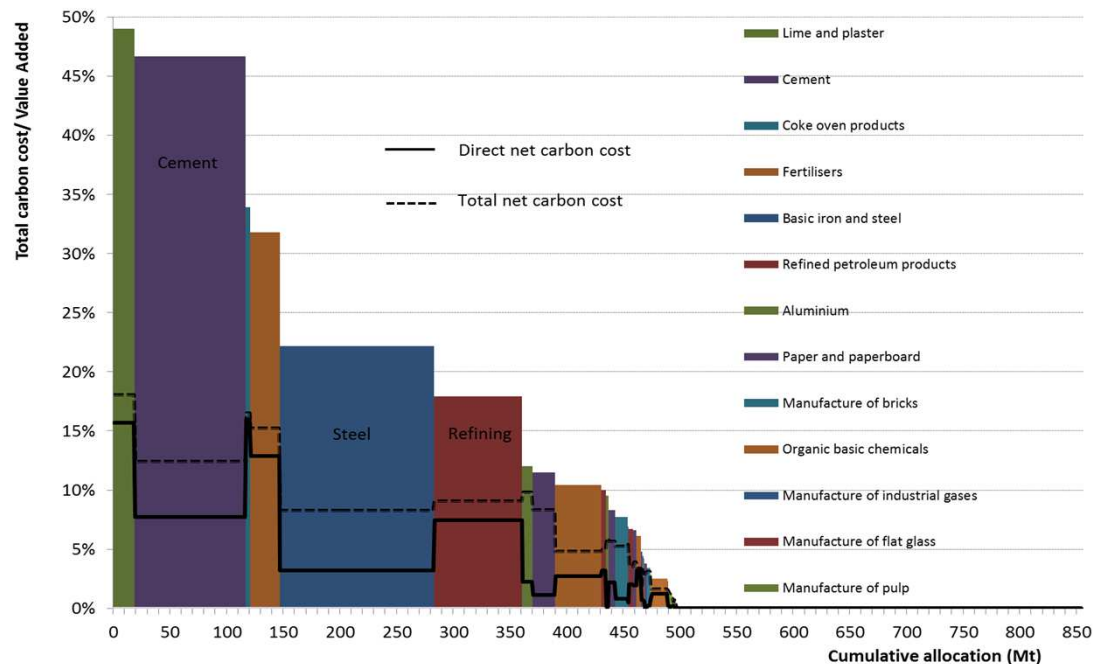
Scenario 1: continuation of current rules until 2030

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- ▶ In 2030, the CSCF is equal to 66% and entails a reduction of free allocation to all sectors, regardless of their actual exposition
 - Sectors at risk may face undue carbon costs
 - High mitigation of carbon cost of low exposed sectors
 - = Inefficient distribution of free allowances

Total carbon cost versus net carbon cost (30€/tCO₂e in 2030)



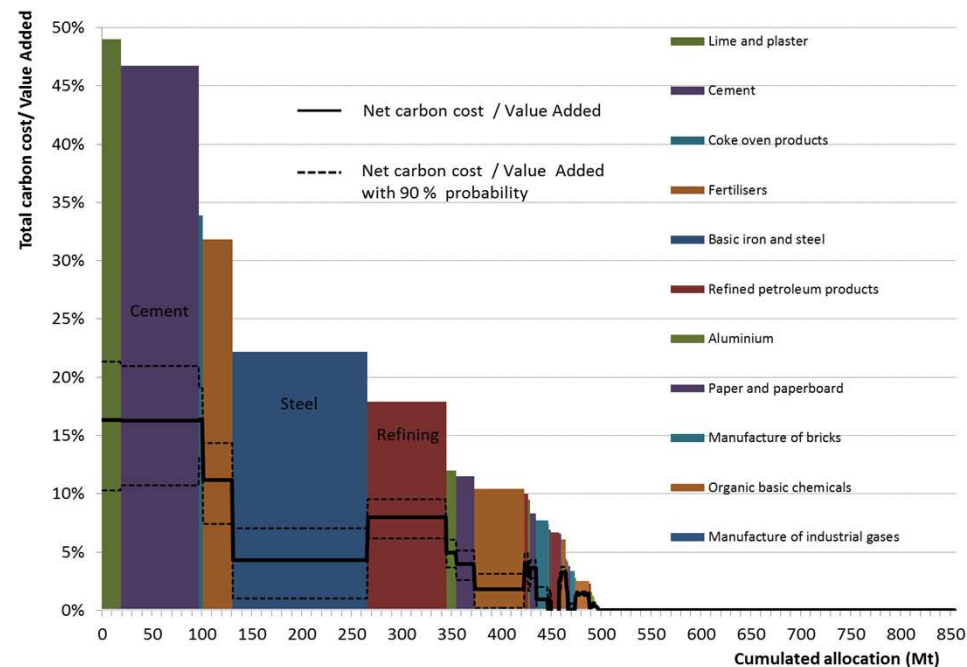
Scenario 2: Update of activity levels and benchmarks

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- ▶ In 2030, the CSCF equal to 71% entails a reduction of free allocation to all sectors, regardless of their actual exposition
 - Sectors at risk may face undue carbon costs
 - High mitigation of carbon cost of low exposed sectors = Inefficient allocation of free allowances
 - Ex post CSCF calculation may entail uncertainties (=10% of VA for cement)

Total carbon cost versus net carbon cost (30€/tCO₂e in 2030)



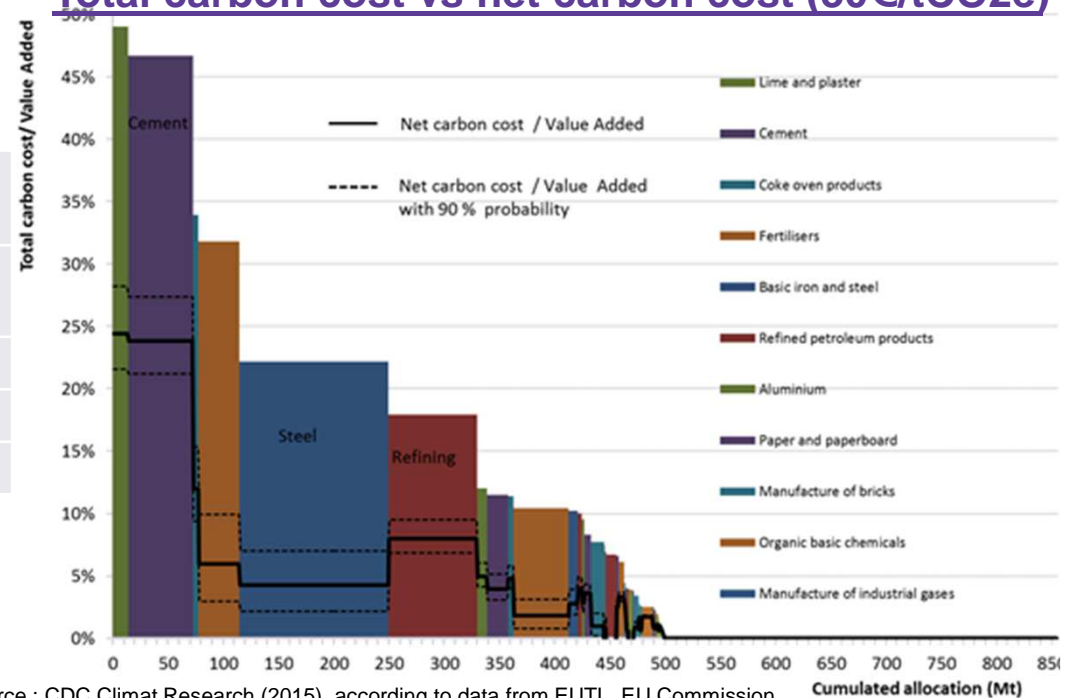
Scenario 3: Update of activity levels and benchmarks and Commission's proposed tiered allocation

- ▶ In 2030, the CSCF equal to 89% entails a reduction of free allocation to all sectors, regardless of their actual exposition
 - **CSCF of 89% in 2030**
 - The Commission's proposal is not targeted enough to get rid of the CSCF
 - Sectors with 0% carbon cost and trade intensity still receive 30 % free allocation
 - Remaining uncertainty and inefficient distribution of free allowances

Leaked IA's thresholds

Exposure	Carbon cost	Trade Intensity	Allocation rate
Very High			
High	27%	20%	100%
High	6%	10%	80%
Medium	2%	0%	60%
Low	0%	0%	30%

Total carbon cost vs net carbon cost (30€/tCO2e)



Source : CDC Climat Research (2015) according to data from EUTL, EU Commission

Scenario 3: Update of activity levels and benchmarks, and more tiered allocation

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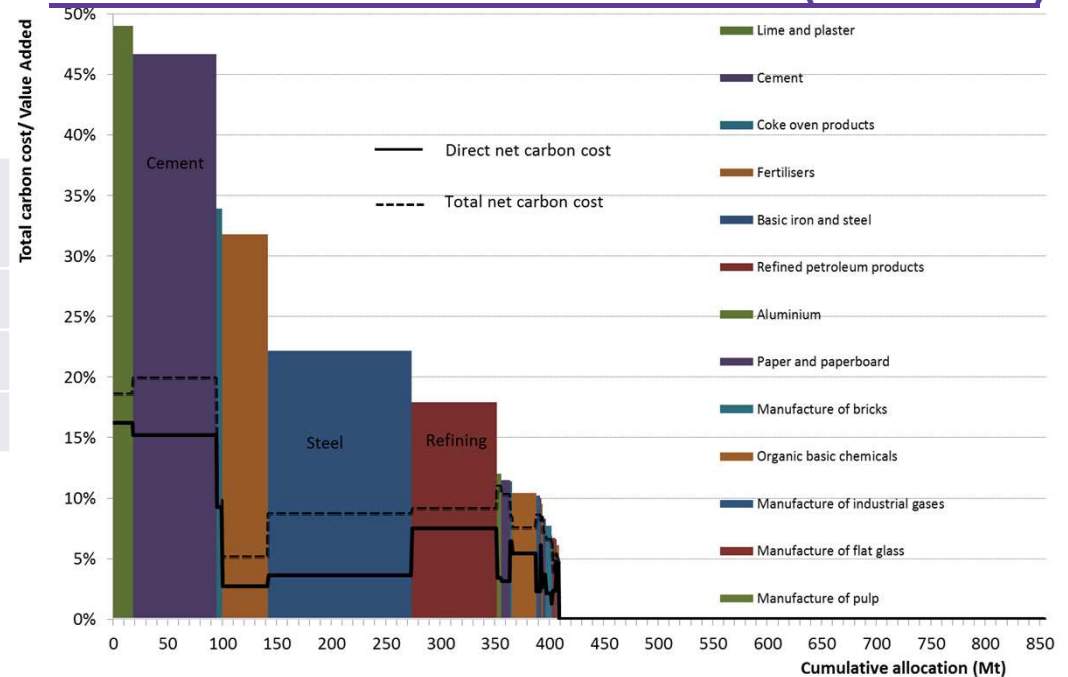


- ▶ In 2030, with the below thresholds, a tiered allocation would amount to the distribution of only 400 MtCO₂ below the allocation cap
 - No CSCF as long as average annual growth is below 2%
 - More efficient allocation of free allowances
 - Volumes allocated per unit of output are certain

CDC Climat Research's proposed thresholds

Exposure	Carbon cost	Trade Intensity	Allocation rate
High	25%	15%	100%
Medium	15%	5%	70%
Low	5%	0%	30%

Total carbon cost vs net carbon cost (30€/tCO₂e)



Source : CDC Climat Research (2015) according to data from EUTL, EU Commission

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Conclusions

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	Net carbon cost profile and leakage protection	Uncertainty	Incentive to carbon efficiency	Distorsions
1. Continuation of historical allocation until 2030 with current list	<p>Inefficient leakage protection Inefficient allocation of free allowances because of CSCF</p>	<p>Certain CSCF = 66%</p> <p>Uncertainty on carbon cost depends only on firm's production level</p>	<p>Lower incentive to carbon efficiency</p> <p>Perverse incentives and gaming</p> <p>But better incentive to substitution</p>	High
2. Output based allocation until 2030 with current list	<p>Inefficient allocation of allowances because of CSCF Better leakage protection</p>	<p>Uncertain CSCF comprised in a 62% to 84% range with 90% likelihood</p> <p>Uncertainty of unit carbon cost, depending on overall production level</p>	<p>Higher incentive to carbon efficiency</p> <p>No gaming</p> <p>But lower incentive to decrease production of polluting goods</p>	Low
3. Output based and targeted allocation until 2030 with	<p>More efficient allocation of free allowances Better protection against carbon leakages</p>	<p>Certain CSCF comprised in a 95% to 100% range with 90 likelihood</p> <p>Low uncertainty < 2,5% of value added for all sectors</p>	<p>Higher incentive to carbon efficiency</p> <p>No gaming</p> <p>But lower incentive to decrease production of polluting goods</p>	Low

Thank you for your readings
Please find us your questions or suggestions

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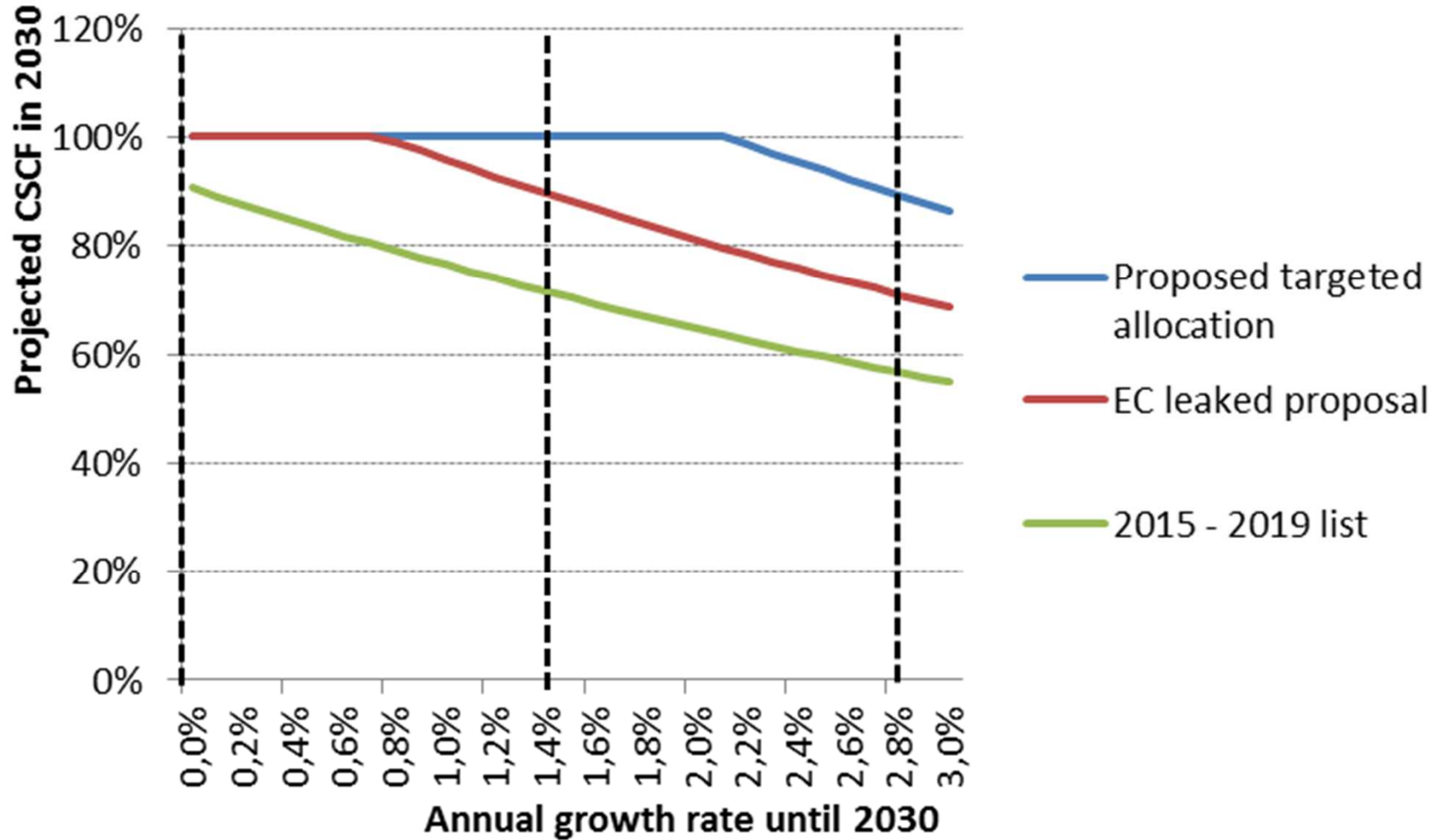
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Annual growth and CSCF value in 2030, with updates of activity levels and benchmarks

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Spec.n°5: Indirect cost not taken into account in the modelling framework

- ▶ **Compensation of indirect cost is important to avoid distortions against electro-intensive processes, with have great low carbon potential**
- ▶ **Nonetheless, it is not an easy task to compensate indirect cost with free allocation :**
 - Diversity of power supplying contracts with varying carbon costs;
 - Bilateral contracts, regulated tariffs (average emission factor = 0 tCO₂/MWh for nuclear, 0,40 tCO₂/MWh for CCGTs) vs wholesale forward supplying (marginal emission factor = 0,75 tCO₂/MWh in NWE)
 - If not done appropriately, there is room to create more distortions than the one supposed to be overcome,
- ▶ **ACER seems to be much more capable of providing adequate financial compensations, in the REMIT framework**