

Beijing, China, 7.7.2015

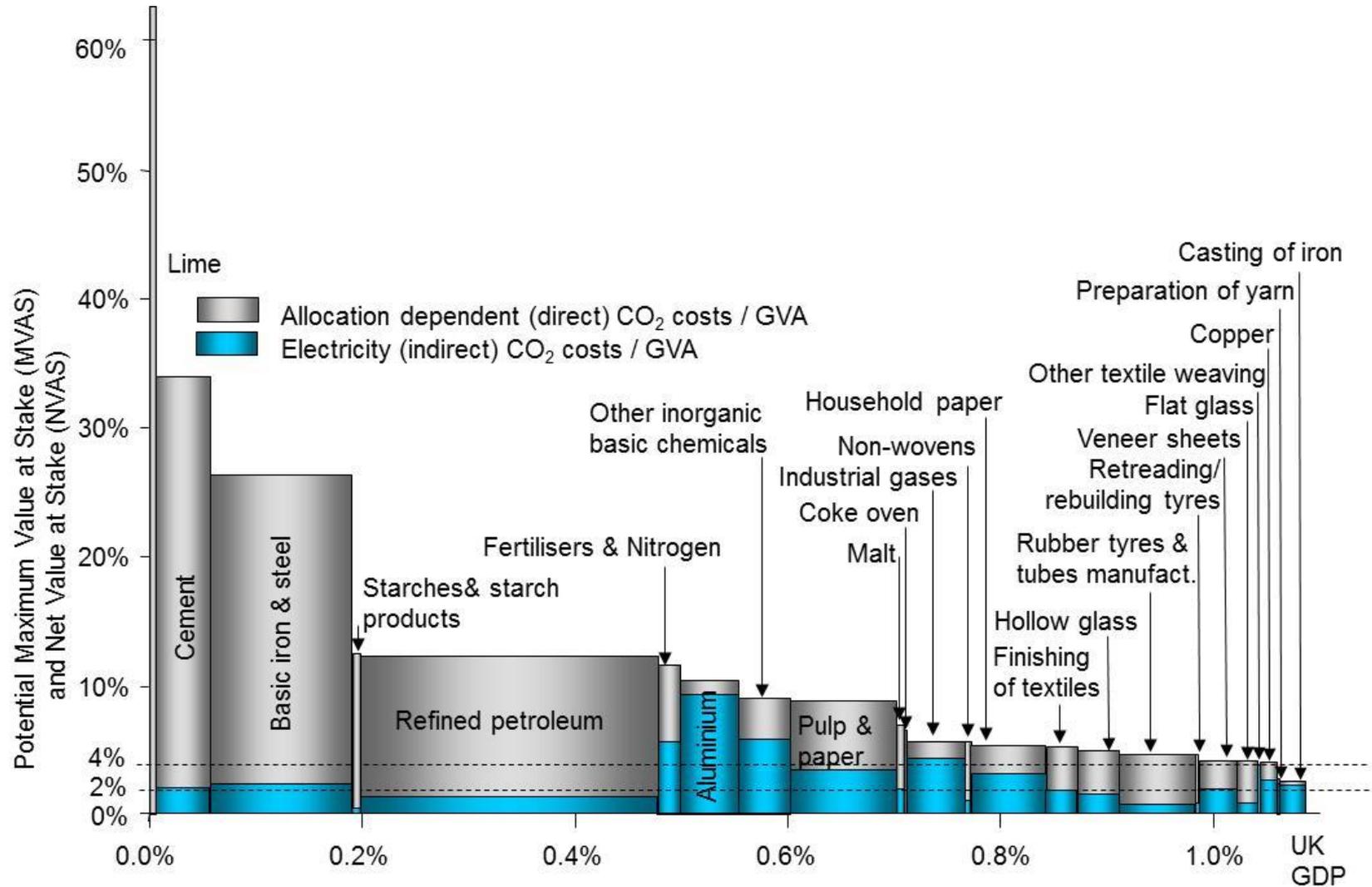
# Inclusion of Consumption

## Beijing Project Workshop

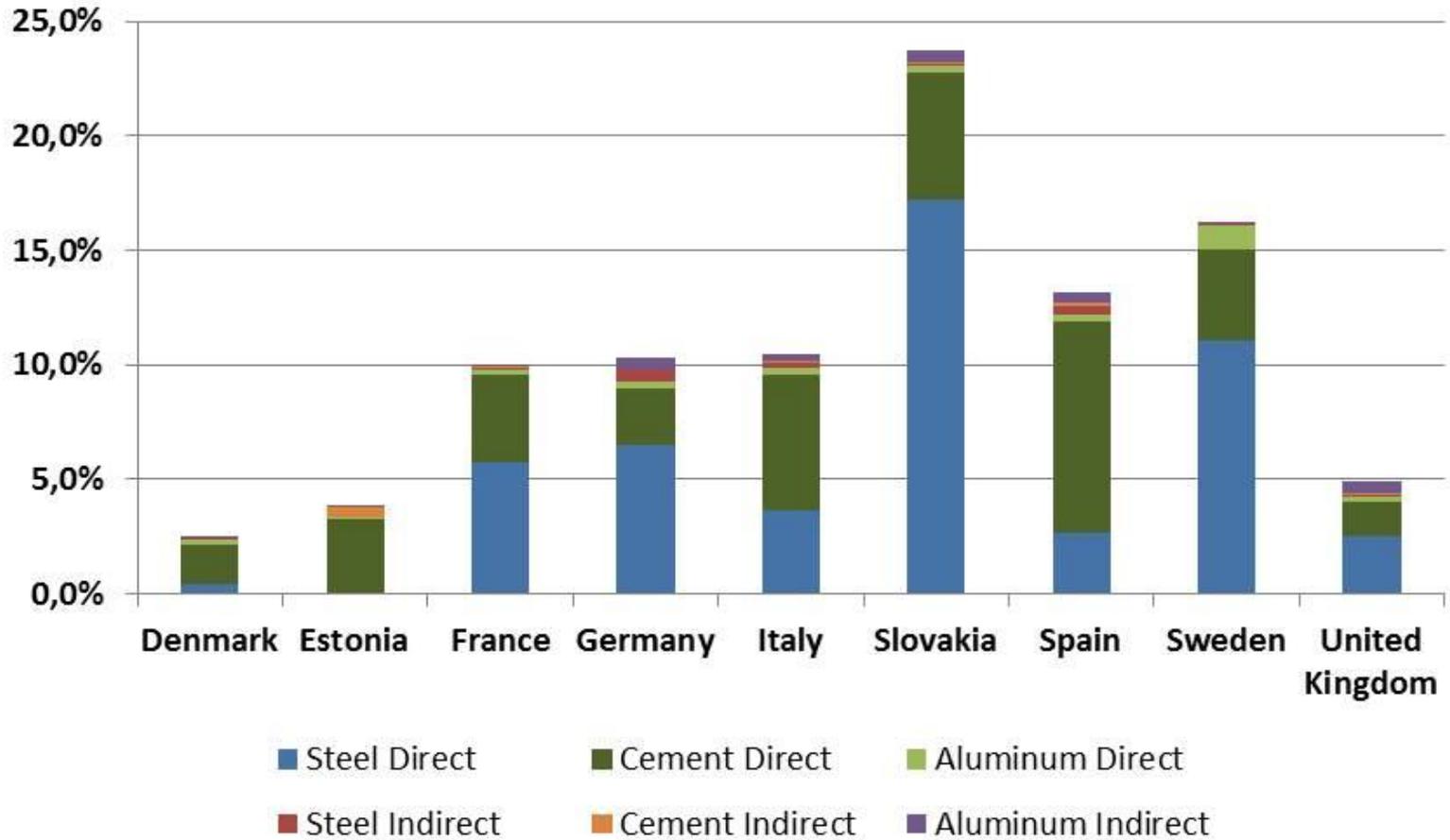
Karsten Neuhoff



# Lets focus on the materials sectors



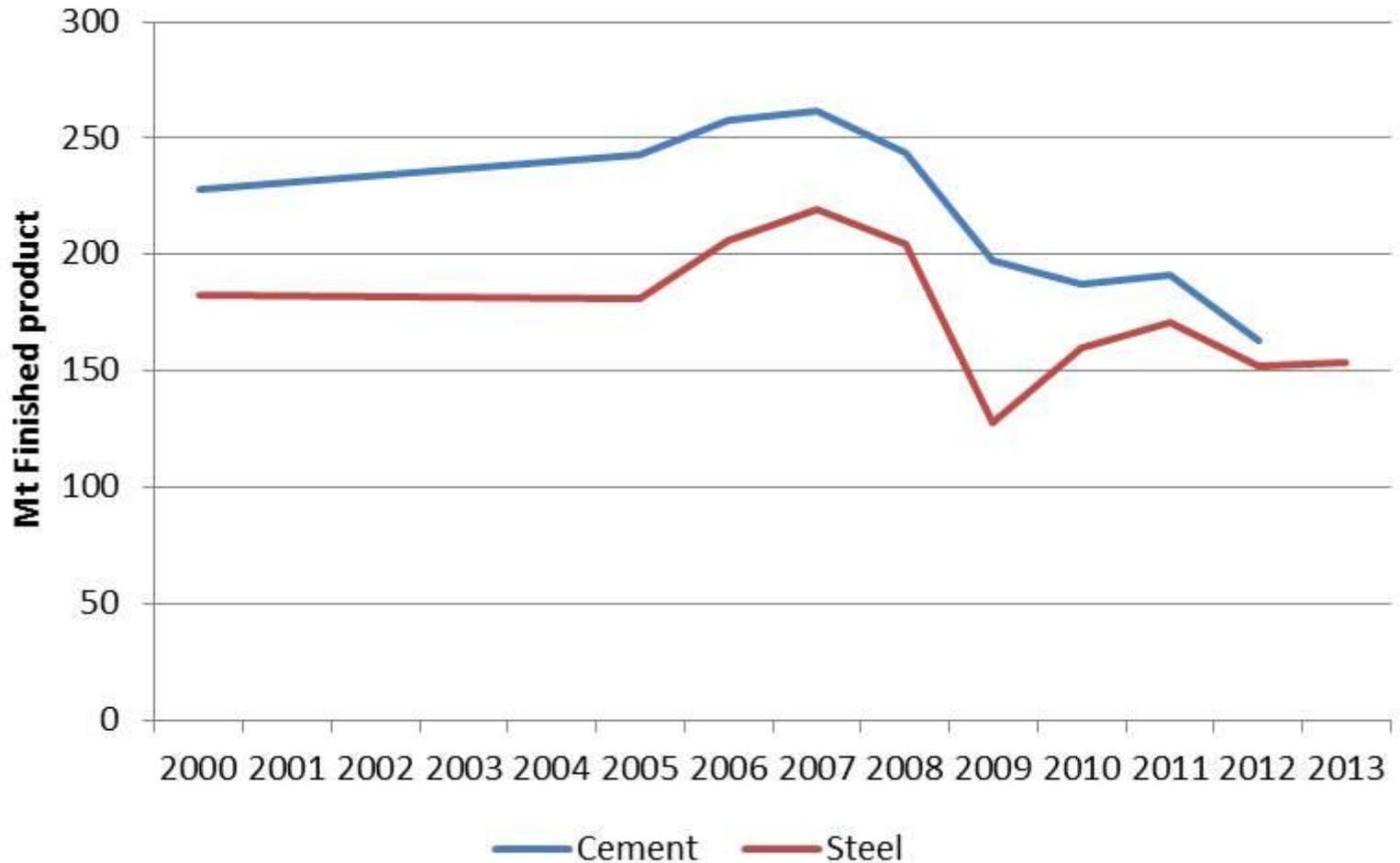
# O Share of total national CO<sub>2</sub> Emissions from 3 materials



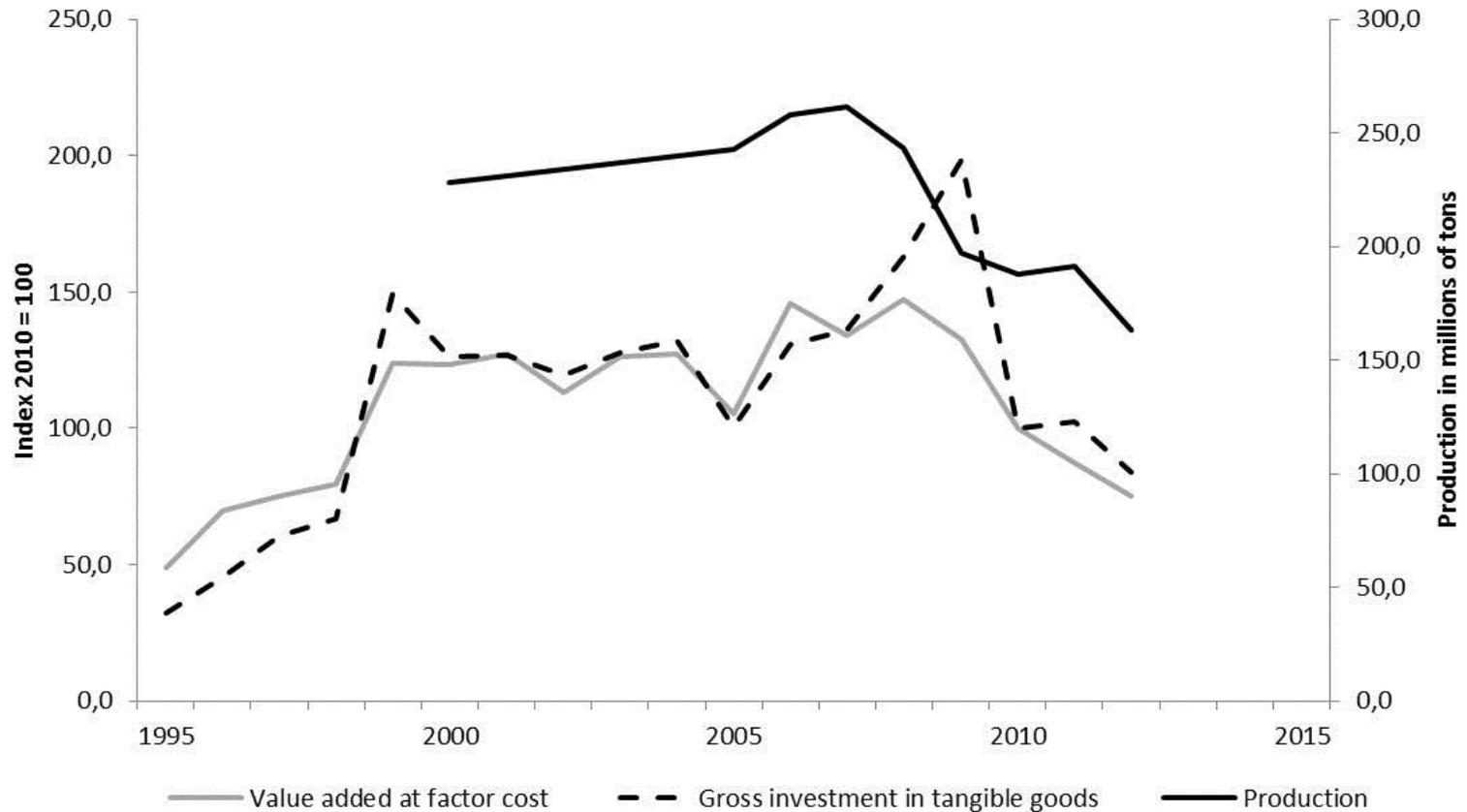
# Carbon Control and Competitiveness Post 2020

Karsten Neuhoff, Arjan van Rooij, Misato Sato, Oliver Sartor, Manuel Hausner,  
Andrzej Ancygier, Ian Christmas, Anne Schopp, William Acworth, Philippe Quirion,  
Ayse Tugba Atasoy, Bruno Vanderborcht, Benedikt Mack, Nagore Sabio, Jean-Pierre Ponsard

# 1 European Consumption of Steel and Cement, 2000 – 2013



# Implications for value added in sector

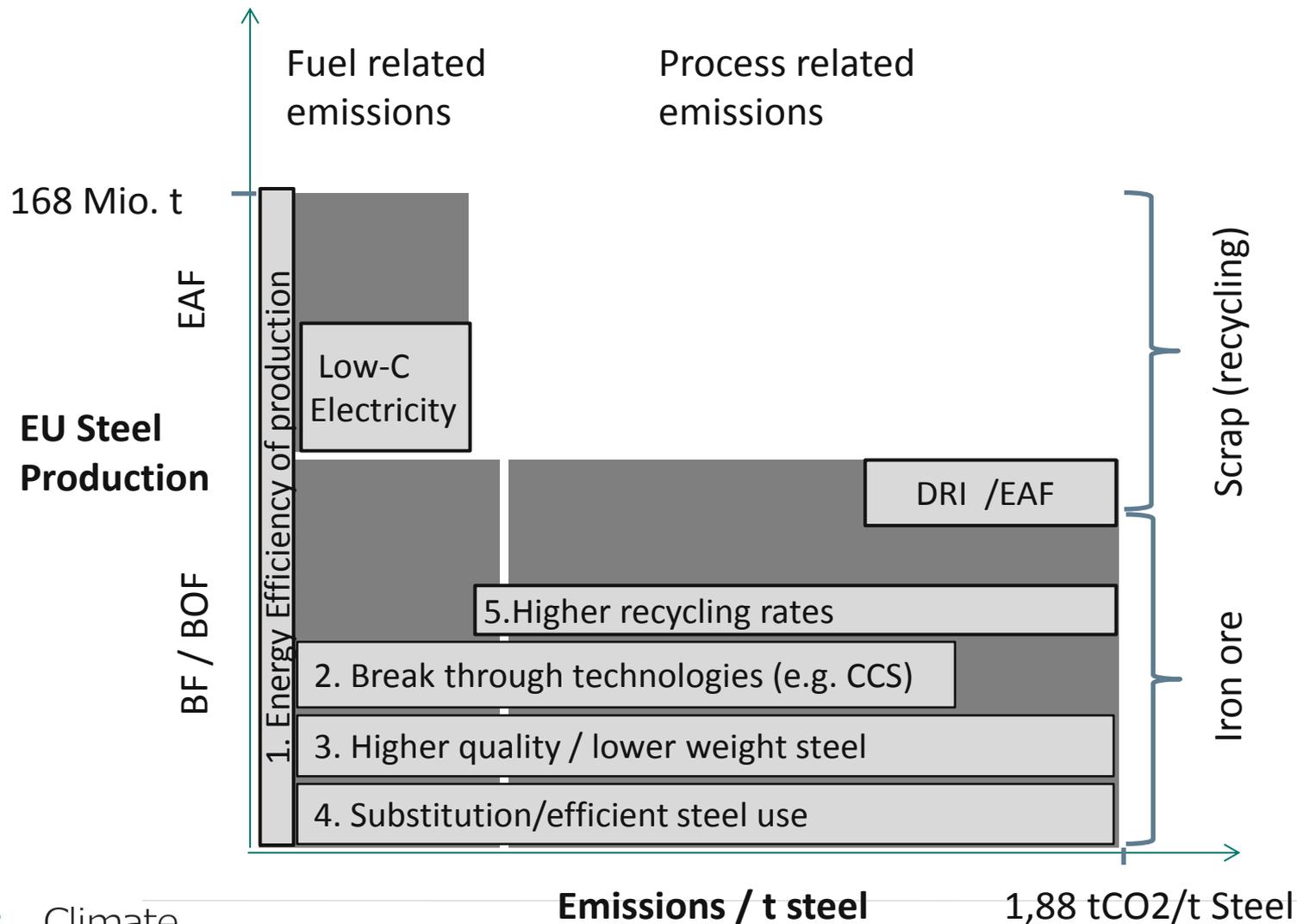


Value added and gross investment are calculated using all available information on the respective statistics on the individual EU-27 countries. All values in prices of 2010.

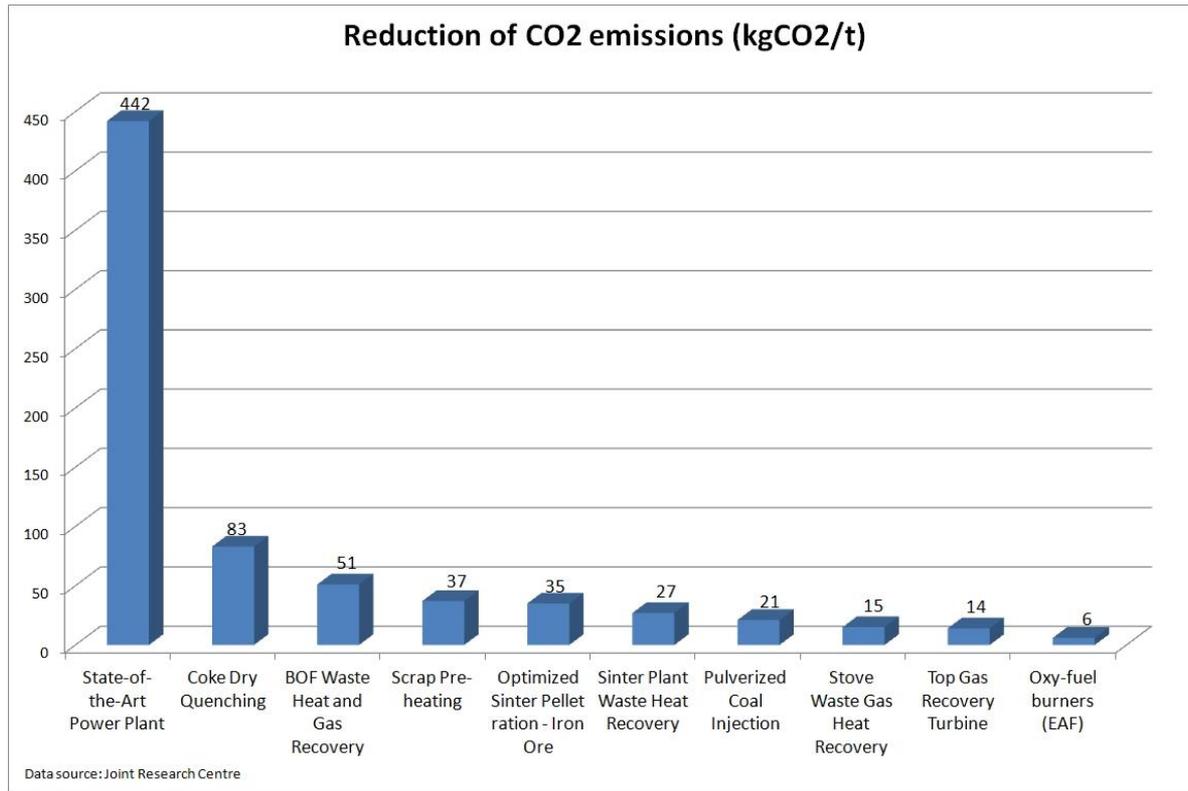
Sources: Eurostat (2015), Cement Sustainability Initiative (2015)

# CO<sub>2</sub> abatement opportunities in steel

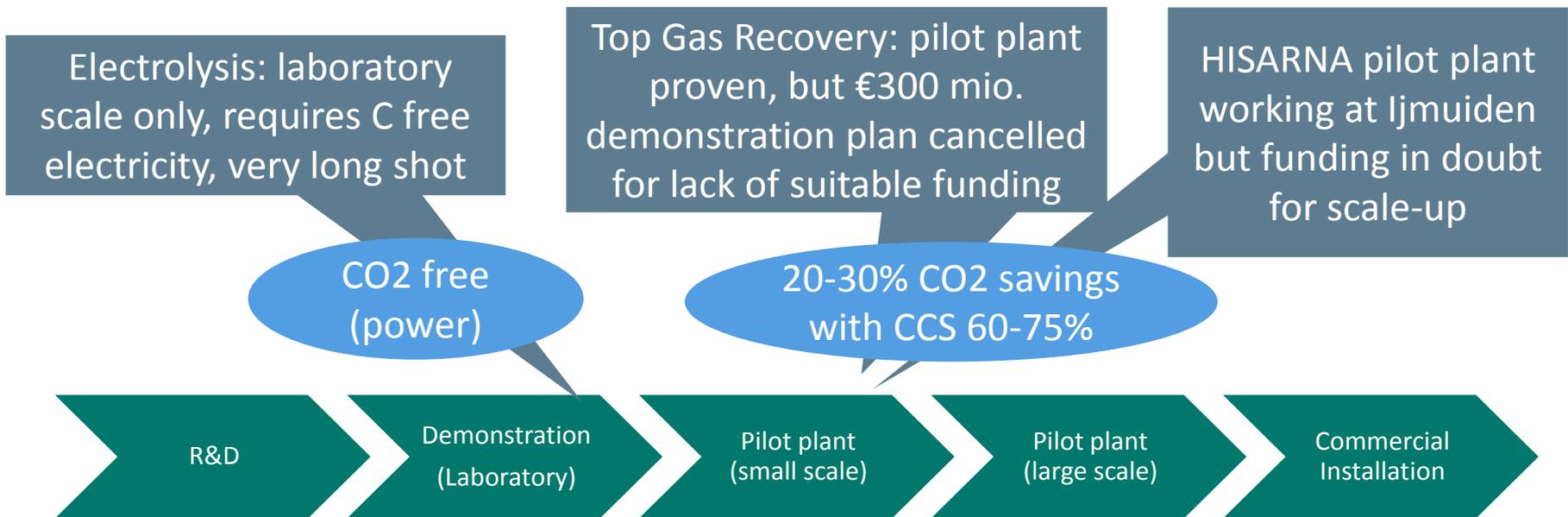
*Illustration*



- 10-15% Emission reduction potential in Western Europe;



- Investment limited by
  - Short pay back requirement (typically 2-4 years, now shorter)
  - Low profits and growth prospects of industry
  - Financial capacity of industry limited



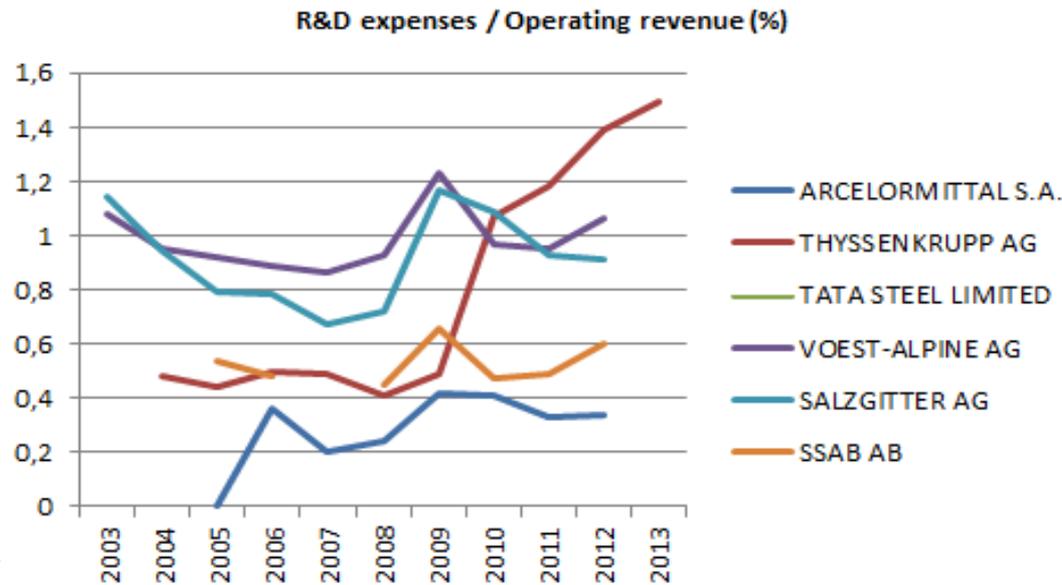
- Expectation of climate policy initiated ULCOS project

### Why have ULCOS projects stalled?

- CCS-based technologies only viable with permanent carbon pricing regime
- Steel firms not prepared to finance and take whole risk (EC was not prepared to take risk share under NER 300 facility)
- (Political challenges of CCS in Europe)

## 3 – Higher value steel products to deliver service with less weight

- Automotive 30-40% savings in body weight over the last 10 years
  - Innovative high strength steel & forming techniques (tailored blanks, hydroforming)
  - With competitive pressure from alternative materials
- Facilitated by value chain integration & regulatory requirements
  - UltraLight Steel Auto Body - private sector initiative 1990<sup>th</sup>
  - To meet fuel efficiency standards lighter components required
- R&D expenditures maintained through crisis period



Example buildings:

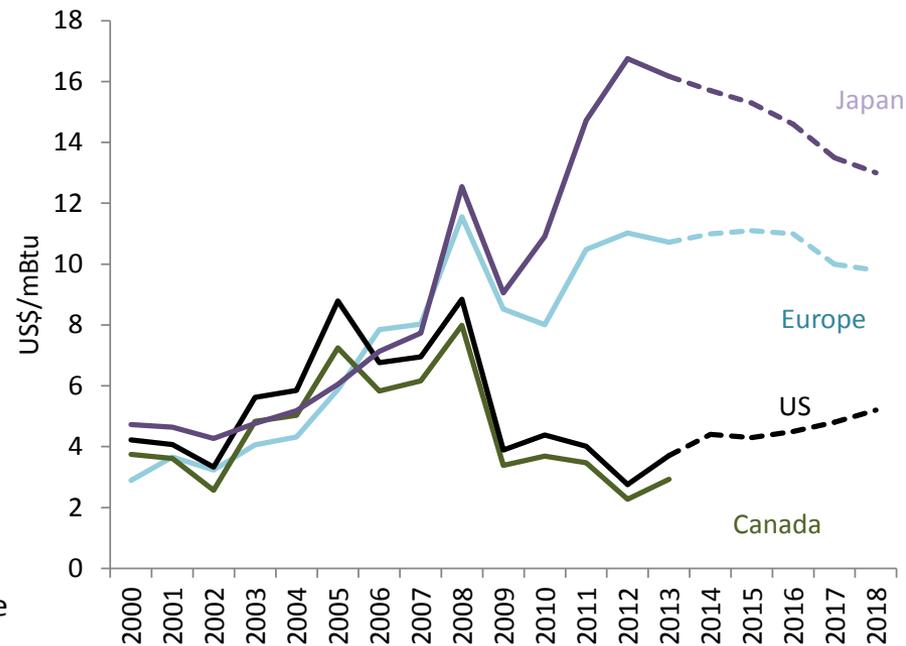
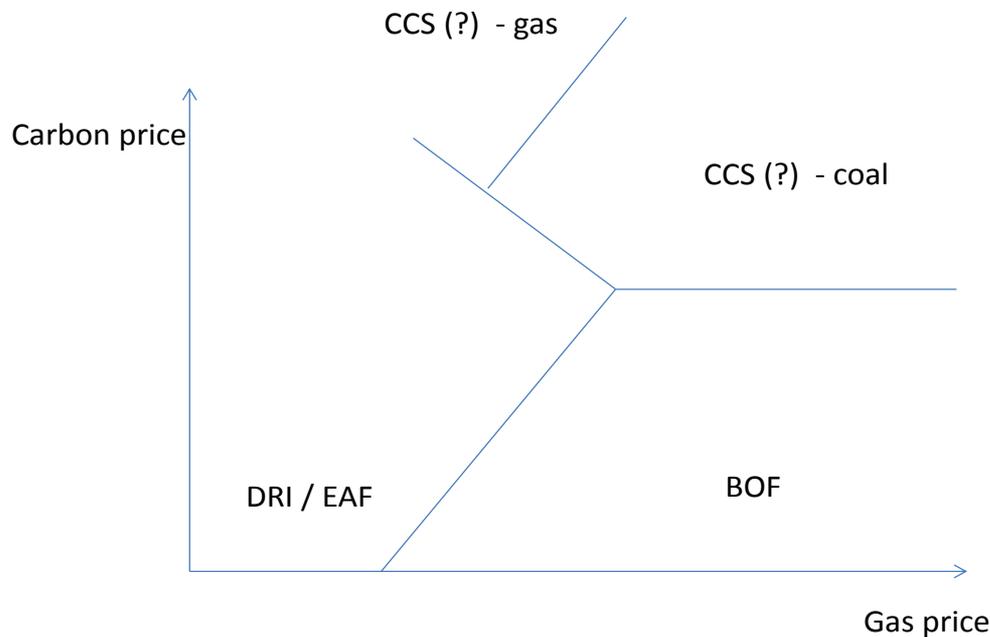
- Many products made of steel could be 25-30% lighter (technically)
- Steel use in buildings can be saved, for example, by using tailored shapes, supporting multiple loads with fewer structures, aligning loads to avoid bending, avoiding over-specification of loads etc.
- But several barriers inhibit change:
  - Excess use of steel can be cheaper than using less (e.g. risk of component failure, higher cost during design, quality control)
  - Fragmented value chain
  - Existing standards and regulation (e.g. minimum requirements instead of target requirements)

(Allwood et al 2012)

- Recycled steel has emissions up to 75% below primary steel
- Availability increases with maturity of economy, EU scrap=64% demand
- EU exports around 20% of its scrap because
  - Typically BOF furnaces only use 25% scrap
  - EAF can use 100% scrap, but share small outside Spain and Italy
  - Global CO2 emissions not influenced – only regional increase  
→ no need to constrain scrap-trade
- Recovery rates vary across products
  - Cars (almost 100%), steel packaging (74 %), buildings (lower)  
→ unlock improvement potential
- Declining quality of scrap due to increasingly complexity of products  
→ explore options to improve separation during design & recovery.

# Switching to DRI/EAF process route

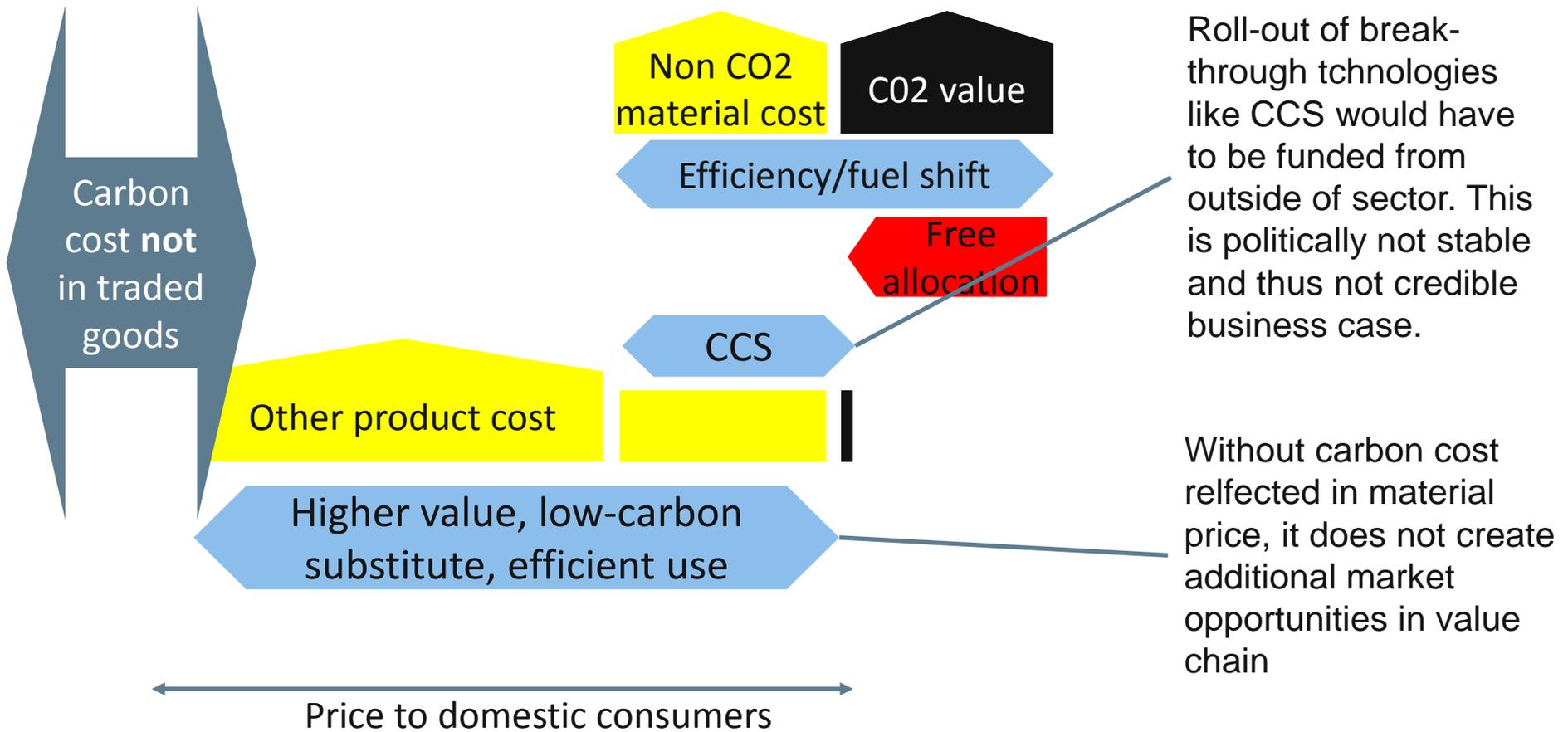
- DRI is not economic in EU due to high gas prices
- Combine DRI in North America with EAF in Europe?
- Still valid with methane emissions linked to North American shale gas?



	Strengthening ETS	Carbon price along value chain	Engagement of all actors	Funding of technology innovation
Unlocking efficiency potential	X			
Business case for break-through technologies like CCS	X	X		X
Higher value steel products and efficient use	X	X	X	X
Increasing recycling rates			X	

# 2

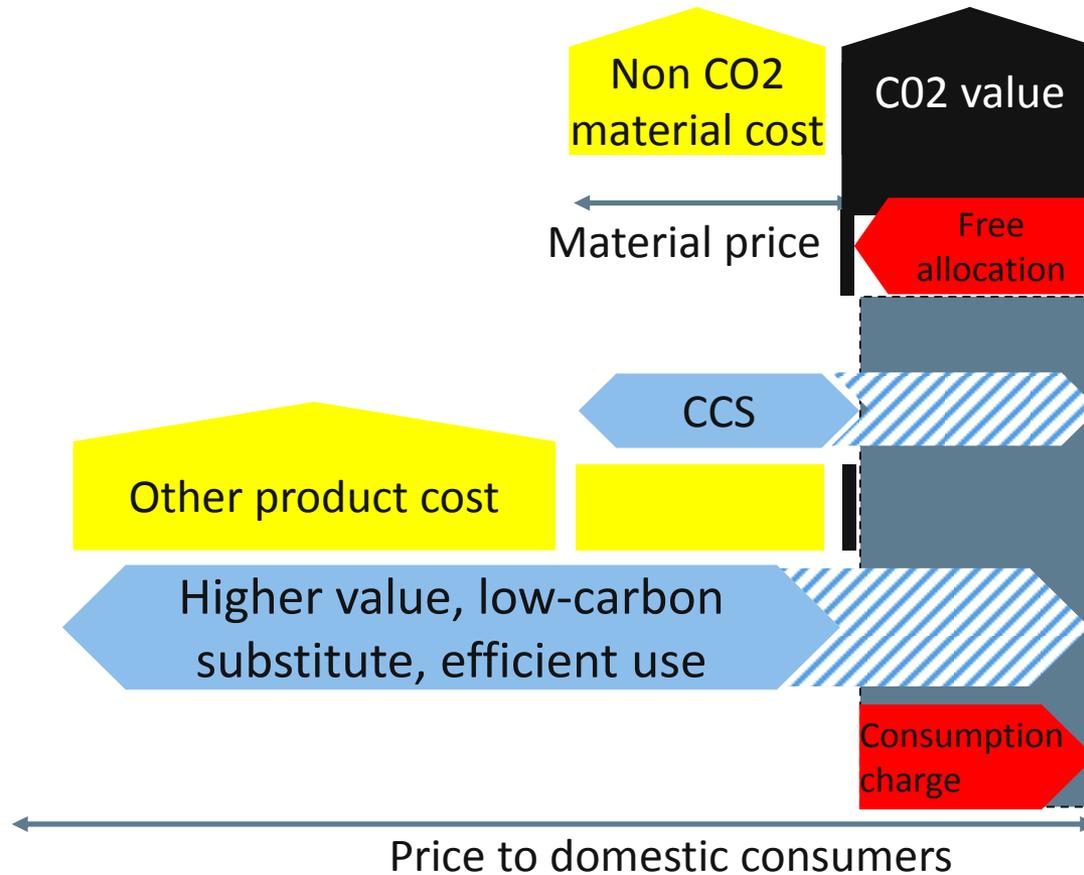
## Leakage protection with free allocation:



Incentives for mitigation other than for upstream efficiency are largely eliminated.

3

# Solution: Inclusion of consumption in ETS to complement dynamic free allocation



Thus ET can deliver the full incentives for all mitigation opportunities.

- Create liability with production in/import to territory
  - Measured in tons of steel, clinker .. (not steel type)
  - Embodied in imports (e.g. steel in cars above threshold)
- Trace liability with movement of material
  - Analogous to EMCS (Excise movement & control system)
  - Electronic reporting to national authority by both parties ensures correct transfer of liability
  - Liability vanishes with export from territory
- Levy charged with release for domestic consumption
  - At primary production benchmark \* ET allowance price
  - To national trust fund for climate action

- It is part of ET to deliver incentives towards environmental objective
- Charge is linked to carbon (bearing component) of product
- Revenue used to pursue climate action that was supposed to be funded with (forgone) auction revenue under ET
- Some revenue used to retire allowances to compensate for net-imports of carbon embodied in trade
- Level of charge based on ET allowance price
- Charge instead of obligation to surrender allowances for ease of administration

# 6 Inclusion of consumption is not a trade related measure

## **WTO perspective**

- Charge for final consumer irrespective of origin and process
- If implemented without discriminatory components not WTO relevant

## **Climate policy perspective**

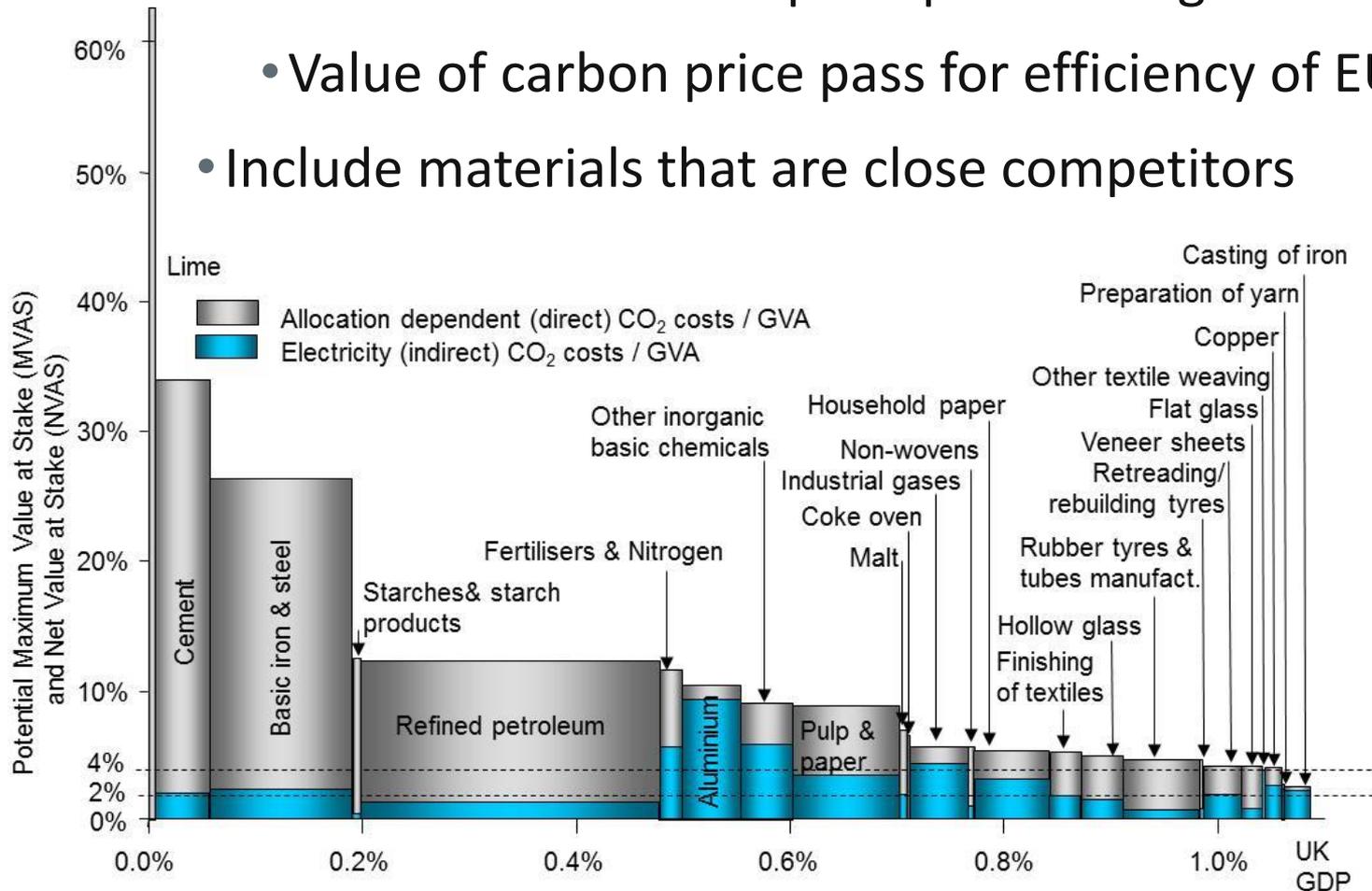
- Directly reflects aim to reduce consumption of CO<sub>2</sub>
- Paid by consumers not at border

## **Explored also in other regions for carbon intensive materials**

- to understand common challenge and share experience
- to identify possible aspects for coordination/cooperation

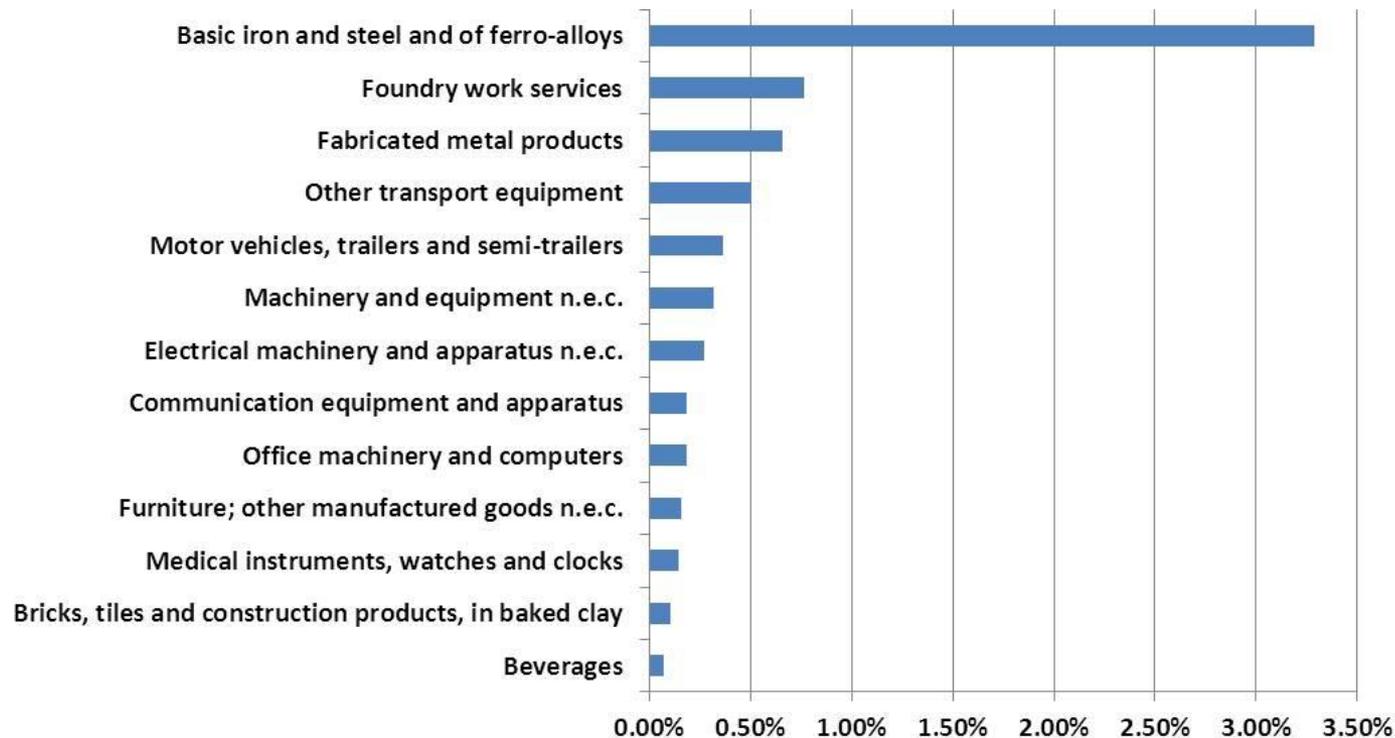
# For ease of implementation: Focus on few materials

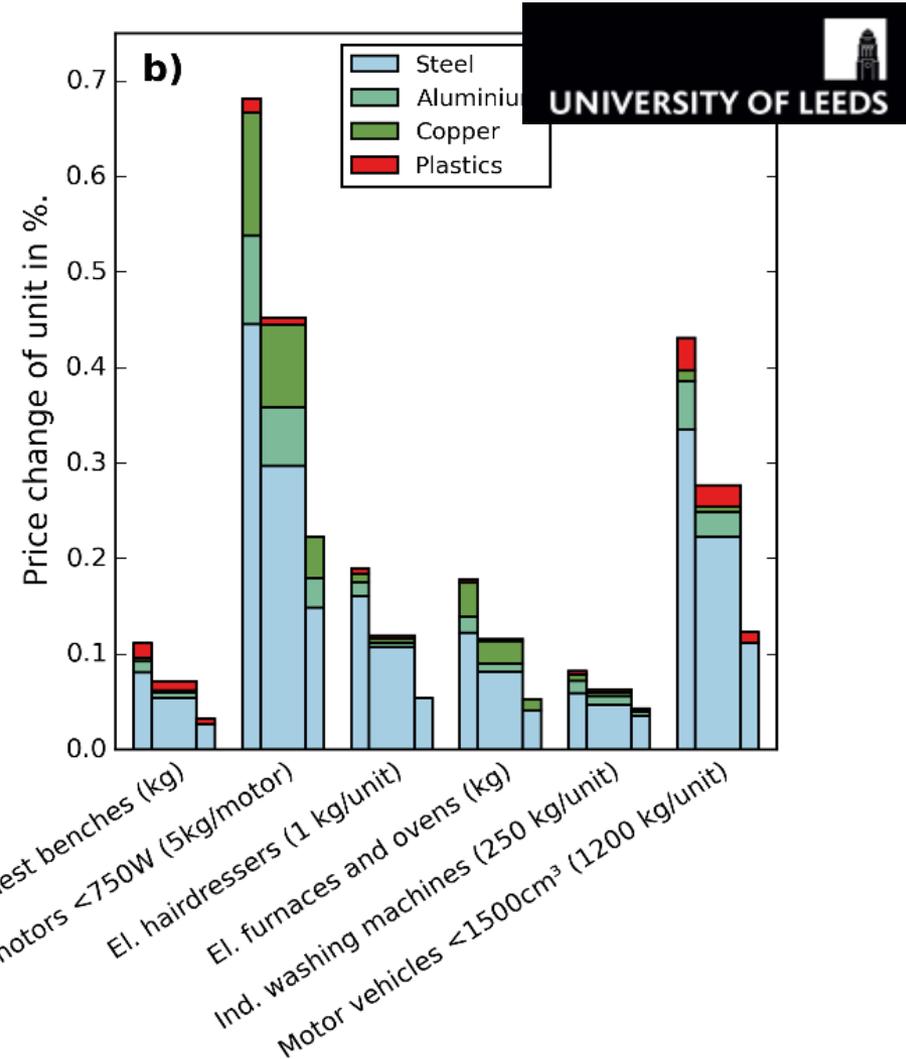
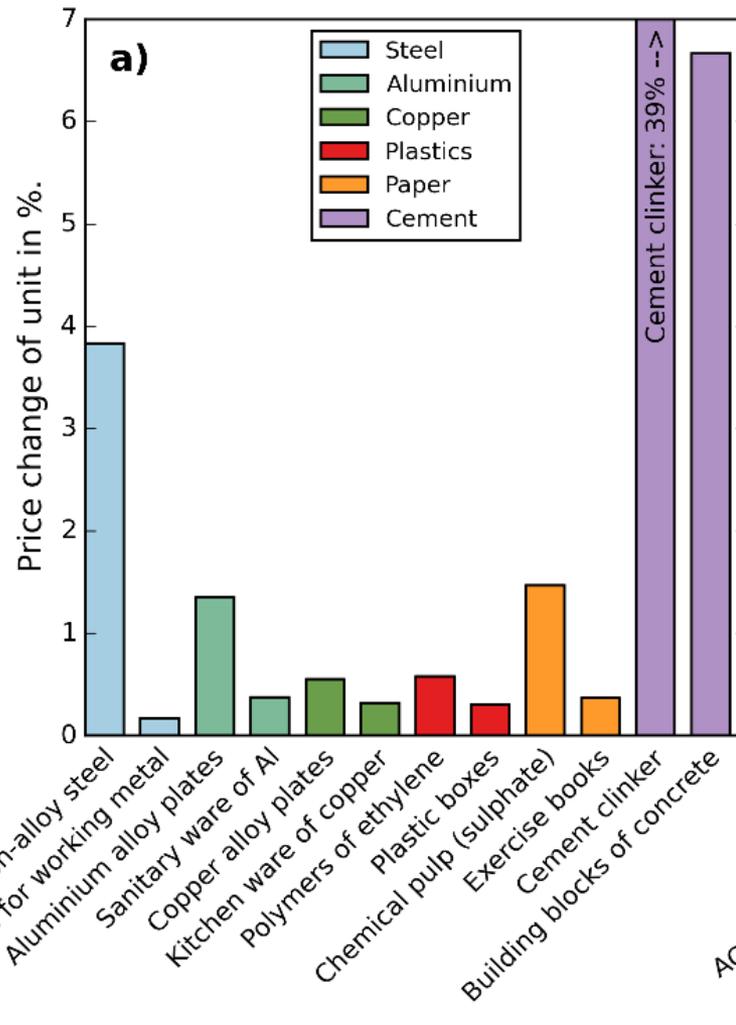
- Internationally tradable carbon intensive materials:
  - Potential for carbon price pass through small/uncertain
  - Value of carbon price pass for efficiency of EU ETS high
- Include materials that are close competitors



Industrial activities with the highest cost increase from carbon pricing, and their contribution to UK GDP, assumed carbon price increase 20 €/t CO<sub>2</sub>, electricity price increase 10 €/MWh.

- Domestic: self-selection whether or not to handle material (containing products) under levy suspension arrangements
- Imports if pre-defined categories of Standard International Trade Classification (SITC) or at self reported or at average level





For goods with multiple materials, steel is the largest contributor followed by aluminium, copper and plastics.



Production	Steel (med est)	Aluminium (med est)	Plastics (med est)	Cement (med est)
<0.01%	2845	3653	3331	4032
0.01-0.02%	109	145	119	0
0.02-0.05%	173	114	151	0
0.05-0.1%	162	42	112	0
0.1-0.2%	196	32	116	0
0.2-0.5%	200	26	152	0
0.5-1%	120	24	50	1
1-2%	94	10	13	4
2-5%	123	1	2	5
5-10%	20	0	0	2
10-20%	3	0	1	1
20-50%	2	0	0	2

Few groups show very high price changes. Large changes are due to unrealistically low original prices per kg and uncertainties in unit to kg conversion

		Ex-ante free allocation	Dynamic free allocation	Full auctioning & border carbon adjustment	Dynamic free allocation & Inclusion of Consumption
Result from carbon price to producers	Efficiency improvements				
	Fuel shifting				
Result from carbon price to intermediate and final consumers	New process technologies				
	Innovative materials				
	Innovative materials use				
Implementation	International acceptance				
	Ease of Implementation				

## **Facilitates investment in all abatement opportunities:**

- Establishes full carbon price to preserve incentives for innovation and investment in all modernization opportunities
- Costs allocation to consumers presents a credible perspective for break-through technologies

## **Long-term stability for investment business case & credible leakage protection:**

- Free allocation at full realistic benchmark without cross-sector reduction factor possible as full carbon price signal retained and auction revenue recovered.
- Allocation at recent production volume matches consumption charge.

## **Simple policy framework for decision makers:**

- Without conflicting interests, less uncertainty about future allocation volumes.
- Strategic decisions can assume full carbon price signal and no leakage risk  
(with free allocation and consumption charge only administrative details)

# Work packages and deliverables

**January 2015**



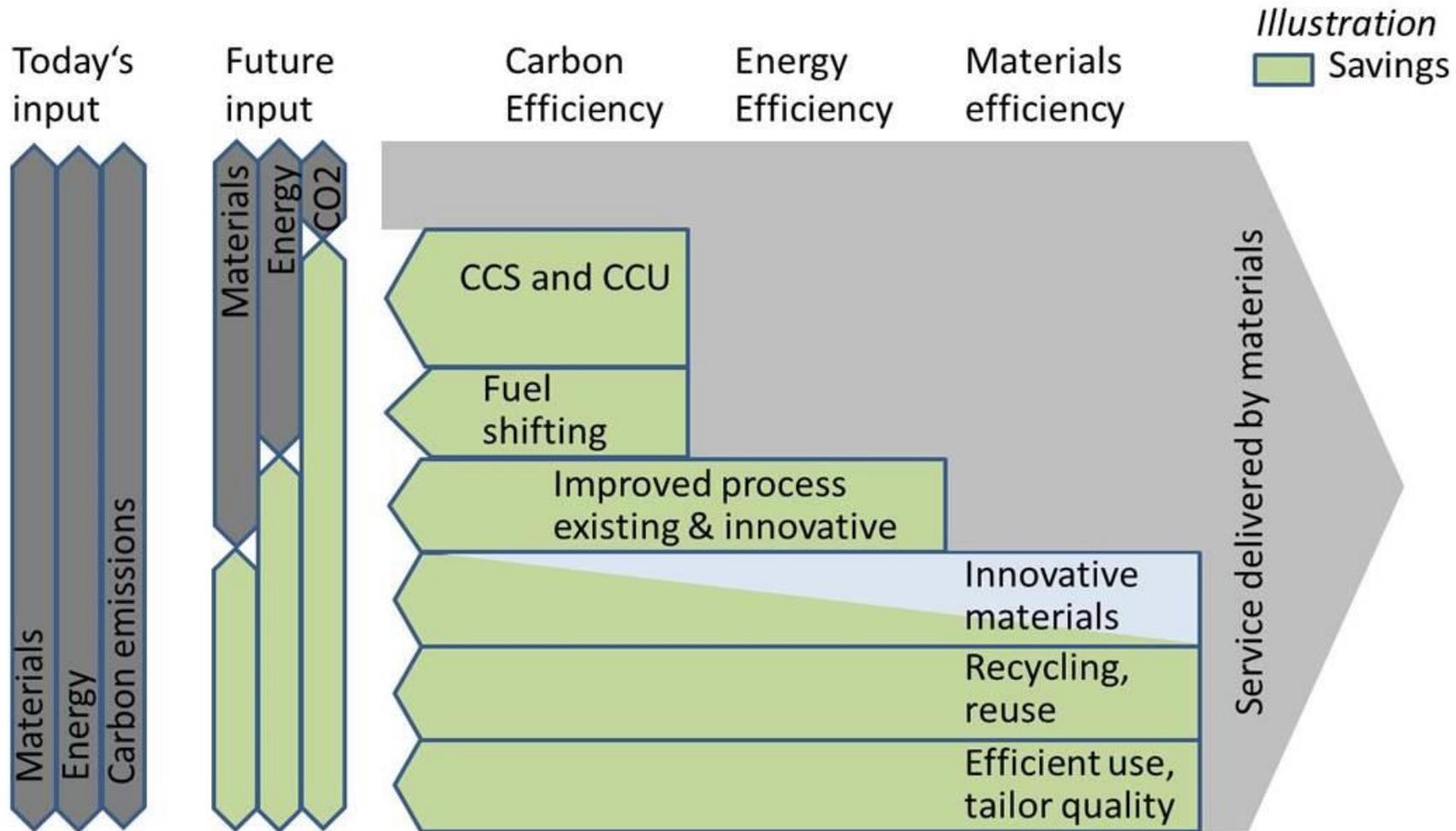
**August 2015**



**December 2015**

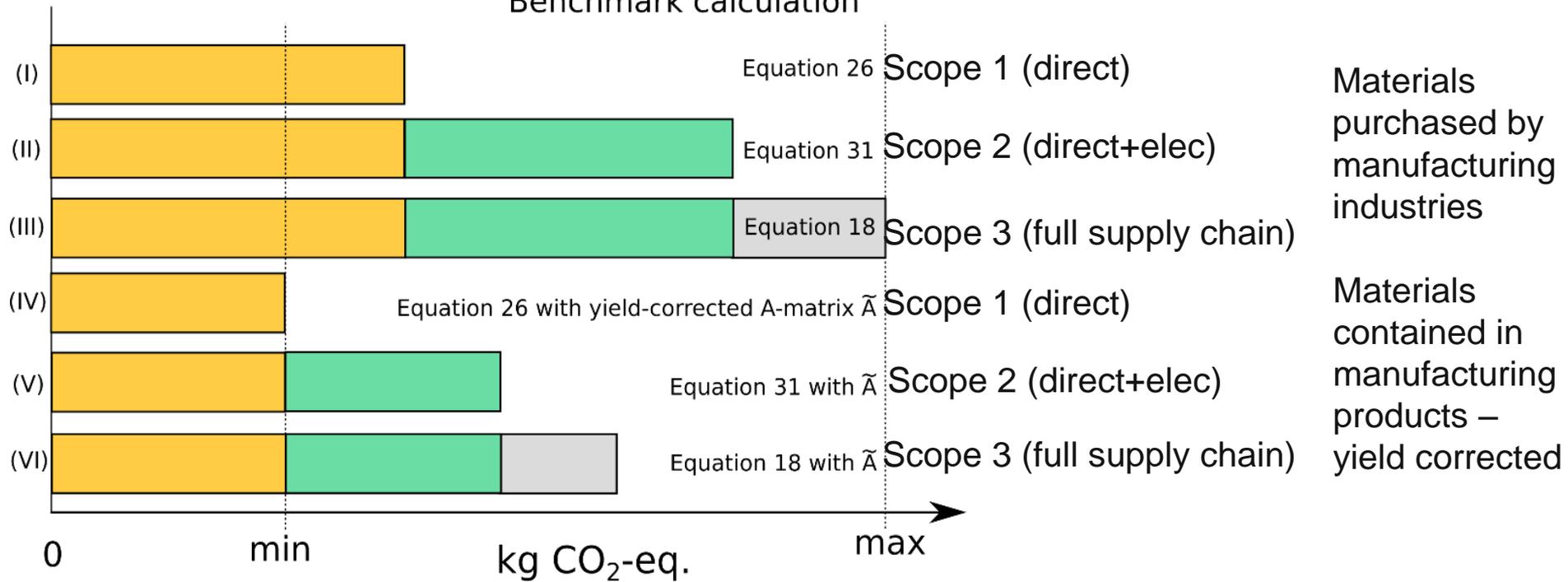
1. Sector specific analysis – main product groups and mitigation opportunities?
2. What emissions to cover for Inclusion of Consumption
3. Implementation details
  - International experience with design choices
  - Assessment of administrative costs
  - Legal analysis
4. Opportunities for internationally coordinated benchmarks
5. Cost impact and use of revenues
6. Communication of results
  - Research workshops
  - Synthesis paper
  - Outreach events

# Sector specific analysis: Main product groups and mitigation opportunities



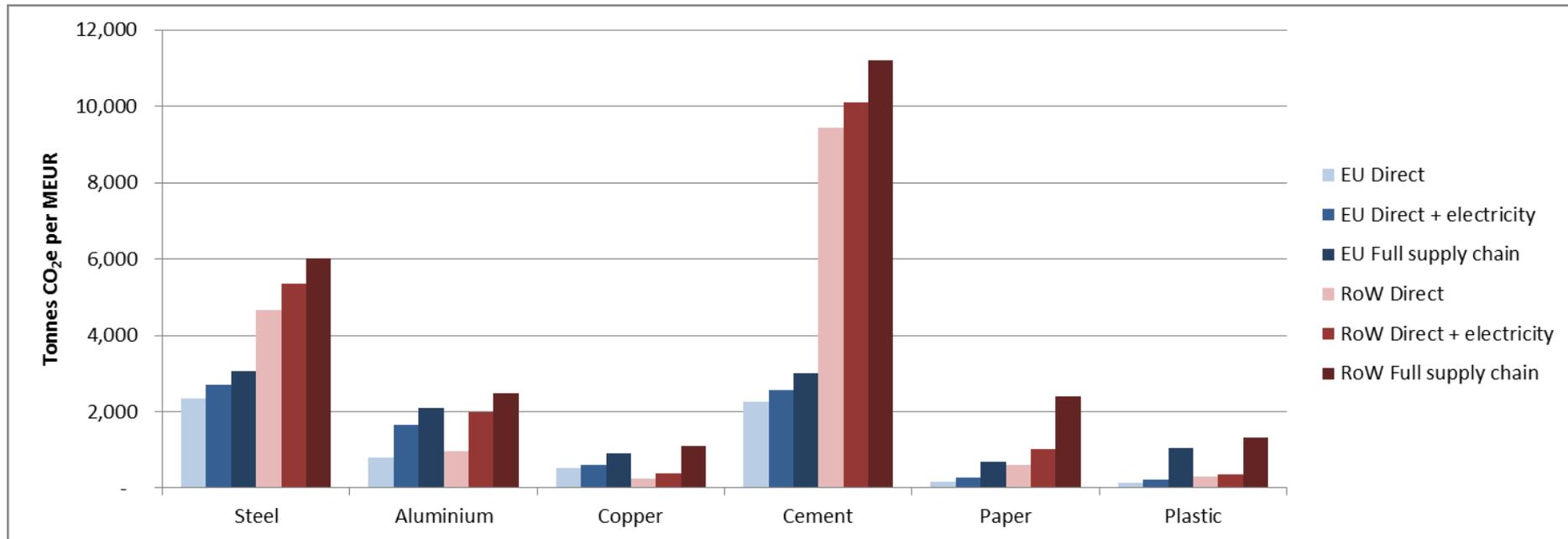


### Benchmark calculation



Legend:

- Scope 1: Direct emissions and first tier emissions
- Scope 2 - Scope 1: Emissions from electricity generation
- Scope 3 - scope 2: Emissions from materials production, service provision, and other ancillary inputs



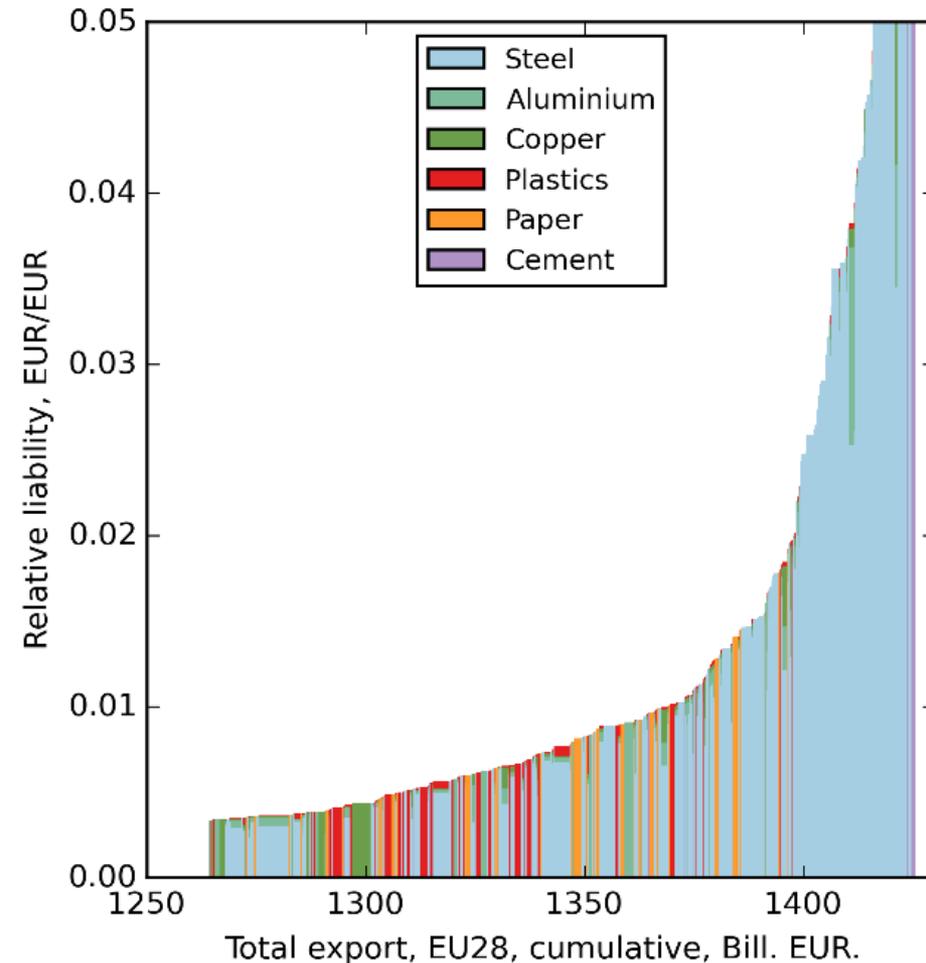
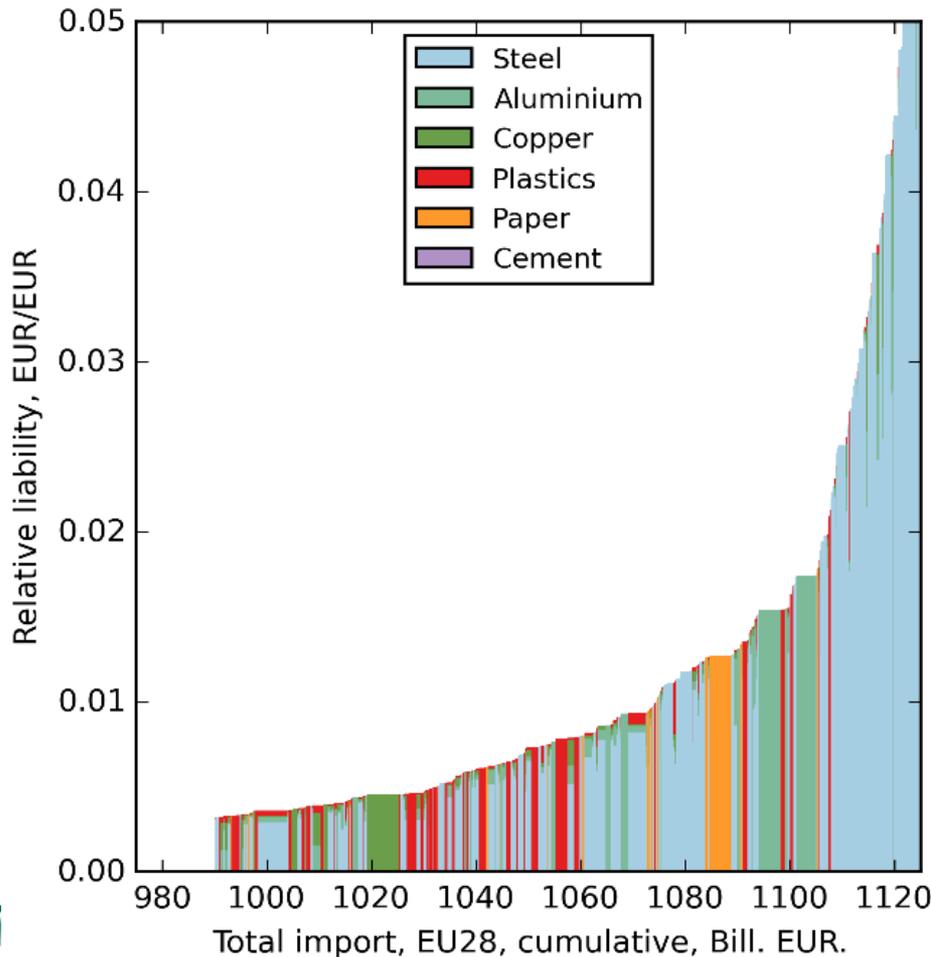
# What products to cover: What price changes occur?



imports

&

exports



“Why are the second wave of emissions trading schemes targeting the **consumption** of greenhouse gases? “

Evidence from:

1. Tokyo;
2. Korea;
3. California
4. Australia and
5. China (Shanghai)



# III

## Implementation details: Administrative costs

Inclusion of Consumption

Licensing

Reporting

Monitoring

**Economic operator**

**Gov Admin**

Application  
Renewal

Services  
Processing  
Site Visits

\$

\$

**Economic operator**

**Economic operator**

**Gov Admin**

Electronic  
systems  
Customs  
Declaration

Time

Electronic  
systems  
Site Visits

\$

\$

\$

## Including Consumption

Compatibility with EU Environmental Regulation & WTO

**Prof. Dr. iur. Roland Ismer, MSc Econ. (LSE)**

Friedrich-Alexander-Universität Erlangen-Nürnberg

Chair for Tax Law and Public Law

January 26, 2015



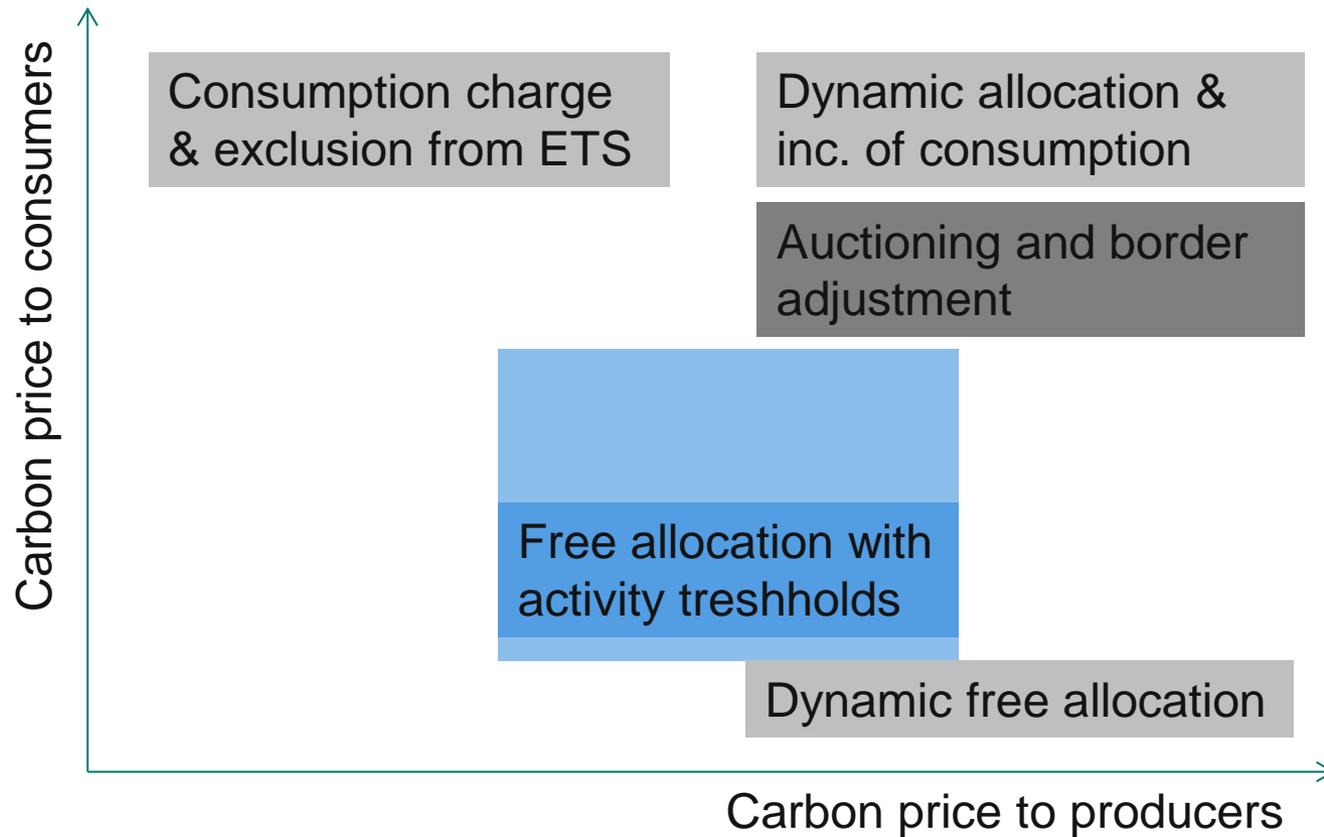
# IV Opportunities for international coordinated Benchmarks:

- International comparison of benchmarks at sector level (level, methodology of design, process of setting)
- Learning from aspects of international coordination (DIN, ISO)
- Dynamic benchmark setting in international context

Sector	Definition of product	Benchmark (t)	Sector	Definition of product	Benchmark (t)	Sector	Definition of product	Benchmark (t)
Aluminium	Pre-bake anode	0,324	Lime	Lime	0,954	Other	Carbon black	
Aluminium	Aluminium	1,514	Lime	Dolime	1,072	Other	Ammonia	
Cement	Grey cement clinker	0,766	Lime	Sintered dolime	1,449	Other	Steam cracking	
Cement	White cement clinker	0,987	Other	Soda ash	0,843	Other	Aromatics	
Ceramics and Bricks	Spray-dried powder	0,076	Paper	Short fibre kraft pulp	0,12	Other	Styrene	
Chemicals	Nitric acid	0,302	Paper	Long fibre kraft pulp	0,06	Other	Hydrogen	
Chemicals	Adipic acid	2,79	Paper	Sulphite pulp, thermo-mechanical and mechanical pulp	0,02	Other	Synthesis gas	
Chemicals	Vinyl chloride monomer (VCM)	0,204	Paper	Recovered paper pulp	0,039	Other	Ethylene oxide/ethylene glycols	
Chemicals	Phenol/ acetone	0,266	Paper	Newsprint	0,298	Other	Plaster	
Chemicals	S-PVC	0,085	Paper	Uncoated fine paper	0,318	Other	Dried secondary gypsum	
Chemicals	E-PVC	0,238	Paper	Coated fine paper	0,318	Other	Plasterboard	
Cokery	Coke	0,286	Paper	Tissue	0,334			
Glass	Float glass	0,453	Paper	Testliner and fluting	0,248			

- The use of revenue from Inclusion of Consumption
- Cost impact for different household groups and public budgets

- Research Workshops
- Interim Policy Report
- Final Synthesis Report
- Outreach events



Beijing, China, 7.7.2015

# Inclusion of Consumption

## Beijing Project Workshop

Karsten Neuhoff

