# The Future of ETS
# Economic and Environmental Effectiveness

Brussels, October 11th 2006

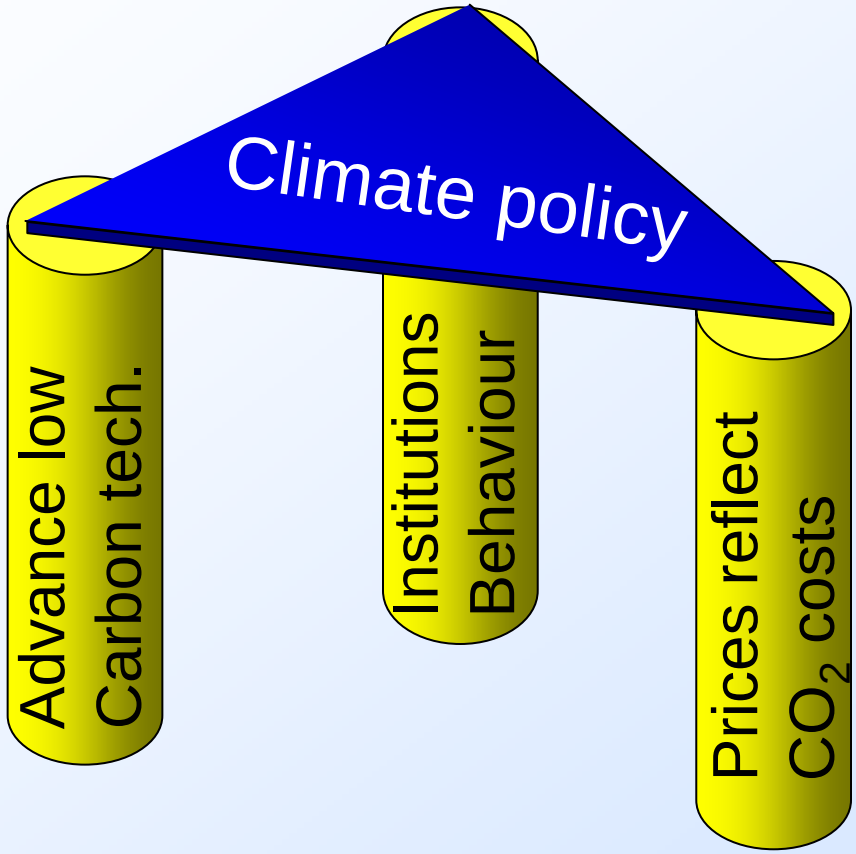
Karsten Neuhoff
Cambridge University

A project of the scientific network Climate Strategies
www.climate-strategies.org
And the Electricity Policy Research Group, Cambridge University
www.electricitypolicy.org.uk

## Future of ETS - Econ and Environmental Effectiveness

- The role of the European Emission trading scheme
- Challenge I – Distortions from allocation
  - and how can we avoid them
- Challenge II - Price stability
  - the role of auctions, contracts and consistency
- Challenge III - International competitiveness
  - Who is affected?
  - Possible perspectives and instruments
- Conclusions

# ETS is an important pillar of our Climate Policy




- We can internalise $CO_2$ prices with emission trading or taxes
- Initial free allowance allocation facilitated introduction of ETS

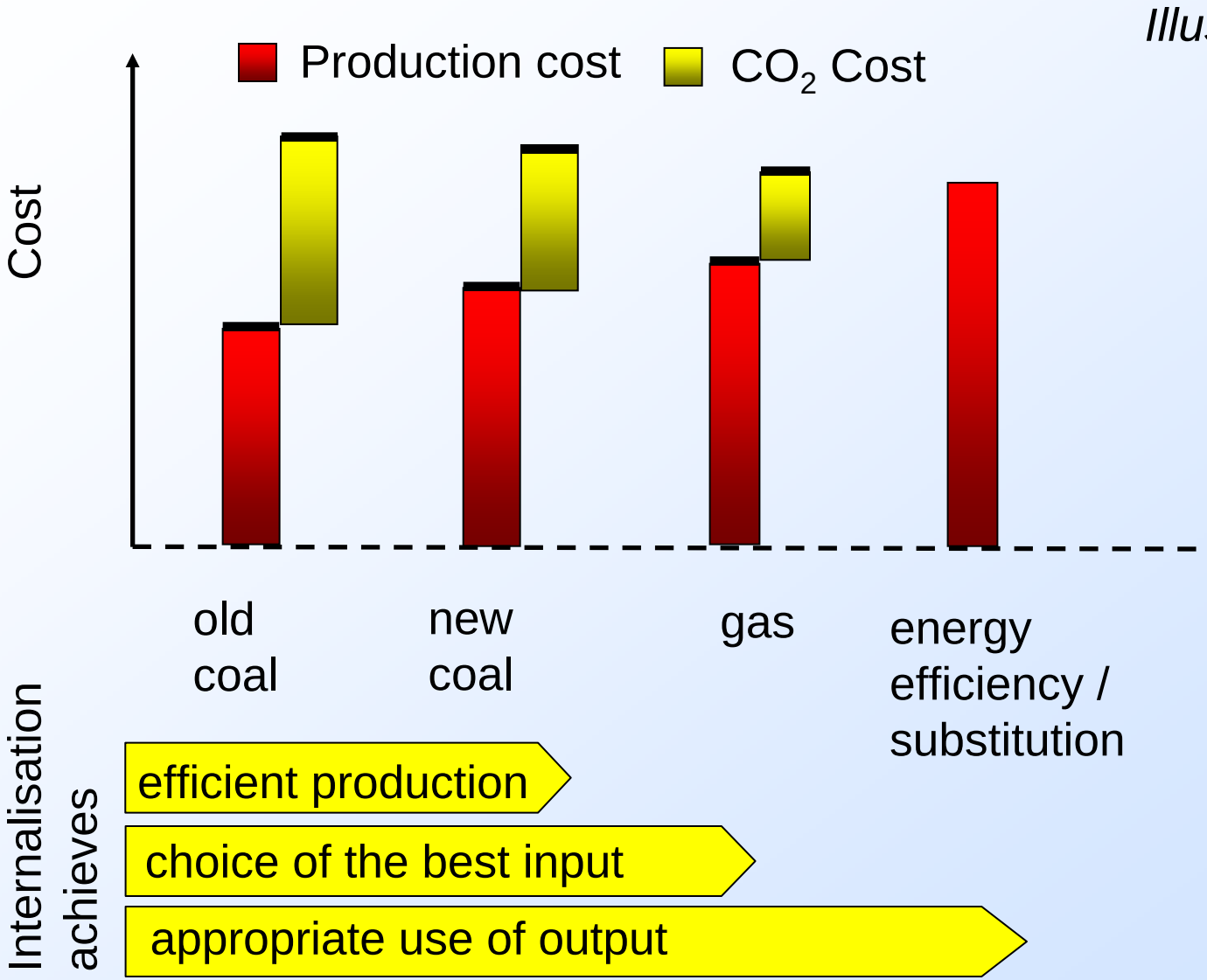
# And succeeds in internalising $CO_2$ prices

Example forward prices for electricity

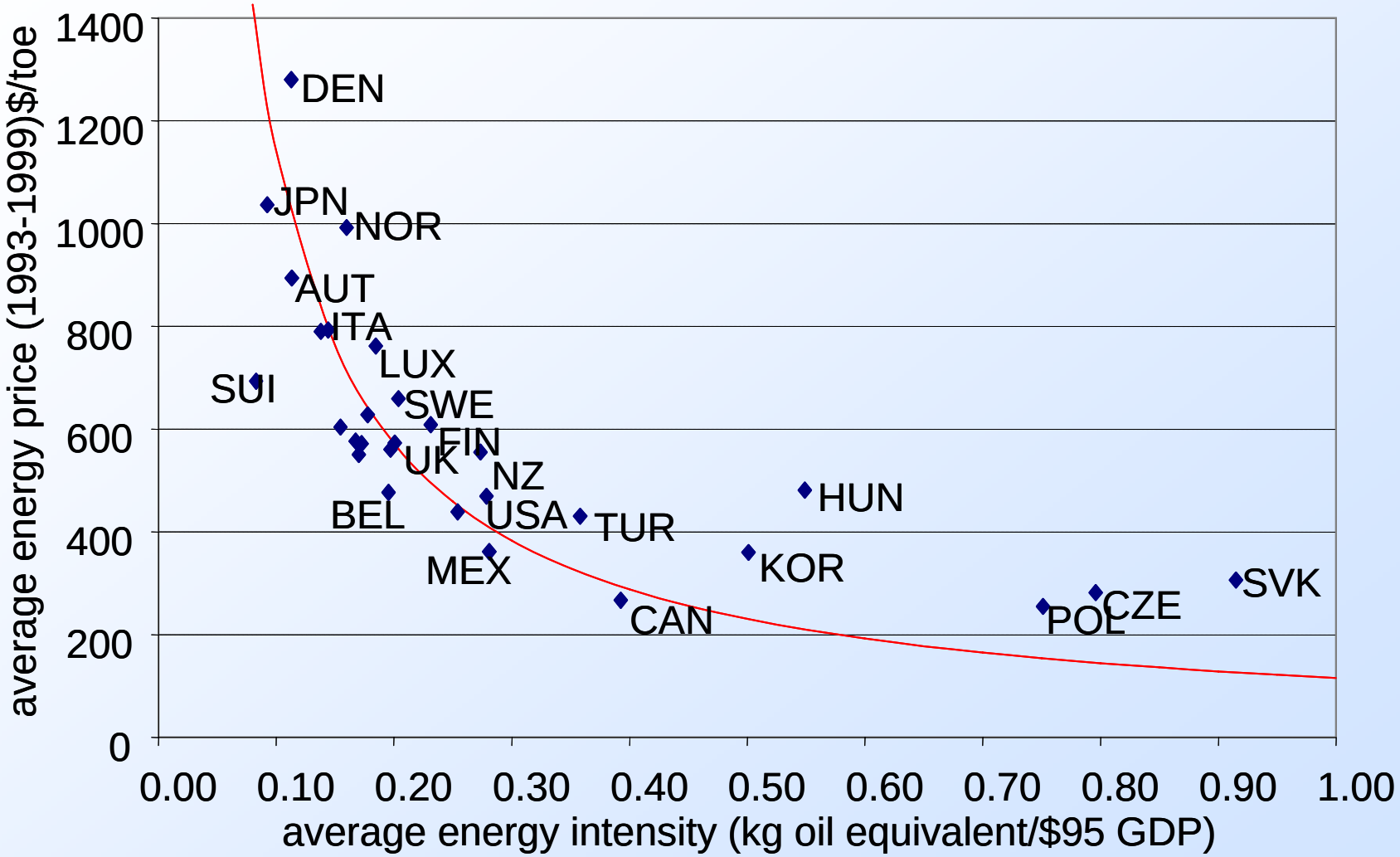

Source, www.eex.com, prepared by Alexandra Maratou

# Why is it important to internalise $CO_2$ costs?

*Illustrative*

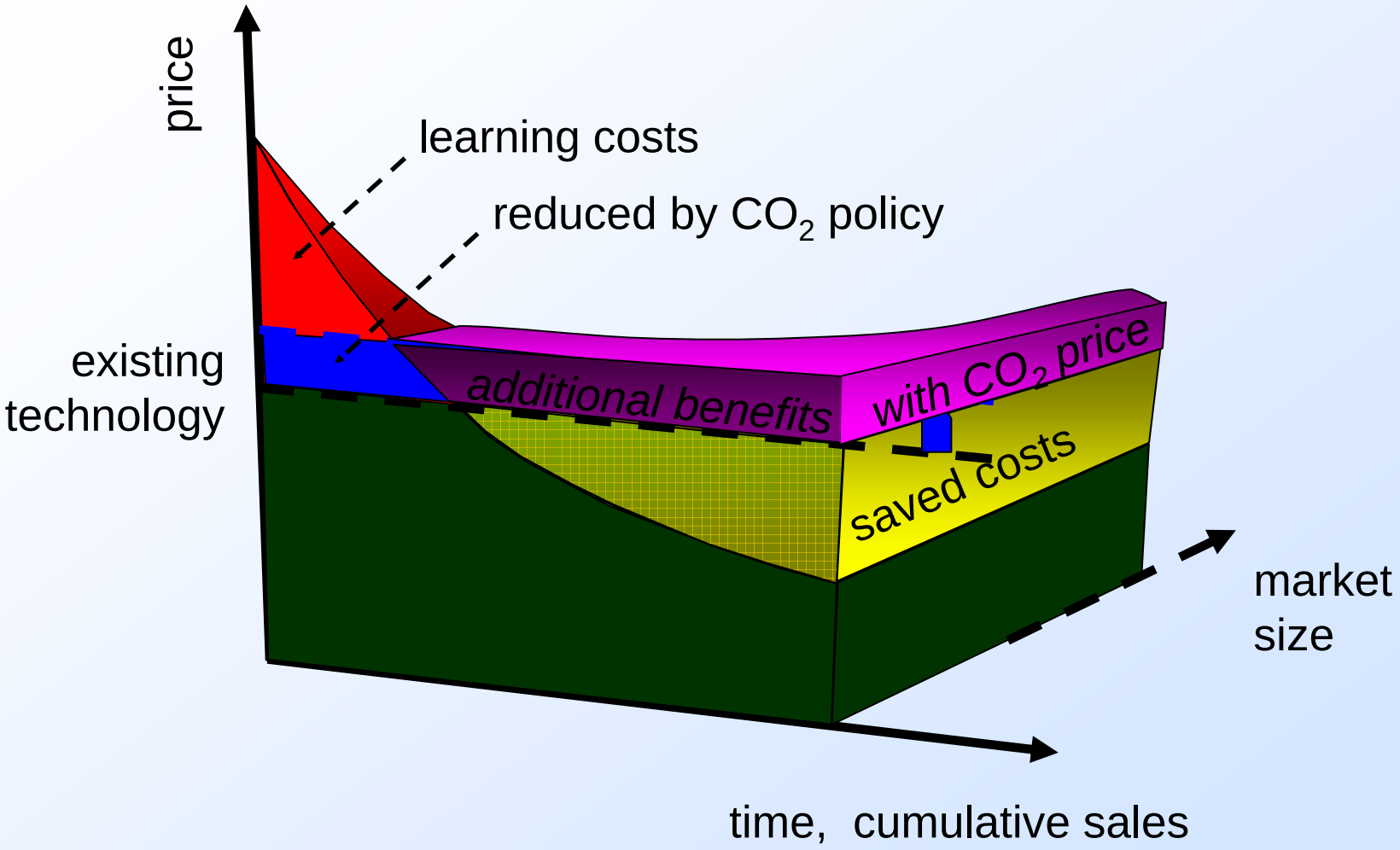


# Cross country evidence:
# High energy price correlate with effective energy use




Source: Newbery 2003

# ETS complements technology policy

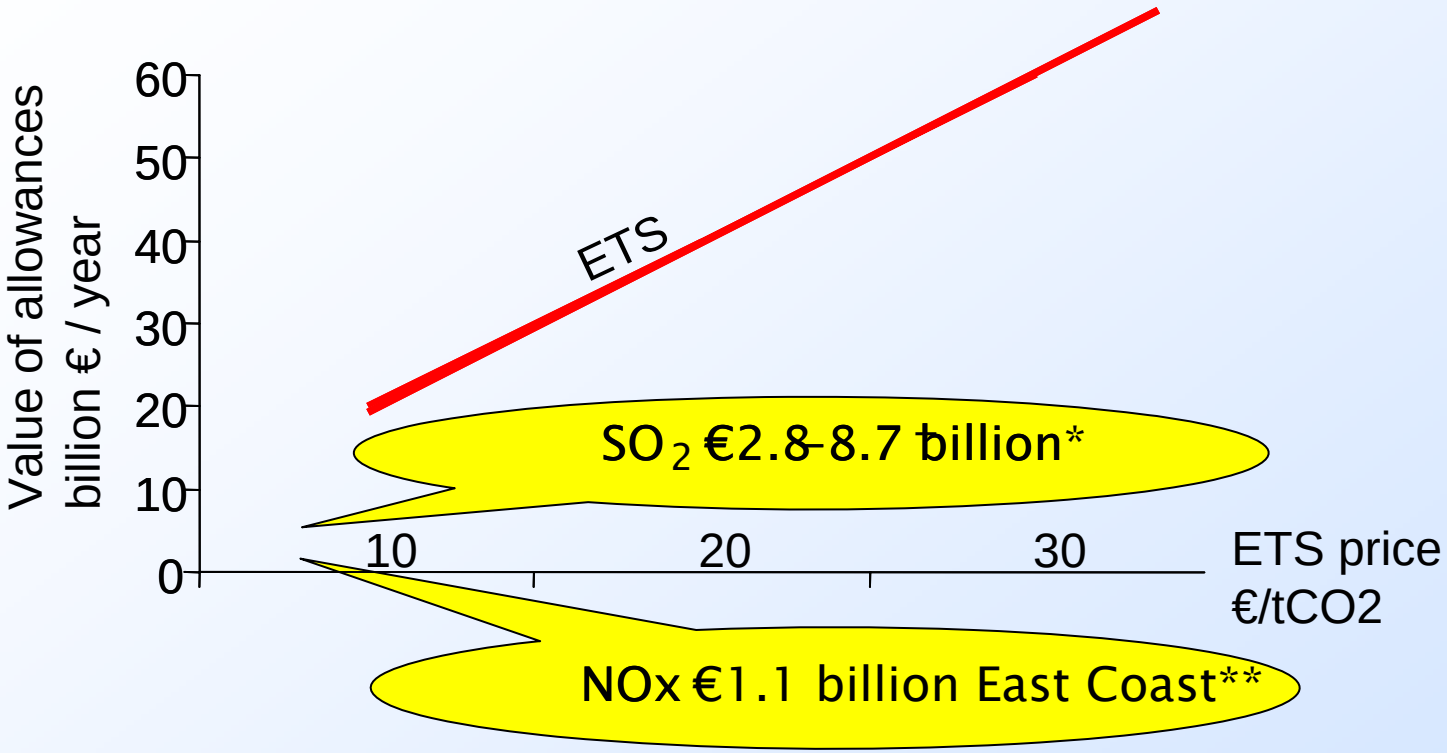



ETS is no substitute for technology policies (e.g. renewable support)

## Future of ETS - Econ and Environmental Effectiveness

- The role of the European Emission trading scheme
- Challenge I – Distortions from allocation
  - and how can we avoid them
- Challenge II - Price stability
  - the role of auctions, contracts and consistency
- Challenge III - International competitiveness
  - Who is affected?
  - Possible perspectives and instruments
- Conclusions

# Allocation matters, because EU ETS is worth billions



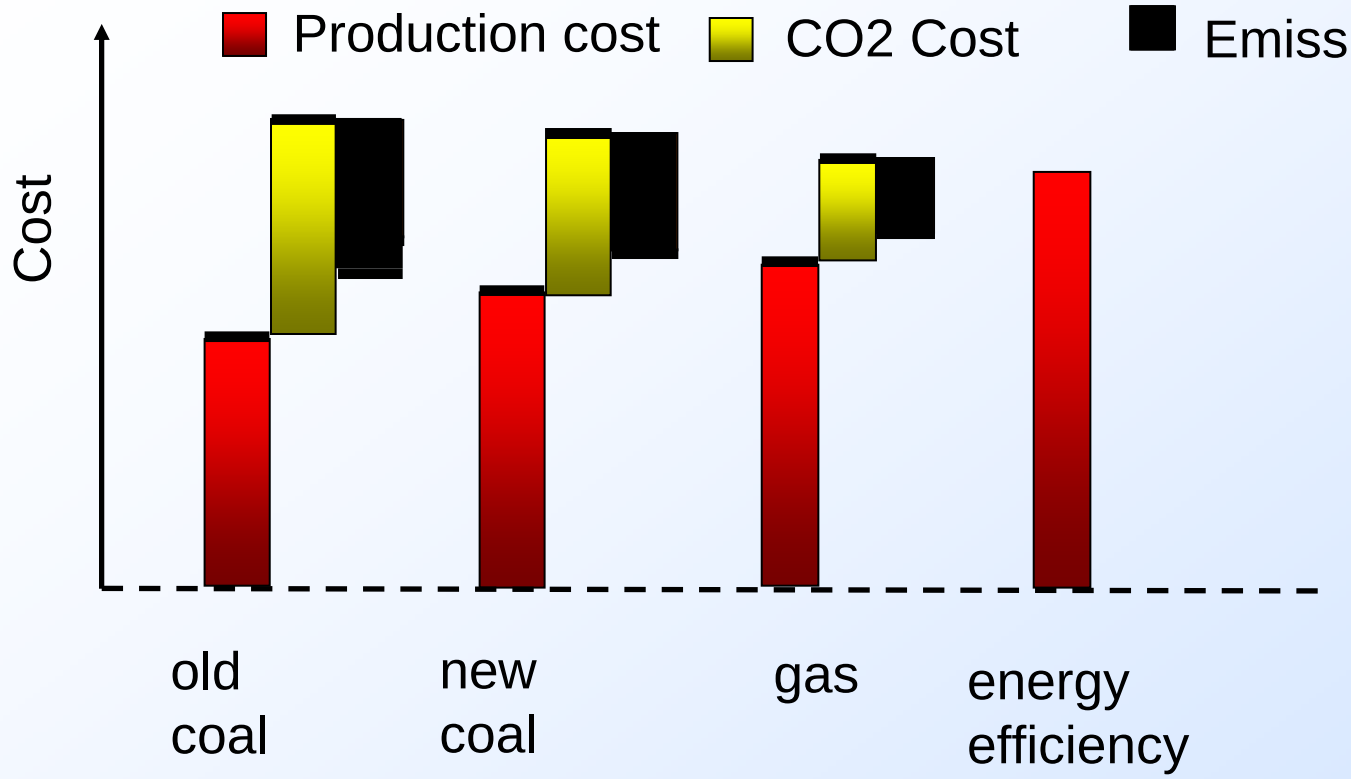

Money at stake drives firms' behaviour

* 10 mio t at 270-850 $/short ton, ** 640 000t at 2000 $/short ton

## The multi period nature of ETS constrains options for effective allowance allocation

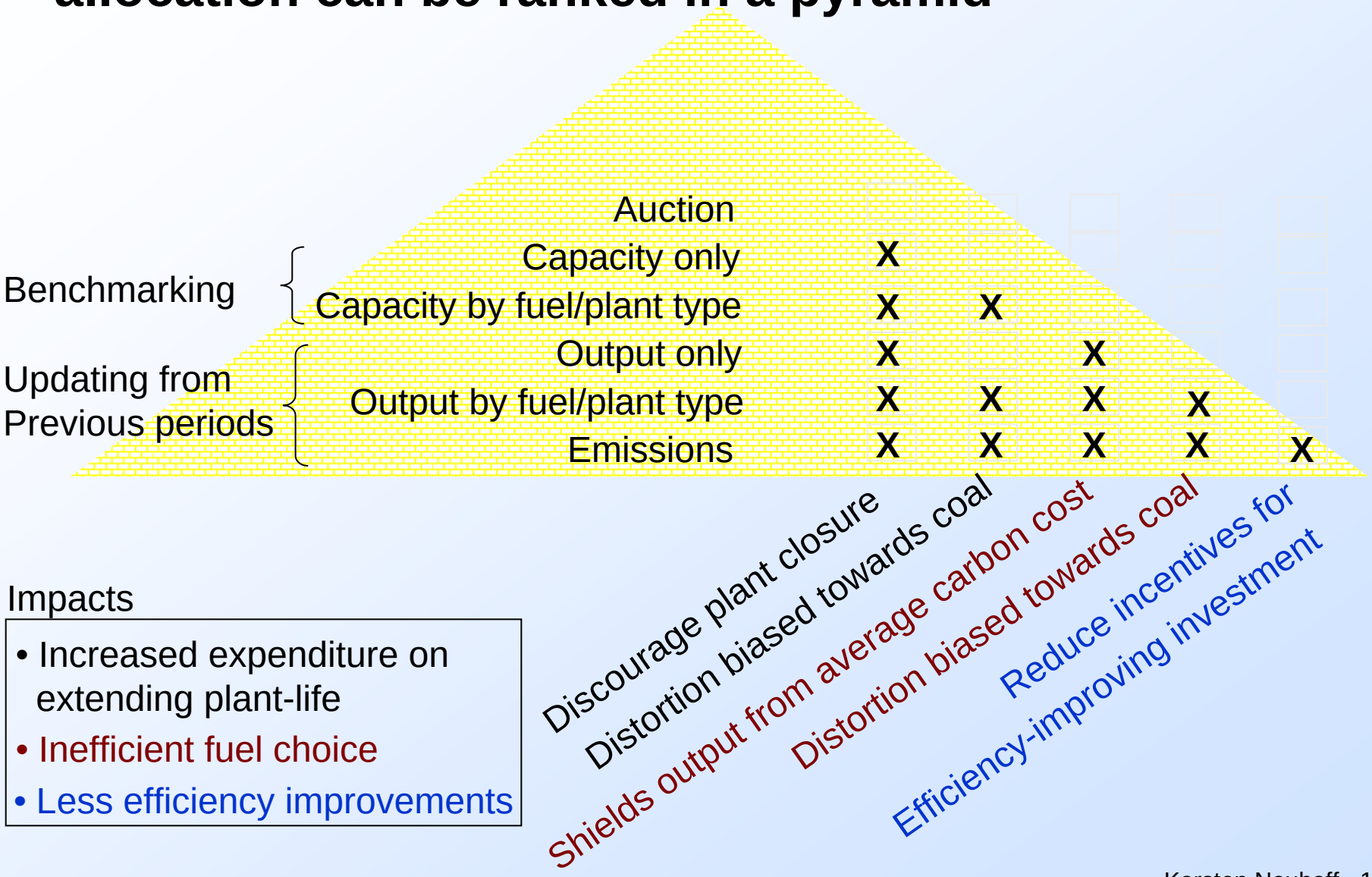
- Commitment periods of 3-5 years
  - Reflect growing scientific evidence
  - Increasing public awareness
  - Nature of international negotiations
- Create iterative regimes, with iterative allocation
- Governments not credible in committing to not using recent information

# And the resulting allocation methods create distortions




| | Auction / Grandfathering | Uniform updating | Fuel specific updating | Emission based allocation |
|---|---|---|---|---|
| efficient production | √ | √ | √ | |
| choice of the best input | √ | √ | | |
| appropriate use of output | √ | | | |

# These distortions from repeated free allowance allocation can be ranked in a pyramid




Impacts

- Increased expenditure on extending plant-life
- Inefficient fuel choice
- Less efficiency improvements

## State Aid rules might address these distortions and protect efficiency and thus competitiveness

- Free allocation involves an element of state aid
- Some aid may be justifiable (e.g. for environment reason)
- Proportionality principle seems important criteria
  - Free allocation to compensate for transition costs
- Allow temporary profits for industry (e.g. 2005-2012)
  - if countries show efforts (e.g. 10% auction 08-12)
  - and commit to phasing out free allocation post 2012

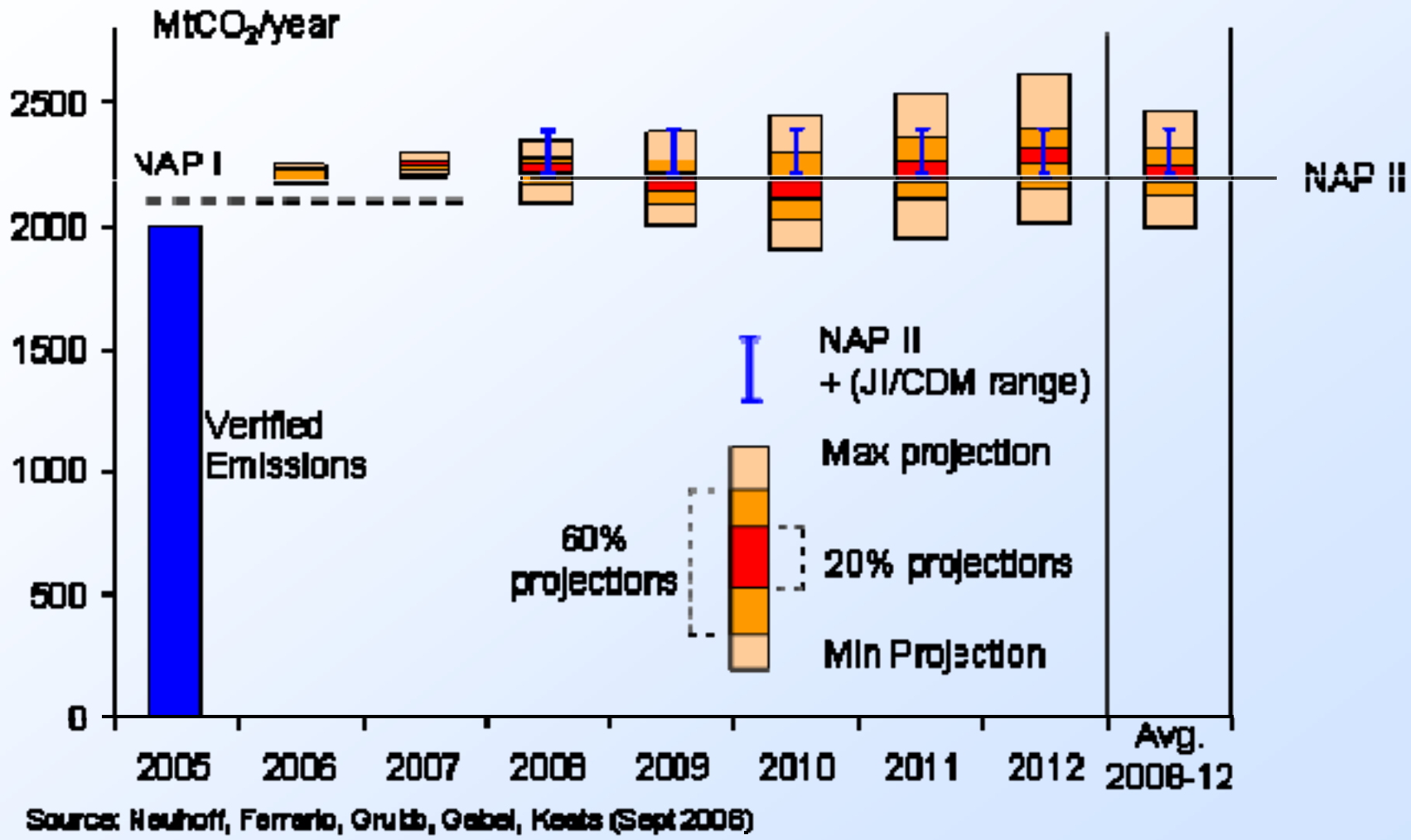
## Summary free allowance allocation

- Repeated free allocation undermines ETS effectiveness
- Move towards auctions ensures efficient decisions on Investment, Operation and Consumption
- Don’t abuse allowance allocation for other political objectives (subsidies generation investment, coal, …)
  - Economic interactions too complex for policy process
  - Undermines credibility and thus effectiveness of ETS to deliver along any objective

## Future of ETS - Econ and Environmental Effectiveness

- The role of the European Emission trading scheme
- Challenge I – Distortions from allocation
  - and how can we avoid them
- Challenge II - Price stability
  - the role of auctions, contracts and consistency
- Challenge III - International competitiveness
  - Who is affected?
  - Possible perspectives and instruments
- Conclusions

# Projection uncertainty large relative to abatement




Source: Neuhoff, Ferrario, Grubb, Gobel, Keats (Sept 2006)

- Cap envisaged in NAPII too lax –> expected price low –> revisit NAPII
- Projections difficult – uncertainty about price likely to remain

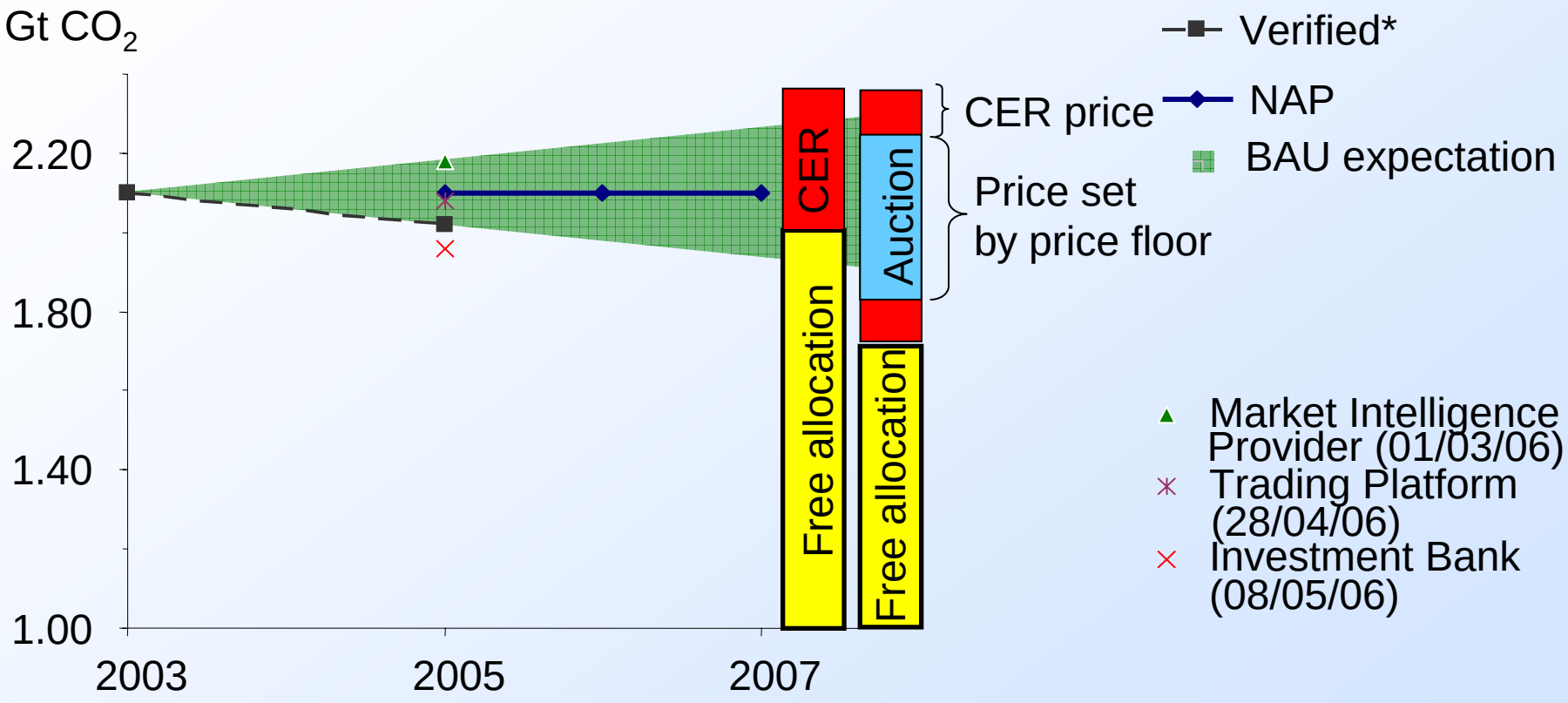
## Traditional approach for price stabilisation

- Normal commodity – use banking and borrowing:
  - Option to borrow might reduce incentive to act
  - Debt might drive future negotiation position
  - Links current price to uncertainty about future targets
- Normal commodity – extend commitment period
  - Not credible, if future targets likely to change
- Currency – ask central bank to stabilise
  - Creates financial exposure especially with gaming

-> all three approaches not really viable

-> But predictable prices desired, they drive investment

# Set price floor in auctions to stabilise price




Coordinated auction with price floor can set floor to allowance price

- Facilitates low carbon investment
- Reduces emissions and thus allowance price

** Still incomplete data as of 5 June 2006*

## Auctions with price floor for price stabilisation

- Auctions are viable and simple option for allocation
- Directive allows for up to 10% auctions in 08-12
- We suggest to a coordinated auction with price floor
- Use supplementarity criteria to limit CER inflows
  - if their price too low relative to desired price floor
- Some allowances from auctions will be required
  - thus they determine a price floor
- Price ceiling – difficult to align with Directive
  - price spikes unlikely given current projections
  - flexibility from CERs likely to prevent price spikes

## Option contracts on $CO_2$ for price stabilisation

- Governments sell option contracts to private parties
- Creates property right, strong enforceability
- Length corresponds to desired commitment, e.g.15a
- Investors can call an option:
  - Hands in option + $CO_2$ allowance
  - receives strike price, e.g. 15 Euro/t $CO_2$
- Hedges investment, and also stabilises $CO_2$ price:
  - Investors will call options if $p_{CO2}$<15 Euro/t$CO_2$

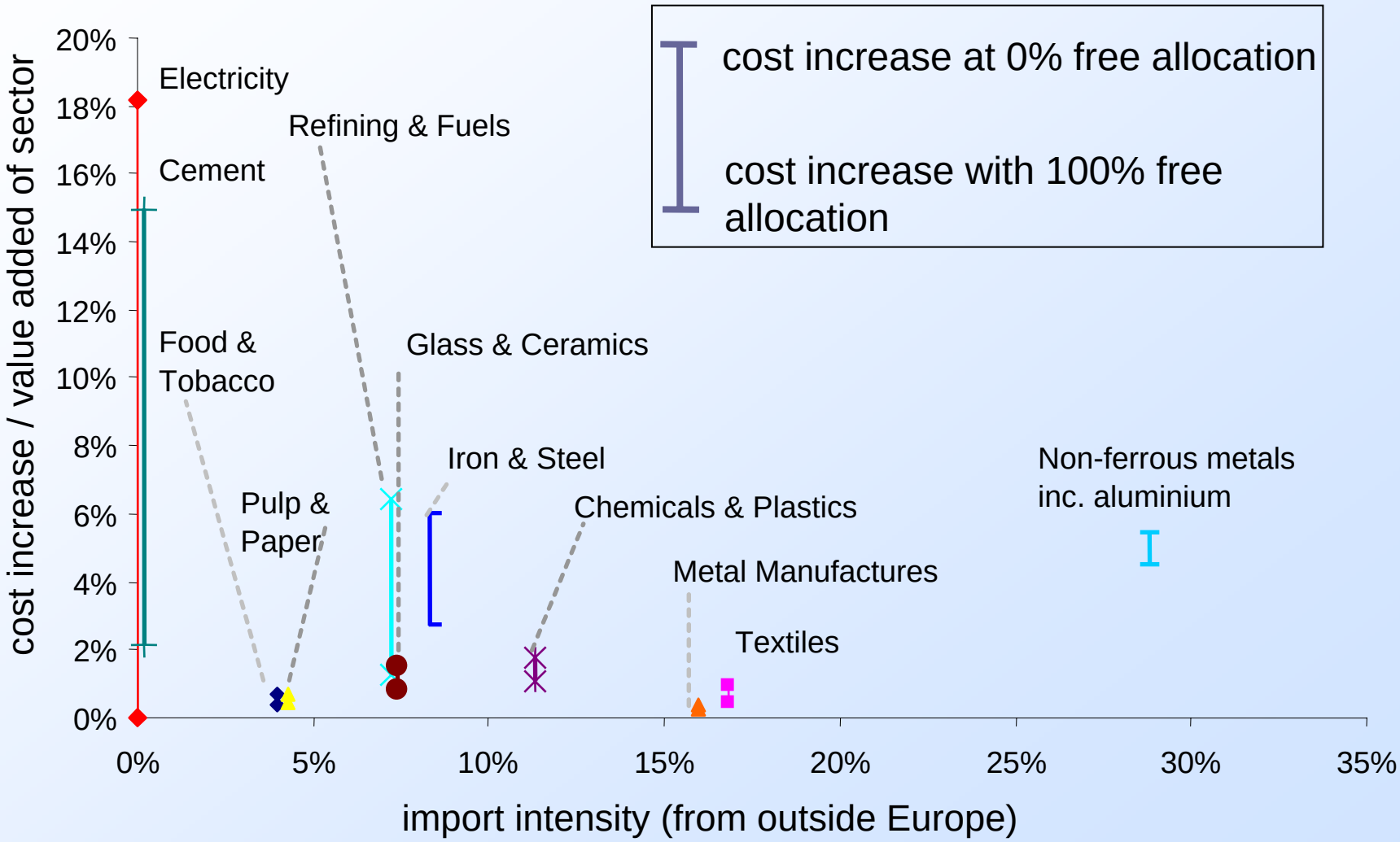
    -> Reduce supply, pushes up price
  - Governments avoid buying back allowances

    -> Restrict issuing allowances to retain scarcity price

## Future of ETS - Econ and Environmental Effectiveness

- The role of the European Emission trading scheme
- Challenge I – Distortions from allocation
  - and how can we avoid them
- Challenge II - Price stability
  - the role of auctions, contracts and consistency
- Challenge III - International competitiveness
  - Who is affected?
  - Possible perspectives and instruments
- Conclusions

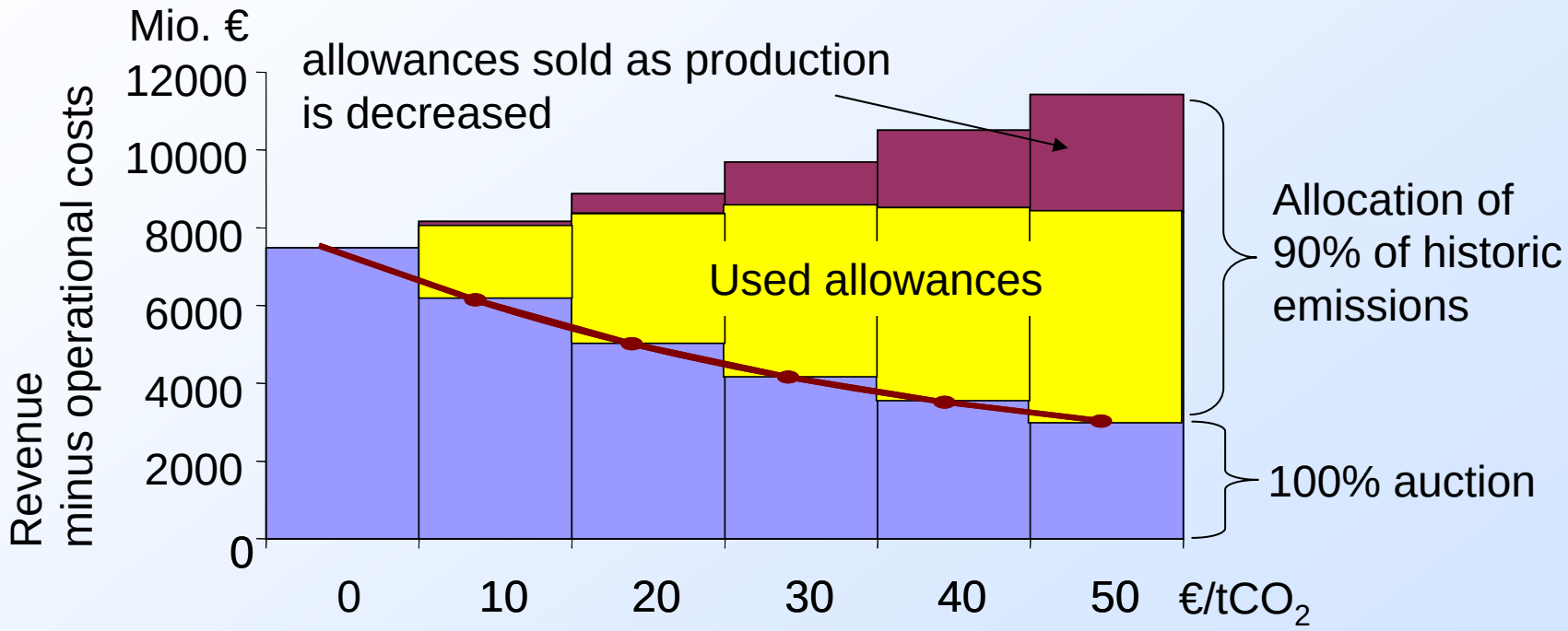
# Emission trading affects competitiveness of few sectors




Assumption: UK, 15 €/t$CO_2$, 10 €/MWh

# The current approach of free allocation shields profits, not the production of effected sectors

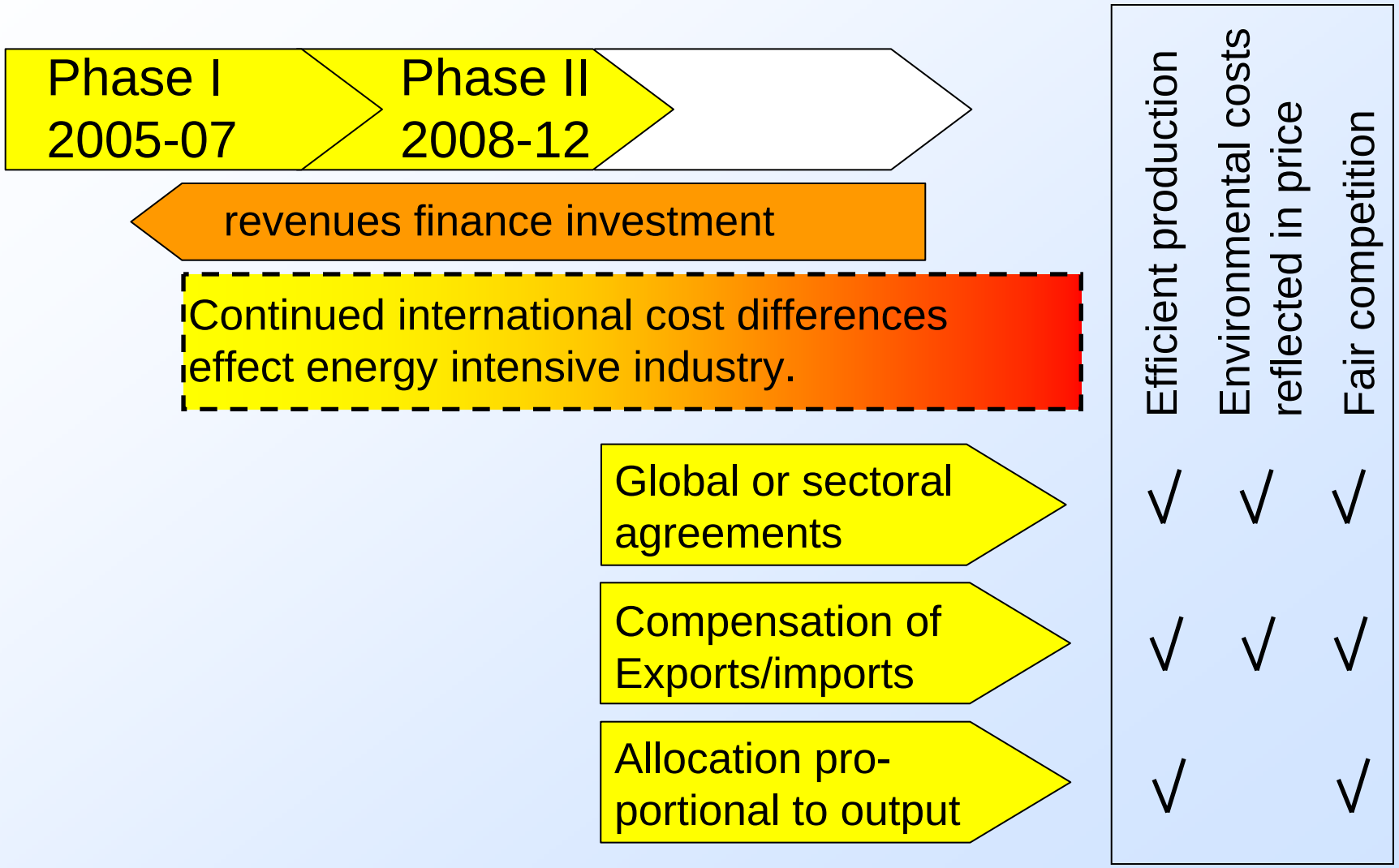
Example: Cournot model of the European cement sector




- energy intensive industry has usually high fixed costs
- relocating production is a strategic (long-term) decision
- competitiveness is affected by post 2012 perspective

Assumptions: For 20€/tCO2, extended cost: +14€/t cement ~200km by road`

# Robust solutions for post 2012 exist




We will find the best solution in an international dialogue.

# EU ETS faces five structural options for post-2012

| Option for post-2012 | Comments |
|---|---|
| (1) Embed “as is” in a comprehensive global agreement | The “first-best” – almost certainly unobtainable |
| (2) Embed “as is” in global sectoral agreements covering core exposed sectors | More credible in terms of “high politics” but institutionally wholly unprecedented – how to reach binding deal with global sectors? *Hybrid* with (1) could be explored |
| (3) Move to output-based and/or downstream allocations for core competitively exposed sectors | Removes core incentives related to product pricing & substitution and complicates system |
| (4) Sectoral protection through Border Tax Adjustment | Maintains core incentives but complicates trade and carries attendant risks of trade disputes |
| (5) Abandon the EU ETS | Disaster for EU credibility and for global efforts to tackle the problem |

## Future of ETS - Econ and Environmental Effectiveness

- The role of the European Emission trading scheme
- Challenge I – Distortions from allocation
  - and how can we avoid them
- Challenge II - Price stability
  - the role of auctions, contracts and consistency
- Challenge III - International competitiveness
  - Who is affected?
  - Possible perspectives and instruments
- Conclusions

# Conclusions: Allocation for 2008-12

- Significant cut back of free allocations to power sector
  - To address state aid / distributional concerns
  - Shift to benchmarking not historic emissions basis
  - New entrants: undifferentiated, harmonised rules
- Modest cutback for other sectors
  - Induces participation, reduces perverse incentives
- Use flexibility of Directive and auction 10% of allowances
  - Floor price creates price stability and low carbon investment
  - Creates positive expectations about post 2012 price formation
- Do not commit now to allocation beyond 2012
  - Keep options open to address competitiveness post 2012

# Conclusion: Design post-2012

- Credibility post 2012 requires consistent design
  - Effective, efficient and political sustainable
  - Address competitiveness by creating level playing field
- Exploration with other Kyoto Parties fallback options for global scheme
  - Sectoral agreements covering all significant trade partners
  - Sector- and carbon-specific border tax adjustments
  - Output-based (intensity) allocation and downstream allocation
- Phase out free allocation post 2012
  - Governments can’t commit to ignore recent information
  - Repeated free allocation creates early action problem
  - Addresses state aid concerns
  - It is consistent with international options

# EU ETS allocation and competitiveness

Papers available: www.electricitypolicy.org.uk

| | |
|---|---|
| Allocation and competitiveness in the EU Emissions Trading System: **policy overview** | Grubb, Neuhoff |
| Emissions, firm profits, and market prices: the consequences from emissions trading | Smale, Hartley, Hepburn, Ward, Grubb |
| CO2 cost pass through and windfall profits in the power sector | Sijm, Neuhoff, Chen |
| Allocation, incentives and distortions: the impact of EU ETS emissions allowance allocations to the electricity sector | Neuhoff, Keats, Sato |
| CO2 abatement, competitiveness and leakage in the European cement industry under the EU ETS | Demailly, Quirion |
| Free Allocation of allowances under the EU Emissions Trading System – legal issues | Johnston |
| Auctioning of EU ETS Phase II allocations: how and why? | Hepburn, Grubb, Neuhoff, Matthes, Tse |