

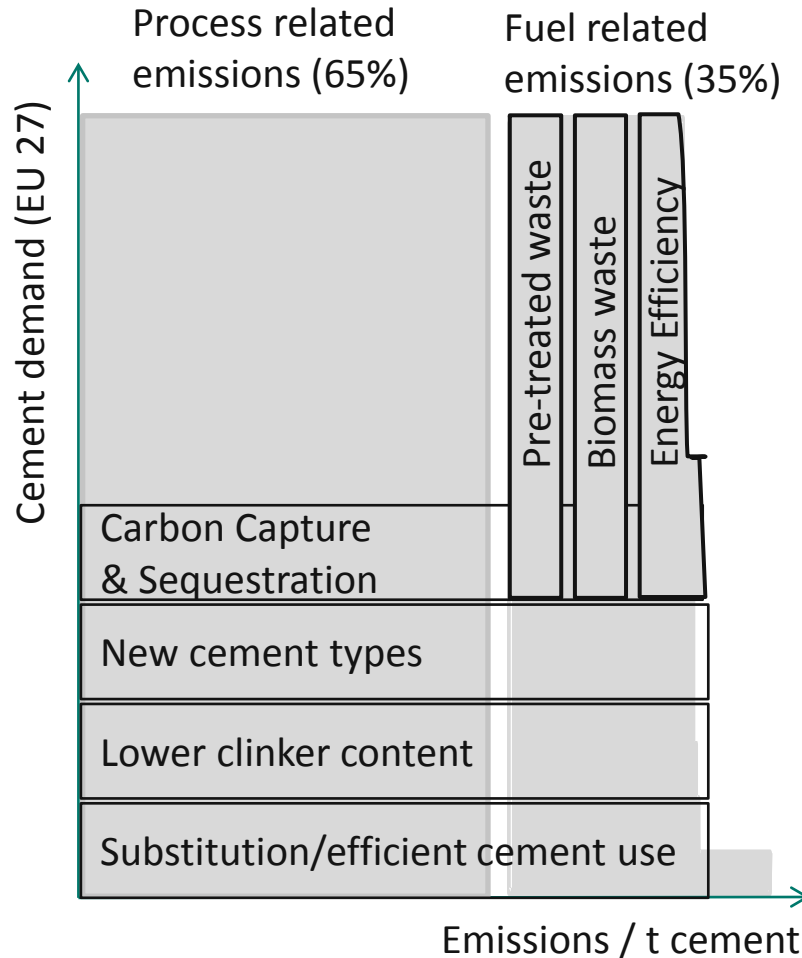
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# Carbon Control and Competitiveness Post 2020: The Cement Report

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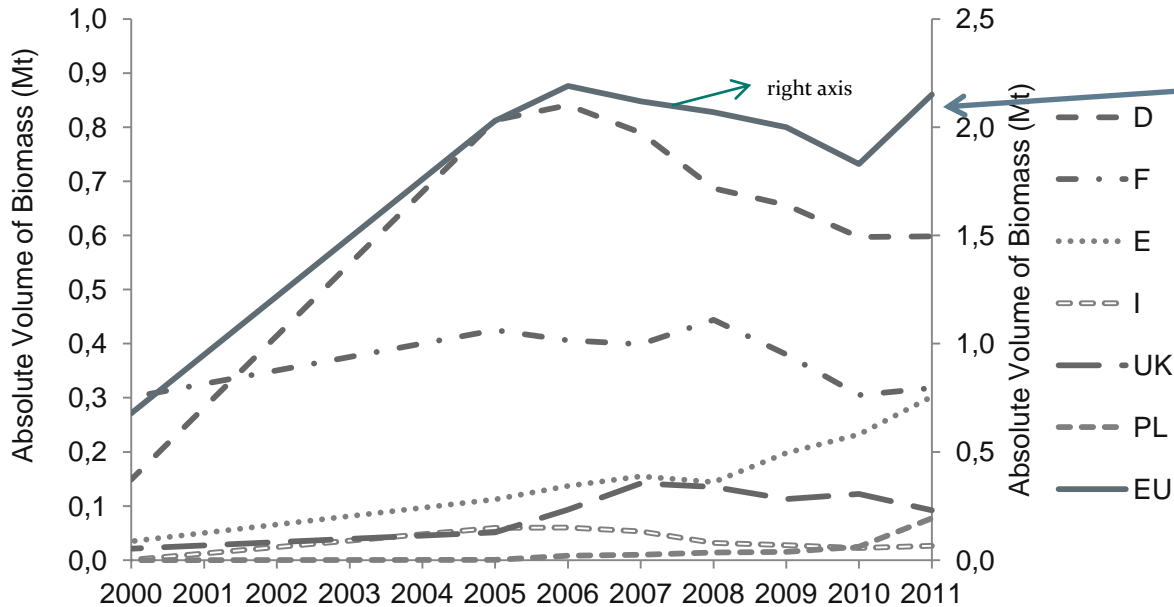
- 1 Mitigation opportunities in the cement sector
- 2 Realization of individual mitigation opportunities
- 3 Policy requirements emerging from analysis

*Illustration*



Policy for mitigation needs to also address options on consumption side.

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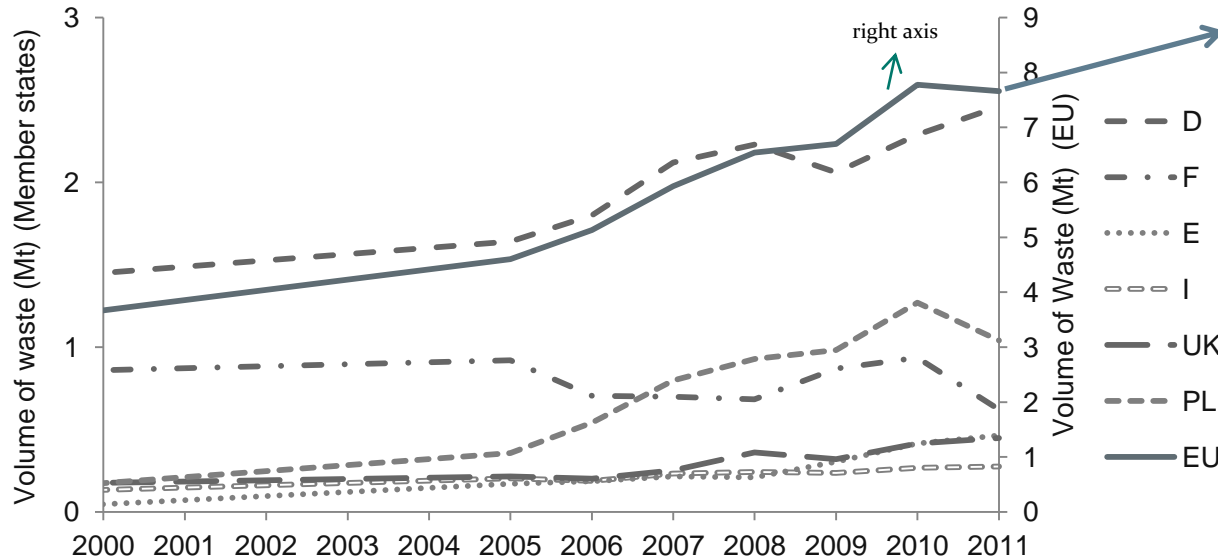
9% of thermal energy from bio-mass (waste)

~ savings of about 3.3 Mt CO<sub>2</sub>

Source: CSI GNR: Indicator 314

- Save of fuel cost (10 €/t clinker) + hedge on fuel price
- RE support for biomass in heat& power not available in cement  
-> only 10% wood (large share in Spain, check RE provision)
- Primarily waste products, 50% animal meal & fat, 17% sewage sludge
- Save CO<sub>2</sub> opportunity (!) cost (1,5€ /t clinker at 10 €/tCO<sub>2</sub>)

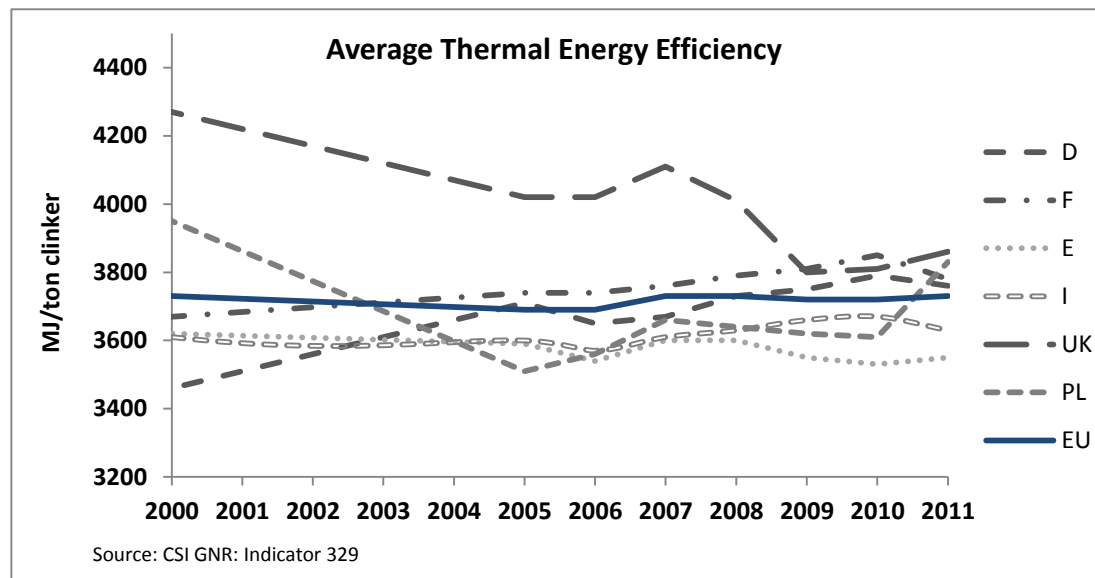
- Carbon price too low / instable
- Opportunity cost have limited impact on choices



Source: CSI GNR: Indicator 313

25% of thermal energy from pre-treated waste  
 ~ savings of about 2.4 Mt CO<sub>2</sub>

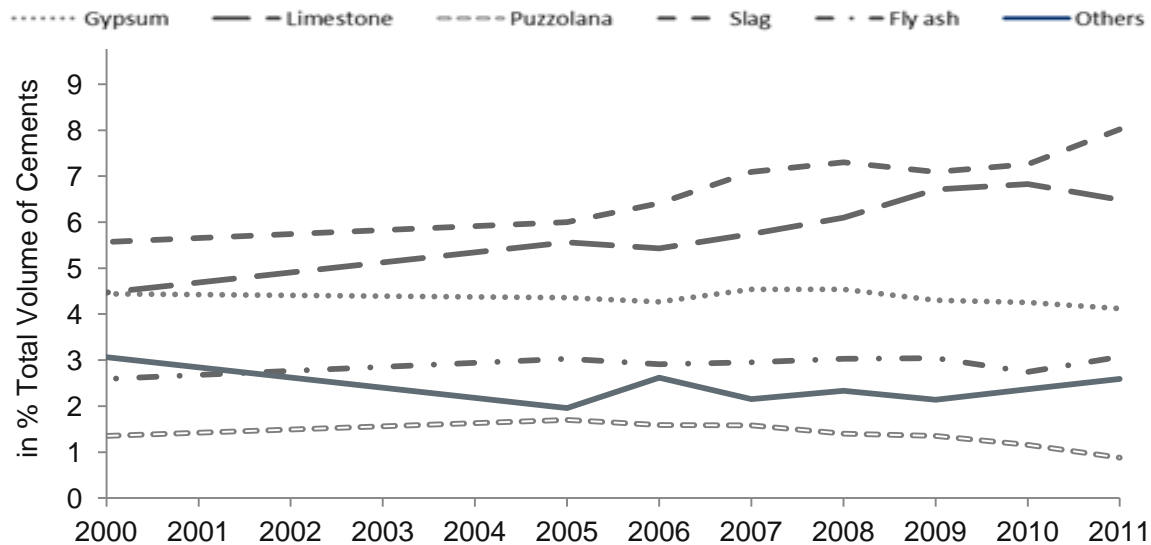
- Save of fuel cost (10 €/t clinker) + hedge on fuel price
- Capture waste service fee (1-10 €/t clinker)
  - Opportunities as EU Directive (99/31/EC) restricts landfill
  - Only slow transposition (2009 deadline only met by 9 MS)
- Save CO<sub>2</sub> opportunity (!) cost (0.3 € /t clinker at 10€/tCO<sub>2</sub>)



- Main savings potential: Replace (semi-) wet kilns

% Clinker produced	Semi-Wet Kiln (9% more energy)	Wet Kiln (50% more energy)
2000	12%	6% (19 installations)
2005	9%	5% (13 installations)
2011	7% (30 kilns)	5% (11 installations)

- Slow progress, kiln conversions, PL pre, UK post 2005
- Potential 0.5 Mt CO<sub>2</sub> savings / year

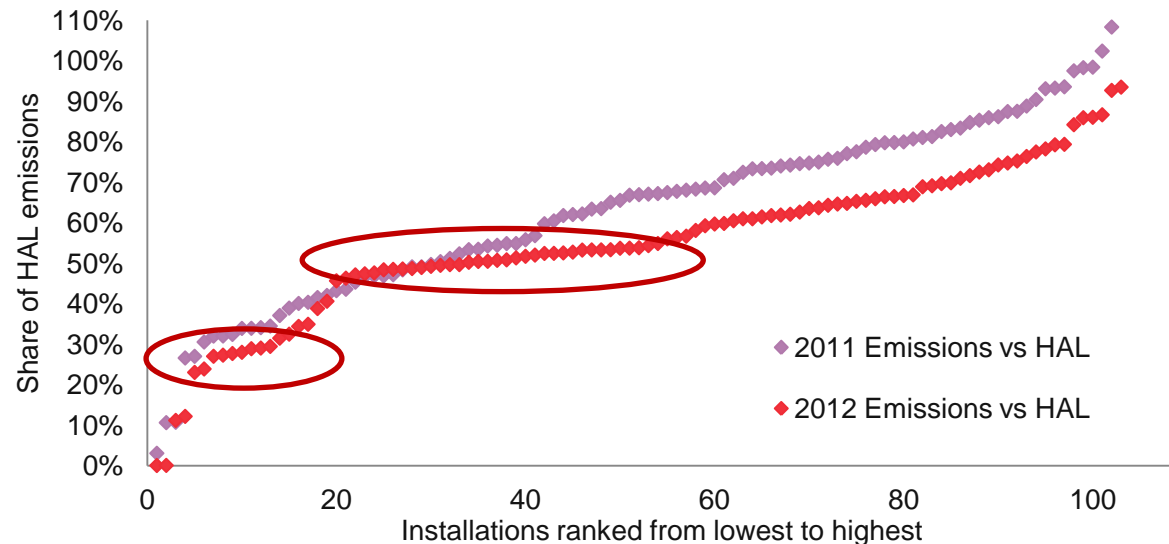


Source: CSI GNR: Indicator 3219

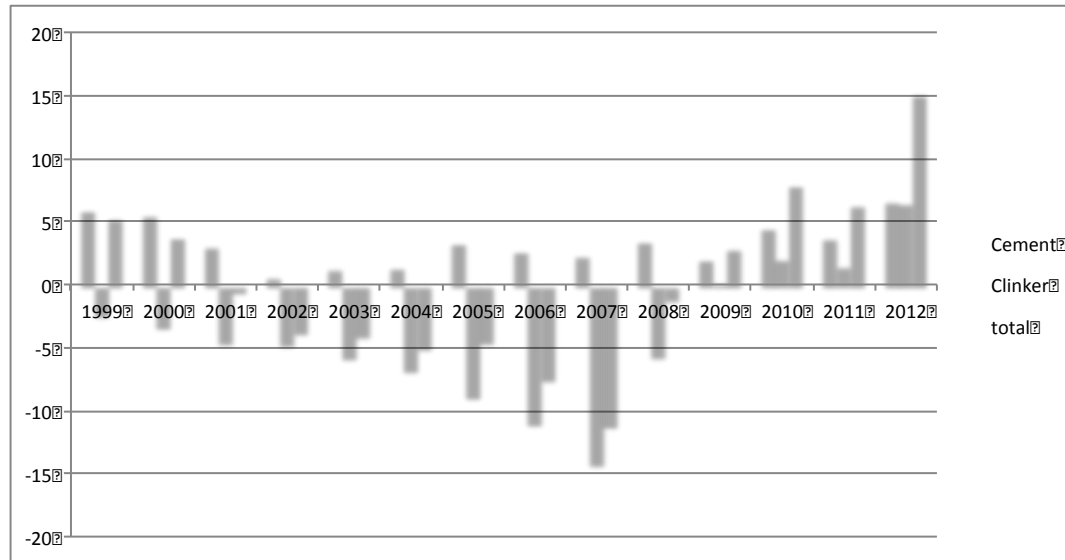
- CEM with 25-30% substitution saves 2€ /t cement (at 10 €/tCO<sub>2</sub>)
- Drawbacks: (i) Dependence on other companies (ii) Surplus clinker capacity
- Result: Slag largely utilized, fly-ash to less than 50% for cement production
- Needs market acceptance for cement with different features
- Attempts with CO<sub>2</sub> labelling, but product quality & price dominate acceptance
- Adjusting norms and standards might be able to achieve more rapid change

- Carbon price too low / instable
  - Uncertainty of cost pass through of opportunity costs
- > reduces competitiveness of lower carbon products?





- 50% utilization of the Historic Activity Level required for full free allocation, 25% operation to receive 50% of the allocation.
- Incentive to (i) spread production over installations (ii) export excess clinker/cement (iii) increase clinker content (possibly stockpiling slag)
- Thus creates incentive to avoid (temporary) closure of inefficient plants
- Further factors: Prospect of future demand, value of permits, access to market, cost of closure (social, site clean-up), impact on company's balance sheet



- Trade flows are predominantly influenced by supply and demand balance
- 2 to 4% of cement is exported, twice the volume of imports
- Europe was a net importer of clinker till 2009 (demand in Spain and Italy)
- Activity level requirements for free allowance allocation have caused increase of export since 2009, amplified since 2012 (Spain, Portugal, Ireland and Greece)
- ETS has not caused an increase of clinker or cement import

- No evidence of emission leakage to other regions
- 50% activity level provisions encouraged exports

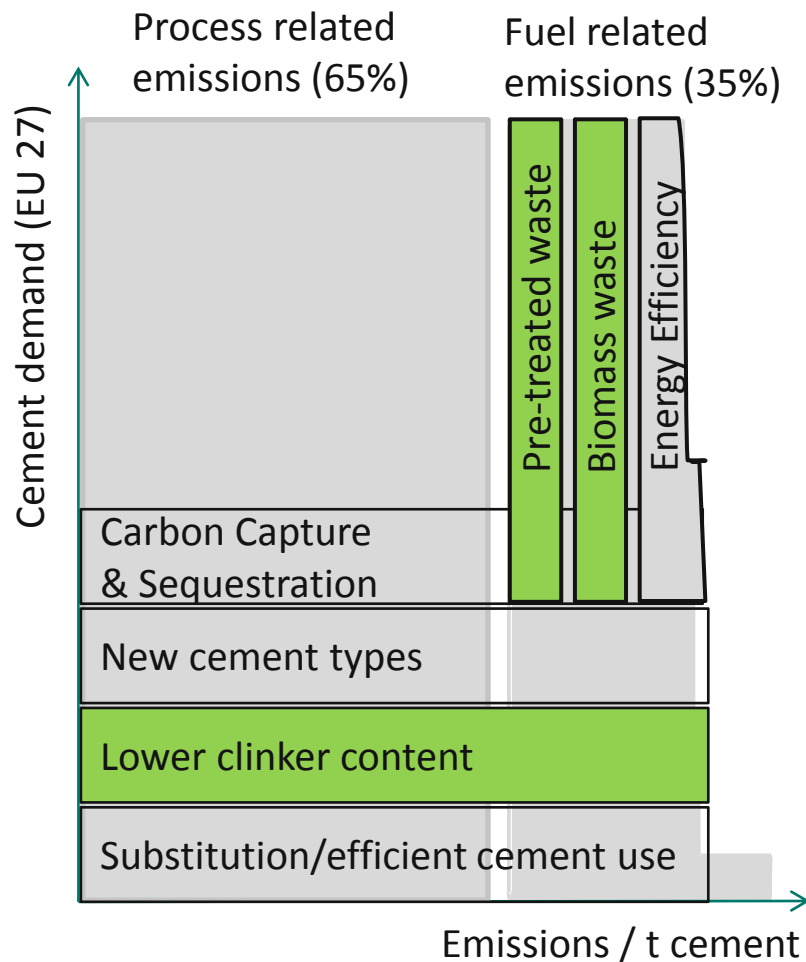
- The European economic outlook is obviously unfavourable for major investments;
- There is no evidence of investment leakage, i.e. no evidence of investment moving out of EU or cancelled because of the ETS.
- However, there are several aspects of the EU climate goals, ETS Directive and the implementation measures that add to the uncertainty for decisions and as such discourage rather than encourage investments in low carbon technology. These are:
  - Long-term CO2 targets for the economy, ETS and EII;
  - Sectoral technical-economic potential to reduce CO2 emissions;
  - Linear reduction factor – cross sectoral reduction factor;
  - Post 2020 leakage protection measures;
  - Complexity and deficiencies of the historic allocation methodologies;
  - Perception of lack of legislative predictability.

- Primary customer demands:
  1. Proven long-term product quality, adapted to application;
  2. Price.
- In the absence of CO2 cost pass through there is little market incentive for low CO2 construction materials.
- But the price signal alone is insufficient; other incentives are indispensable.

	Civil engineering 22%*	Residential buildings 45%	Commercial buildings 32%
Economic cost			
Chemical resistance			
Durability			
Strength			
Fire resistance			
Acoustic insulation			
Thermal mass			

\*Turnover shares based on European Cement Association

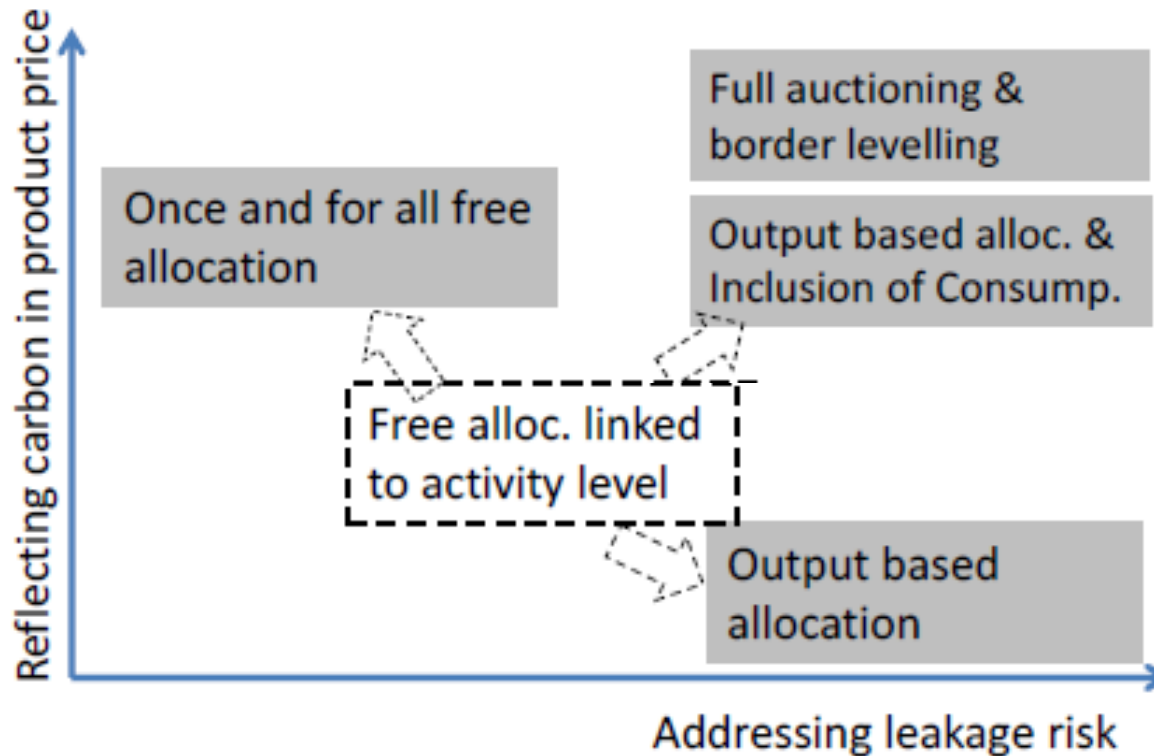
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To date progress only on some mitigation options.

		CO <sub>2</sub> Price	Free allocation		Clarity on future development	Innovation support	Adjustments to regulations and building codes
			CO <sub>2</sub> Cost to producer	CO <sub>2</sub> Cost pass through			
		Section 5.1	Section 5.2		Section 5.3	Section 5.4	Section 5.5
Traditional mitigation levers	Biomass						
	Fossil Waste						
	Clinker substitution						
	(Efficiency) Investment						
	Asset rationalisation						
Customer side	Low CO <sub>2</sub> cement						
	Efficient use, building practices						
	CCS						

Combination of policy levers required to advance mitigation.



- Leakage protection measure needs to preserve carbon cost for consumer.
- Two main options: Inclusion of imports or inclusion of consumption in EU ETS



- Combined with shift to full auctioning;
- At benchmark level (Best Available Technology- BAT)
  - > addresses leakage risk;
  - > does not discriminate against foreign producers;
  - > retains full incentives for EU producer and consumers.

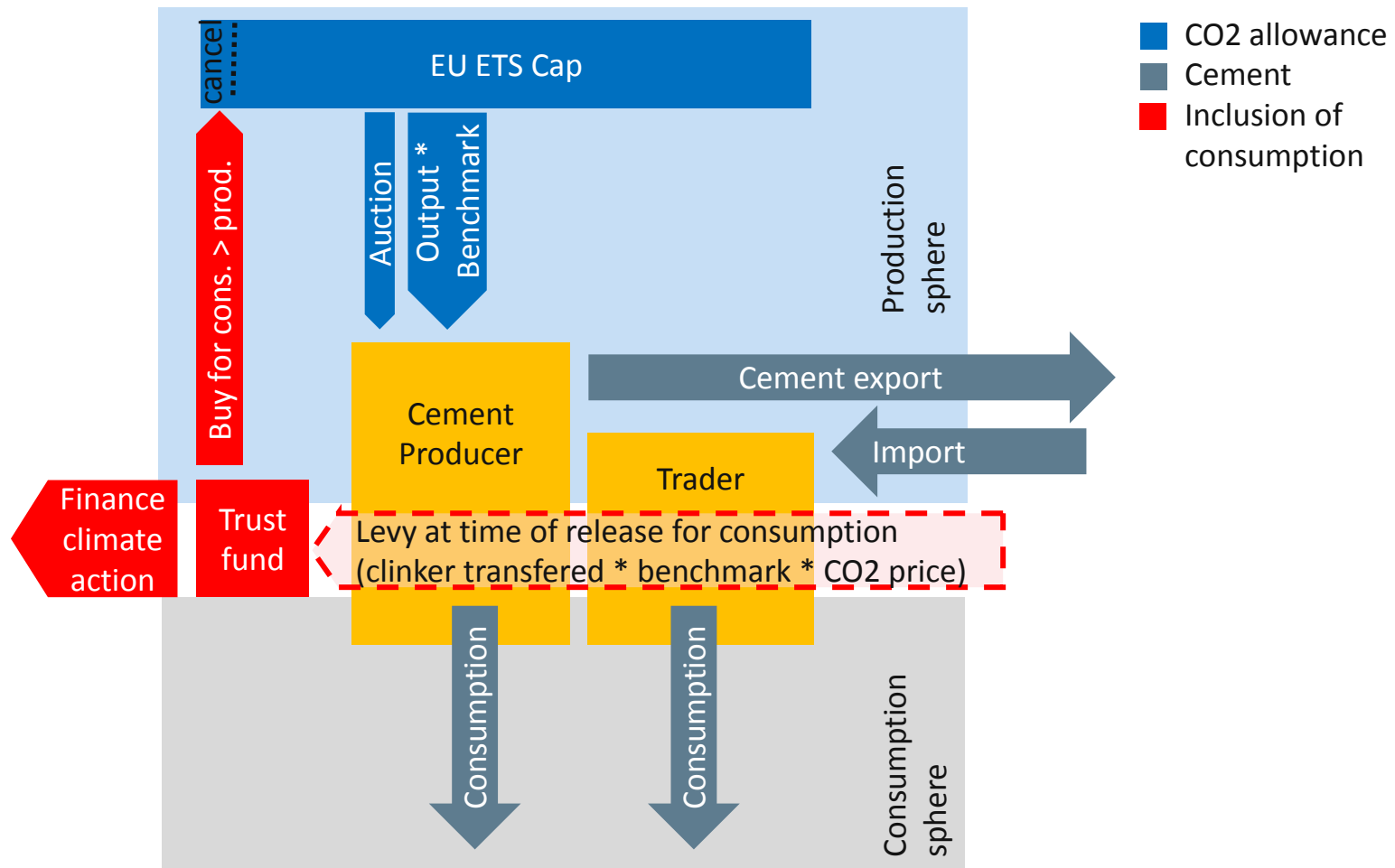
Challenge: International political acceptance

## **When applied to selected other sectors:**

- How far down the value chain track cement, steel ...
- Compensation of exports needed;
- Treatment of electricity?

- Inclusion of imports&exports in EU ETS: leakage protection & full carbon price .
- But international politics difficult.

# Inclusion of consumption in EU ETS (one new approach)



- Inclusion of consumption can reinstate carbon price and full incentives.
- Avoids political complications of trade related approach.

- EU ETS has attracted top management attention on need to reduce CO<sub>2</sub>:
  - > Emission reductions is now part of the strategy of most cement companies;
  - > Emission target equally important to carbon price for some firms/decisions.
- Overall economic situation (surplus capacity) dominates investment picture
- Uncertainty about future development of EU ETS slows down decision making
  - > What sector on leakage list, what provisions post 2020, what price level?
  - > What will impact development in the future?
  - > Differs from other input uncertainty as it only impacts Europe
  - > If system does not fully meet policy needs, what reforms to expect?

- Shared perspective required: Low-carbon roadmaps facilitate coordination.
- Backed by EU ETS overall targets allowing for competition across sectors.

- Low/uncertain carbon-price and pass through;
  - > uncertainty about future market demand.
- Substitutes for cement can reduce value of assets;
  - > incumbents need competition from (potential) entry.
- Long demonstration period can increase technological spill-over:
  - > investors might require support to advance techn. development.

- Development and demonstration of processes and products requires large scale investment.
- Innovation strategy needed to advance portfolio of mitigation options.

- Enable use of lower-carbon options;
  - > Reduction of clinker content often requires adjustments;
  - > Further adjustments likely required for innovative materials.
- Encourage use of lower-carbon options;
  - > Engage decision makers to consider embedded carbon;
  - > Formulate min or max requirements for products/practices.

- Several tailored policy (changes) require coordinated approach.
- Consider guidance from low-carbon road-map and suitable political mandate.

## **I. ETS creates visibility for emission targets & captured management attention:**

- But attention has declined (partially due to economic crisis);
- Credibility needs to be restored with „robust“ carbon prices.

## **II. Effective carbon price essential for economics of mitigation options:**

- Free allowance allocation reduces effectiveness of EU ETS in cement;
- New leakage protection: inclusion of imports or of consumption in EU ETS.

## **III. EU ETS not sufficient - policy mix needed to unlock mitigation portfolio:**

- Addressing regulatory and institutional constraints for low-carbon options;
- Engaging decision makers to overcome inertia / low share of total cost;
- Supporting investment in innovation (process, products, building practice).