



Improving investment framework for low Carbon technologies

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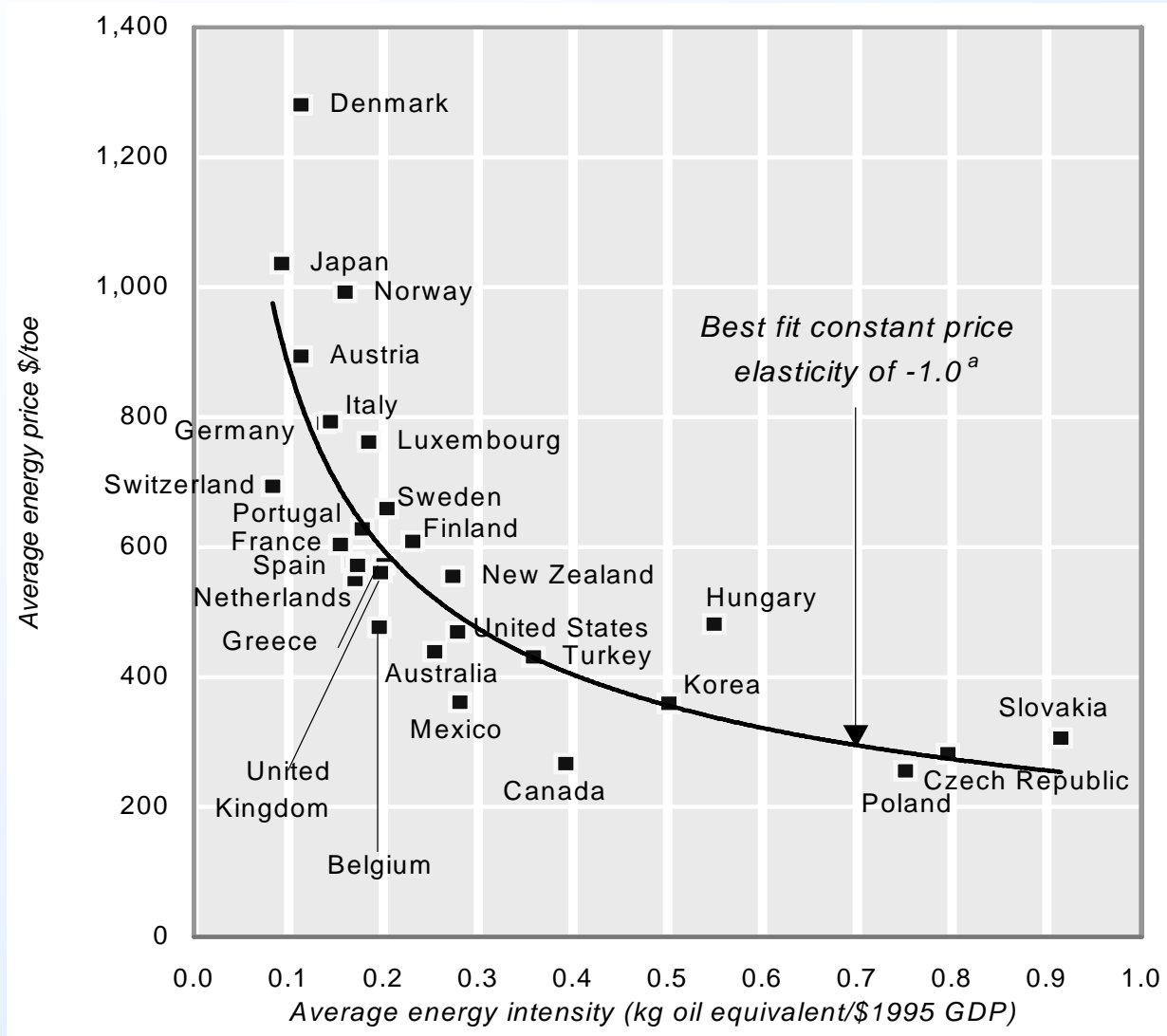
Karsten Neuhoff
Cambridge University

www.electricitypolicy.org.uk/tsec/2

Improving investment framework for low Carbon technologies

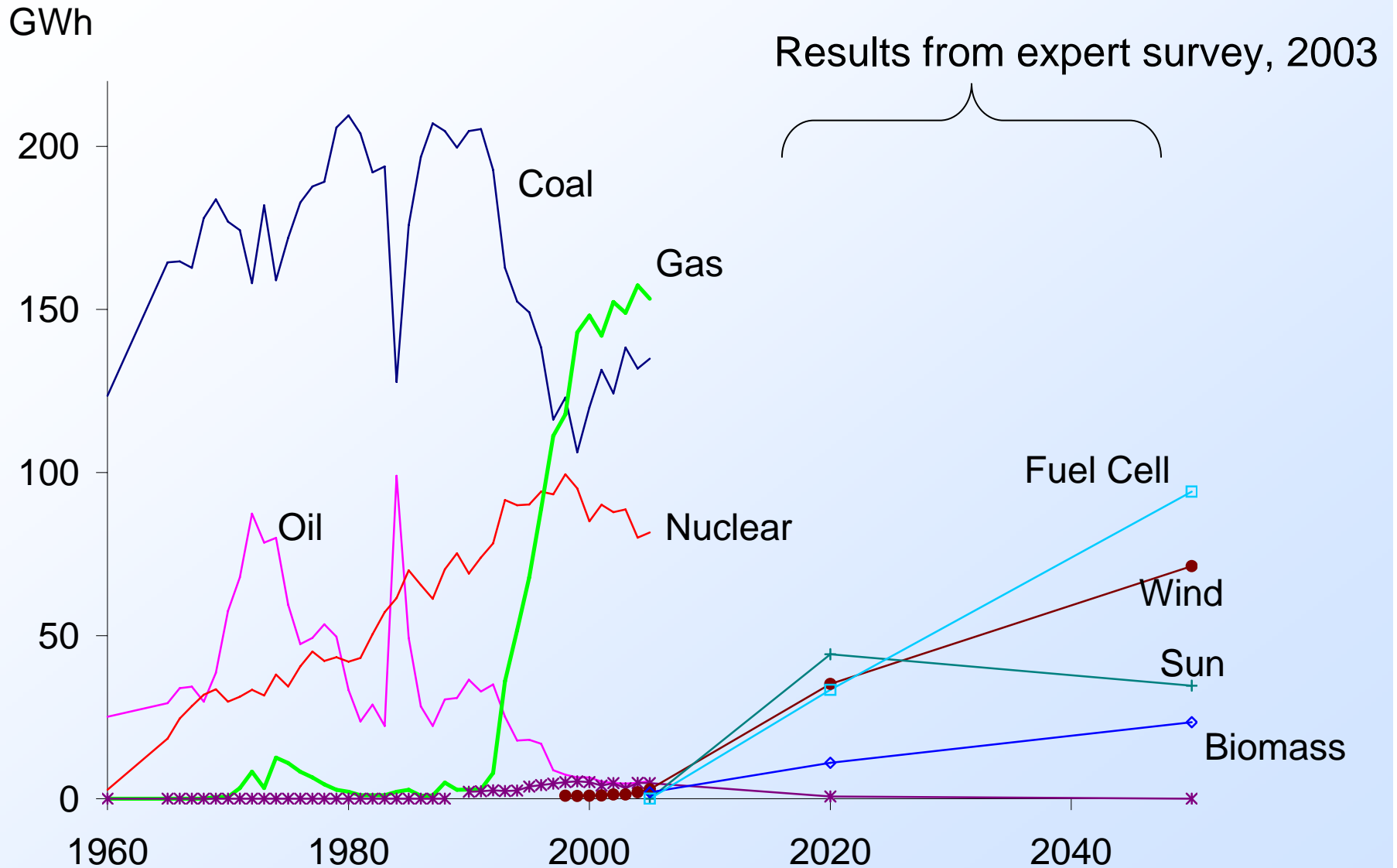
- Background
- Reduce distortions from allocation
- Ensure strong price till 2012
- Create market confidence going forward

Objective – allow price signals to work



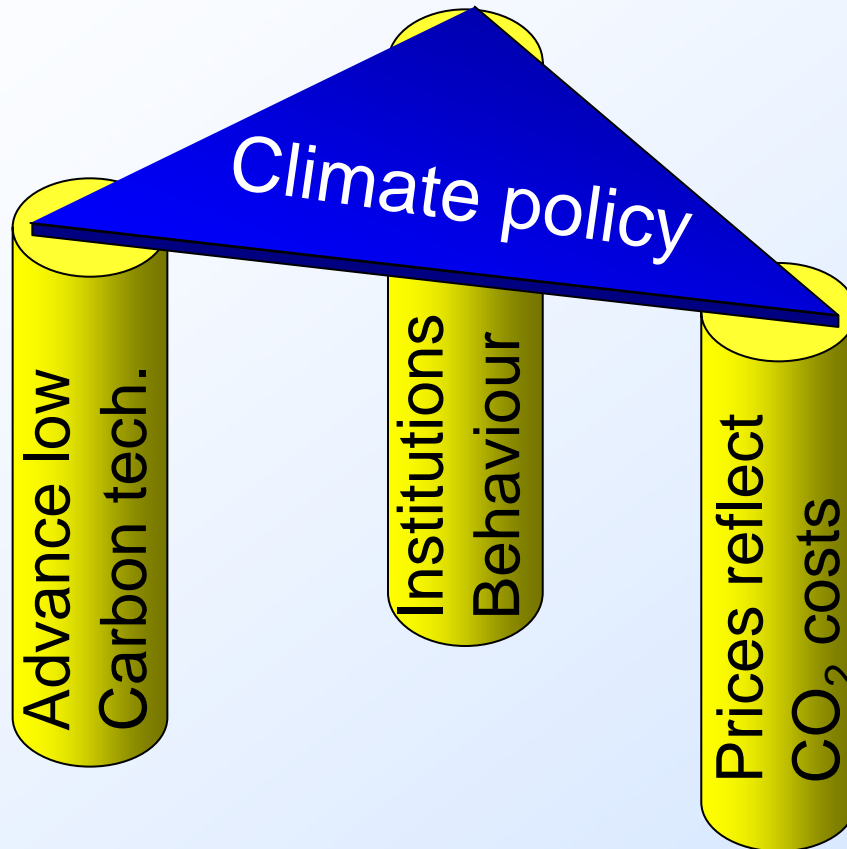
Source: Newbery, D. M. (2003) Sectoral dimensions of sustainable development: energy and transport. Economic Survey of Europe 2(73-93).

Strong price signals did deliver in the past

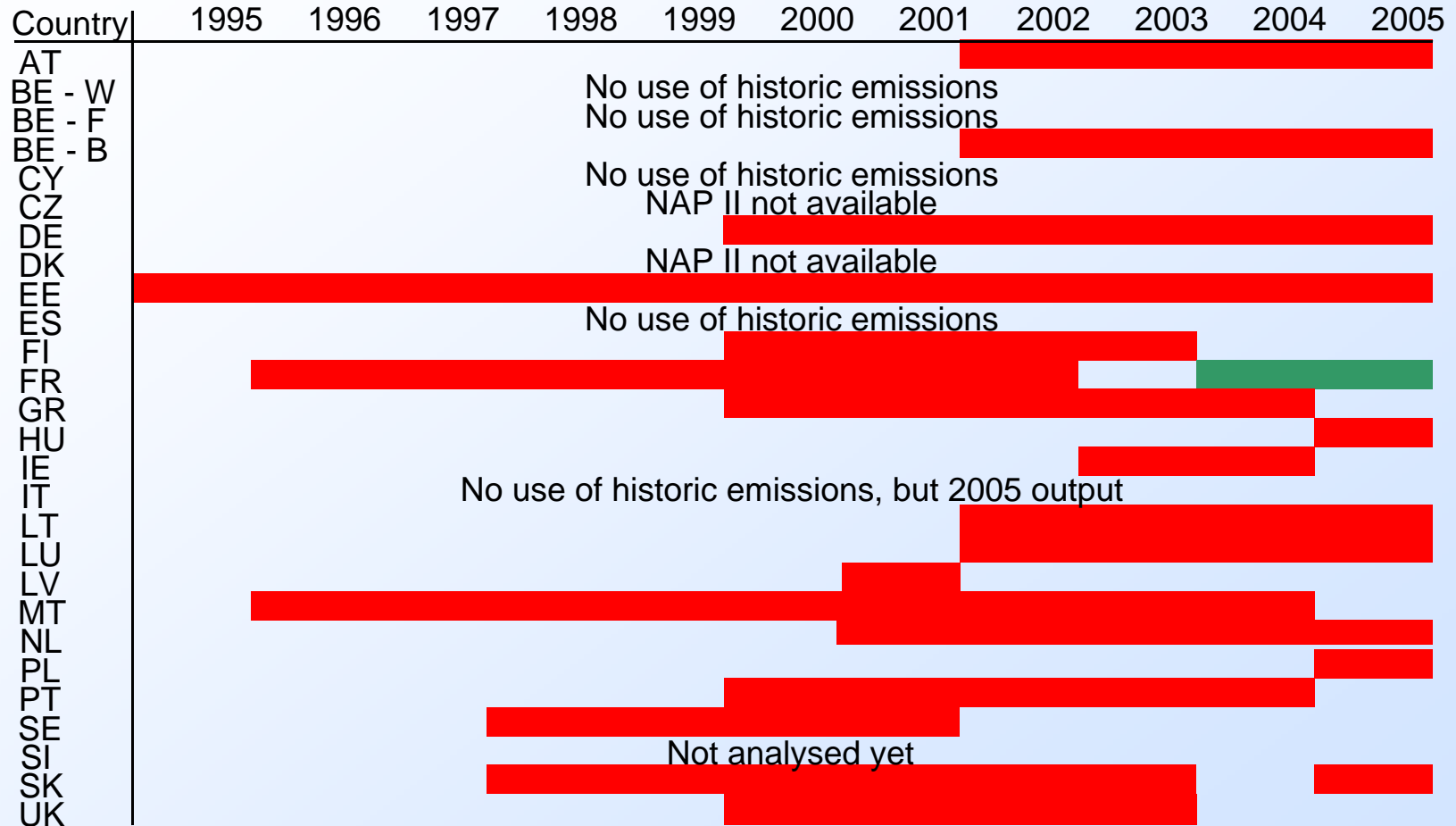
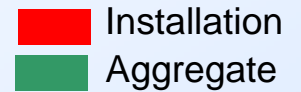


Source: 1960-1997 DTI Energy statistics, Fuel consumption for power generation, transformed to output using 1998 average efficiencies, 1998-2005 DTI Energy statistics, Power generated, Projections based on Survey among participants on Future generation technologies workshop (asking for demand evolution and generation shares), Cambridge 2003
 Karsten Neuhoff, 4

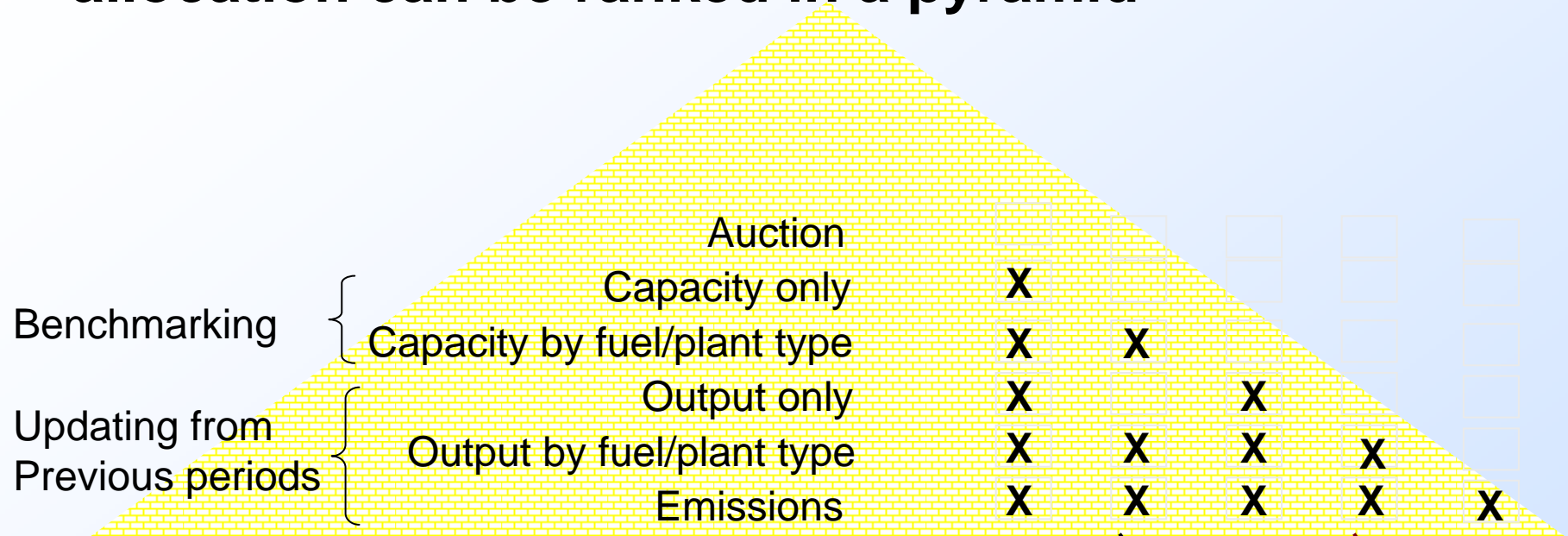
But we do need the other two pillars as well



Recent data used for allocation to existing facilities – updating prevalent



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

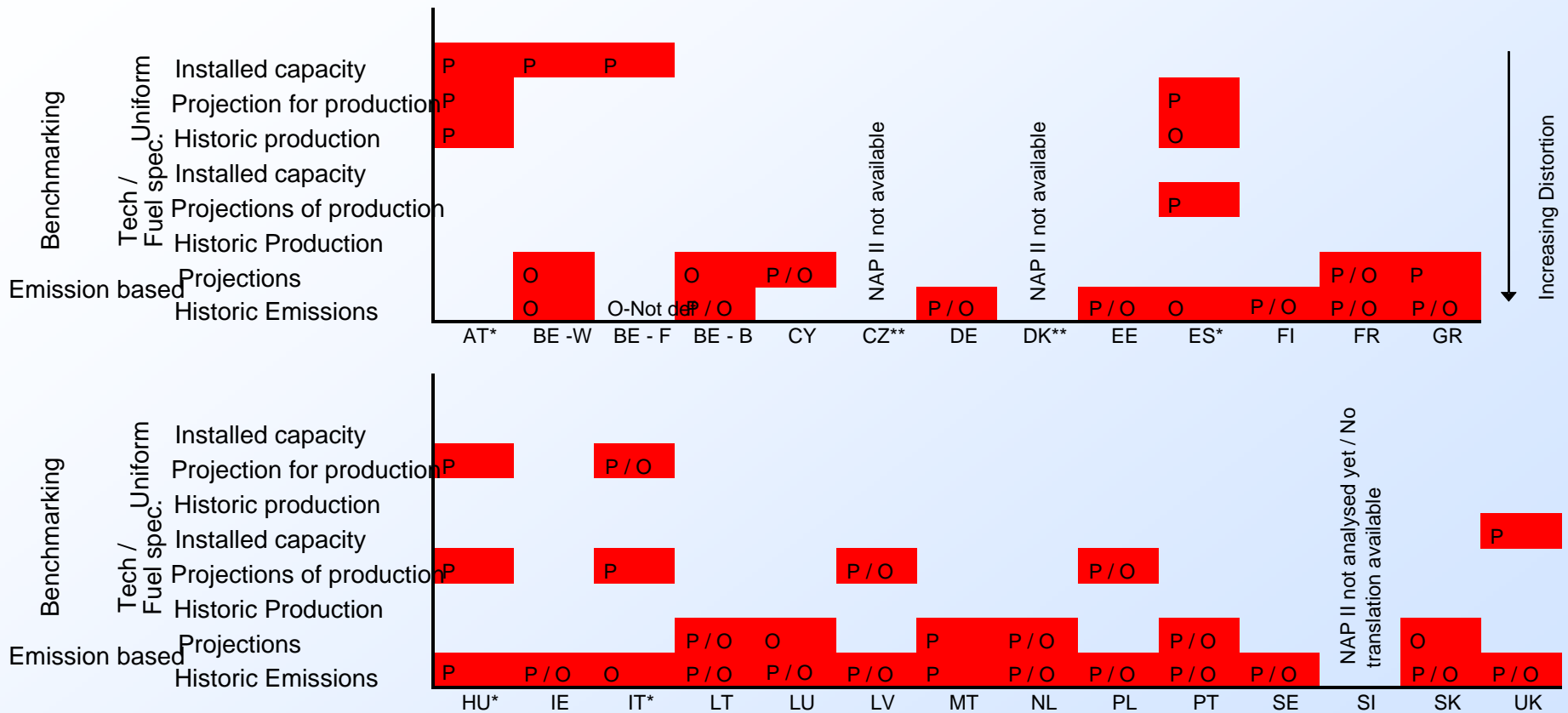


Impacts

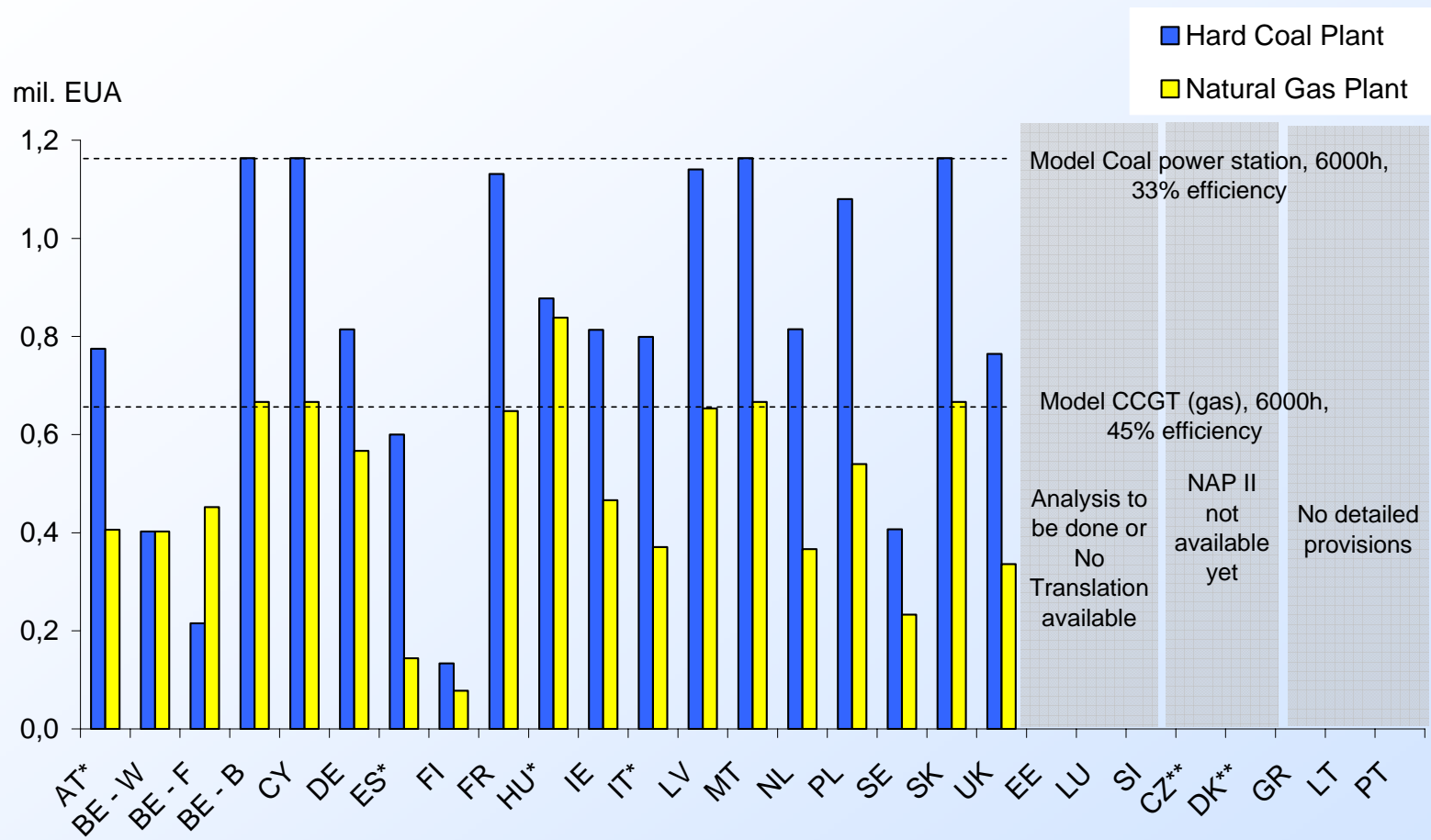
- Increased expenditure on extending plant-life
- Inefficient fuel choice
- Less efficiency improvements

Discourage plant closure
 Distortion biased towards coal
 Shields output from average carbon cost
 Distortion biased towards coal
 Reduce incentives for
 Efficiency-improving investment

... and we seem to have made little progress moving up

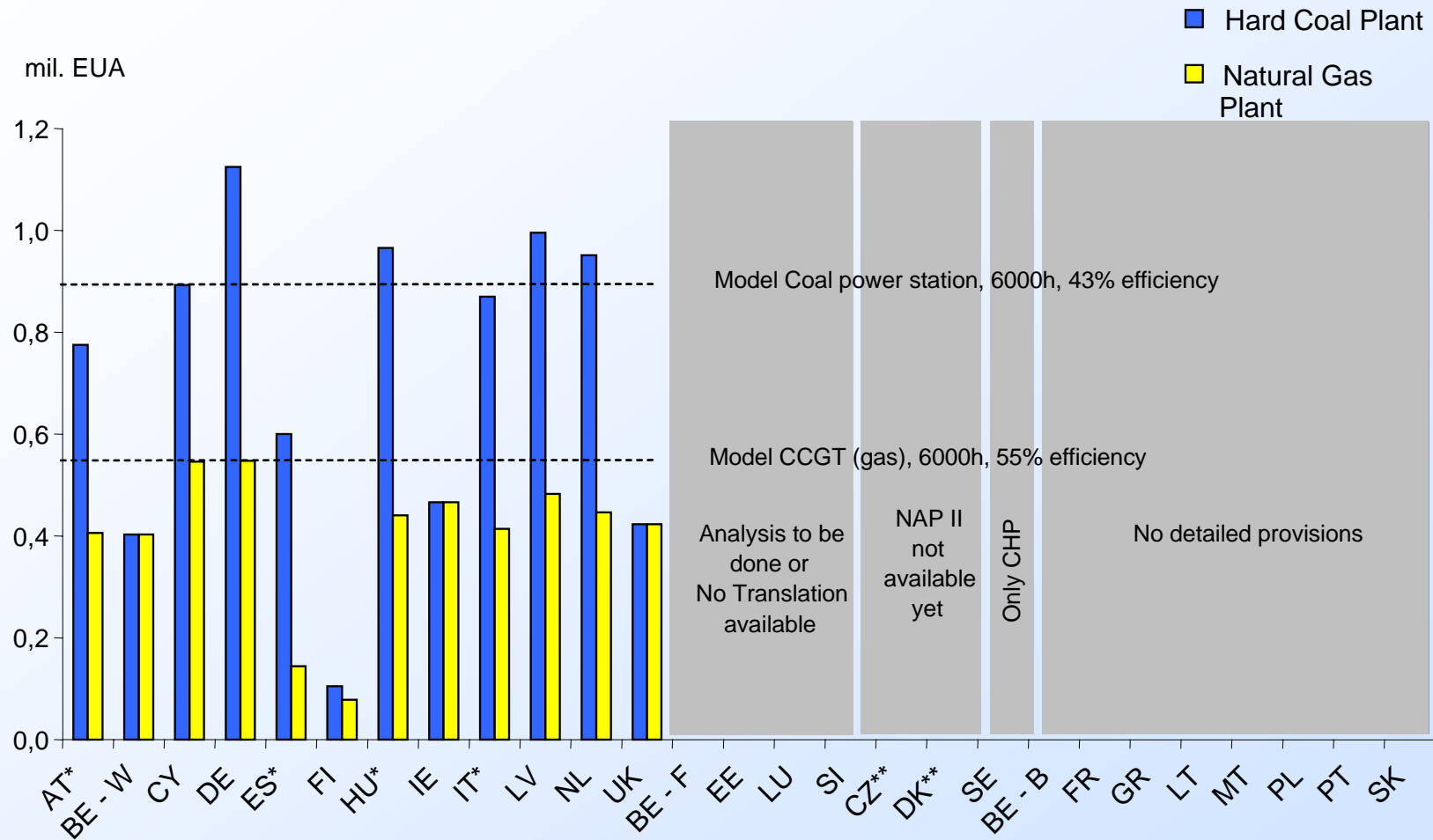


And the level of allocation is not trivial

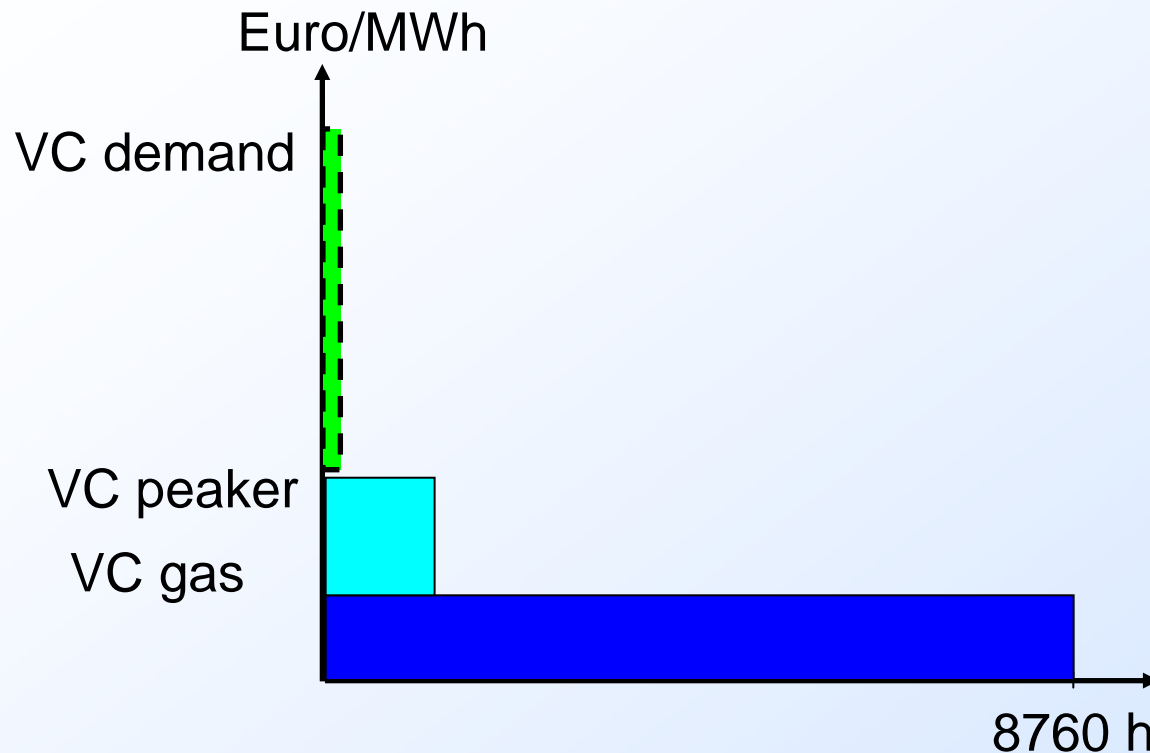


Comparison of National Allocation Plans for the Period 2008-2012, Karsten Neuhoff, Markus Åhman, Regina Betz, Johanna Cludius, Federico Ferrario, Kristina Holmgren, Gabriella Pal, Michael Grubb, Felix Matthes, Karoline Rogge, Misato Sato, Joachim Schleich, Jos Sijm, Andreas Tuerk, Claudia Kettner, Neil Walker

New entrant allocation distorts fuel/technology choice



The missing money argument



Ideas how to finance peaker without demand response:

- Long-term contracts from single buyer
- Pay for reserves at the expected costs of lost load (Hogan)
- Long term capacity requirements/payments, but distribution, intermittency
- Market power induced prices above marginal costs
- Second best, use CO₂ allocation as capacity payment

Why not to use CO₂ allocation as capacity payment

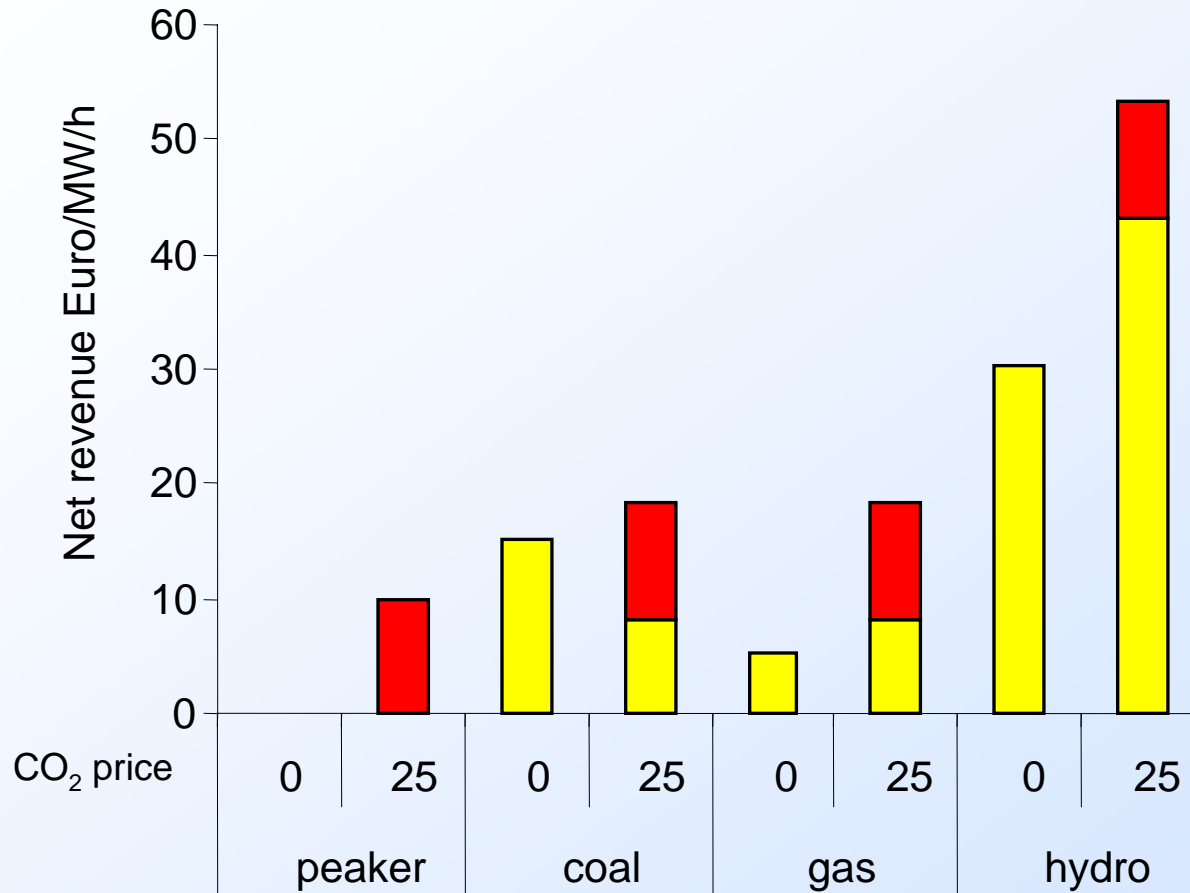
(1) Subsidies avoid price internalisation

Might not do the trick:

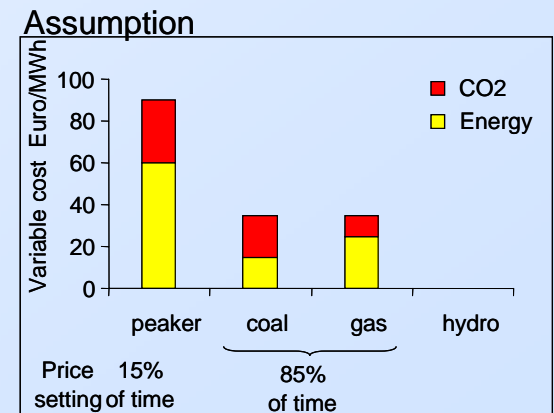
(2) Provides no incentive to be available at peak

(3) Increases volatility of net returns with CO₂ price

CO2 allocation to new entrants increases volatility of returns (for all but coal power stations)

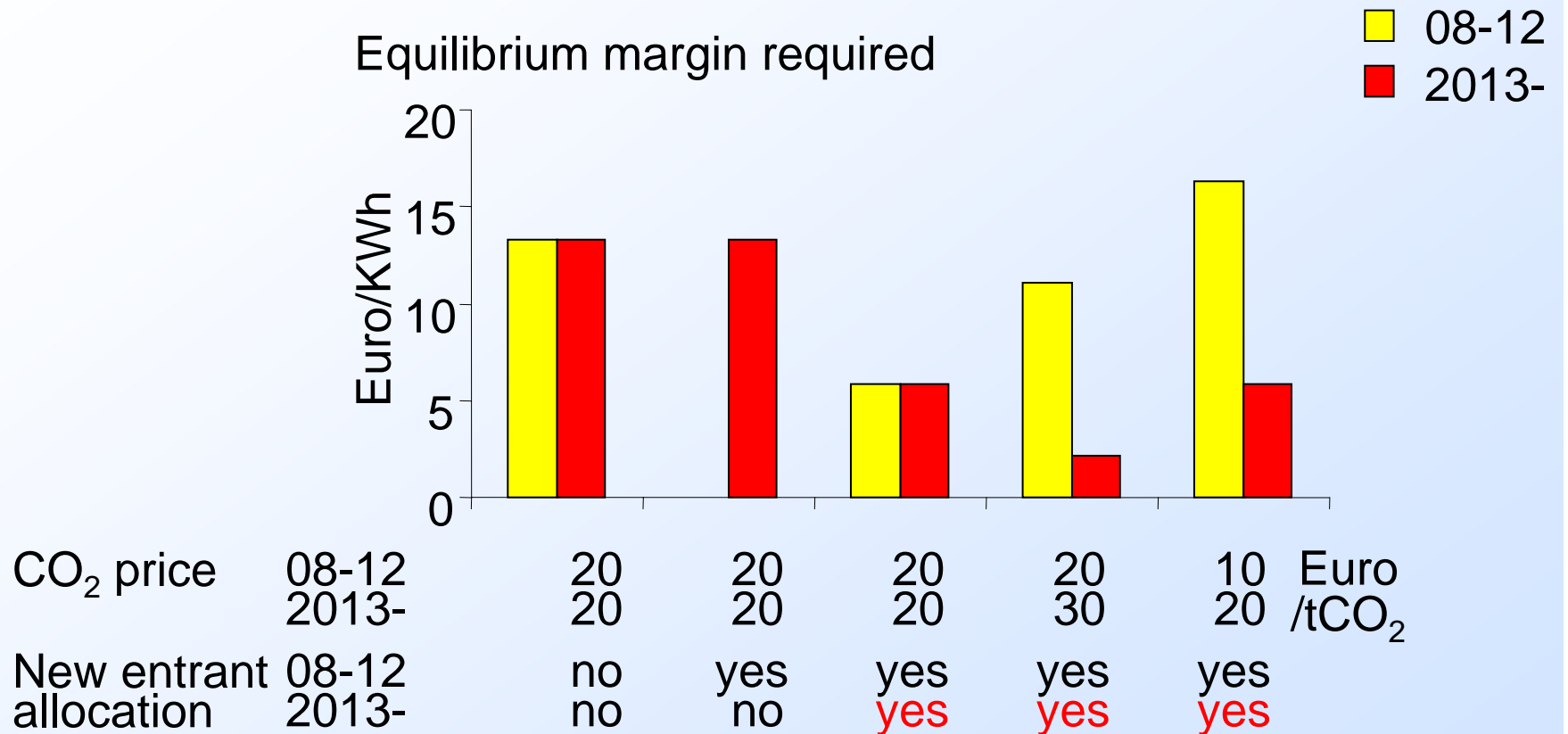


■ Value CO₂ alloc.
■ Net profits



Assumptions as in previous slide

Future new entrant allocation can reduce investment



Reduces future investment thresholds -> reduces revenue streams for today's investment -> increases today's investment threshold

Why not to use CO₂ allocation as capacity payment

(1) Subsidies avoid price internalisation

Might not do the trick:

(2) Provides no incentive to be available at peak

(3) Increases volatility of net returns with CO₂ price

(4) Retains uncertainty about future new entrant allocation
(potential even negative effect)

Negative side effects

(5) Reduces government flexibility

(6) Delays move away from distorting free allocation

(7) Violates one instrument – one objective (central bank)

Conclusion on free allocation

- Distortions from free allocation strong if there are expectations of continued high allocation post 2012
- Phase out free allocation post 2012
 - Potentially conditional on measures to address international competitiveness for certain sectors

-> Go through state aid assessment

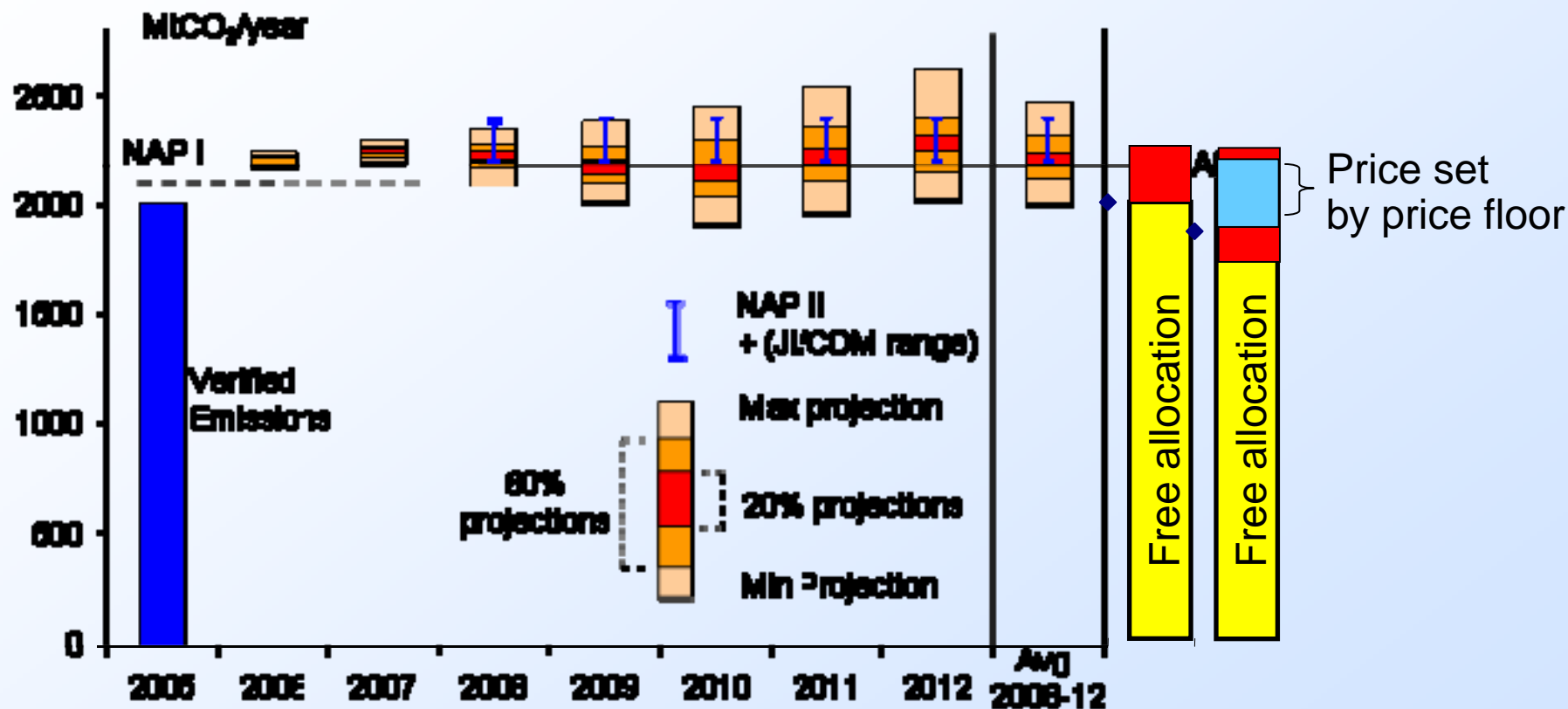
- Free allowance allocation is state aid
- Some can be justified as proportional to cost of transition
- This would likely require committing to no further free allocation post 2012

-> PERFECT

Stern 2006

The next 10 to 20 years ... transition ... to [world] where carbon pricing is universal and is automatically factored into decision making. ... avoid the risks of locking into a high-carbon infrastructure ... additional measures may be justified to reduce the risks."

10% auctions with price floor – could facilitate investment



Source: Neuhoff, Ferraric, Ombidi, Ombidi, Keats (Sept 2008)

Coordinated auction with price floor can set floor to allowance price

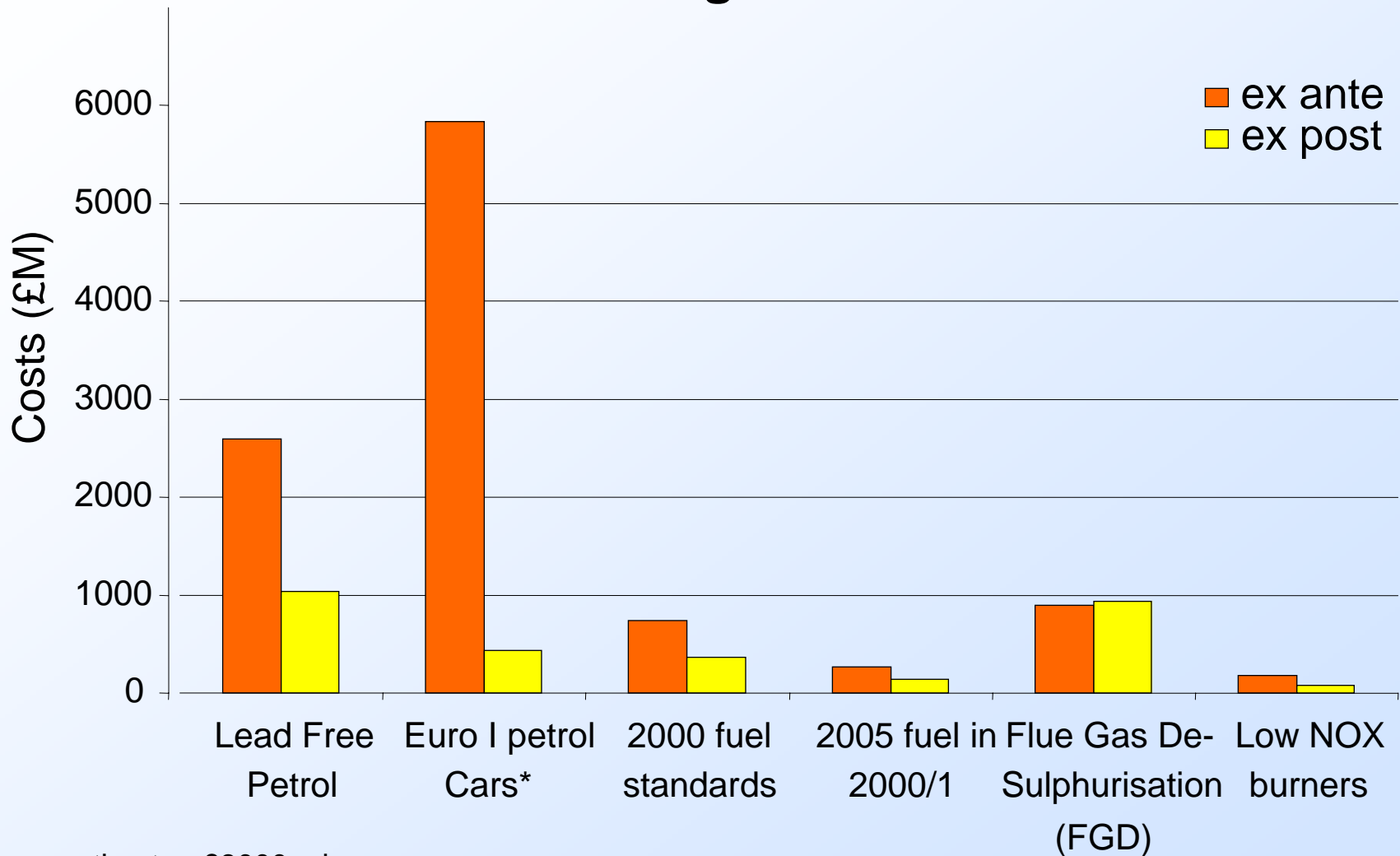
- Facilitates low carbon investment
- Reduces emissions and thus allowance price

Source: Hepburn, C., Grubb, M., Neuhoff, K., Matthes, F. and Tse, M., 'Auctioning of EU ETS Phase II allowances: how and why?'

Other proposed approaches to support investment

- Longer commitment periods:
 - What framework shall we use?
 - Is the commitment sufficiently stringent?

Expected (Ex Ante) and Actual (Ex Post) Total Costs of some UK Policies during 1990-2001



* Upper estimate >£8000 mio.

Source: AEA Technology Environment, 2005, An Evaluation of the Air Quality Strategy, Report to DEFRA, available at: <http://www.defra.gov.uk/>

Other proposed approaches to support investment

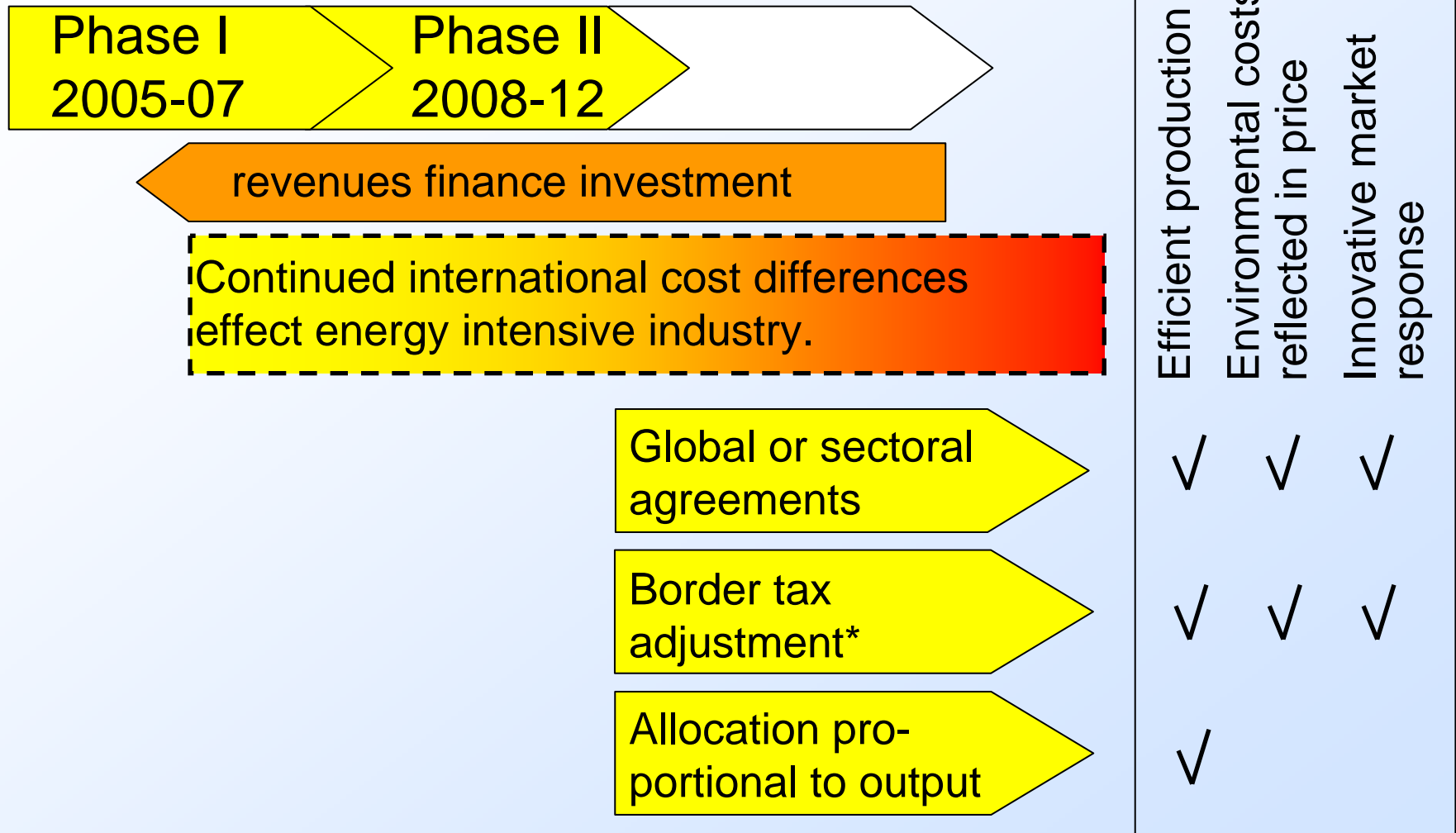
- Longer commitment periods:
 - What framework shall we use?
 - Is the commitment sufficiently stringent?
 - Is it credible that we won't change it?
- Increased use of banking*
 - Ongoing policy decision creates uncertainty
 - Commitment to long-term price – but which??
- Open market intervention
 - Credibility?
- Splitting allowances as under US clean air program
 - Market uncertainty?

* Newell, R., W. Pizer and J. Zhang (2005) Managing Permit Markets to Stabilize Prices. Environmental and Resource Economics 31(2): P.133 - 157.

Option contracts could create long-term price floor

- Governments sell option contracts to private parties
- Creates property right, strong enforceability
- Investors can call an option:
 - Hands in option + CO₂ allowance
 - receives strike price, e.g. 15 Euro/t CO₂
- Direct hedge for investment
- Investors will call options if $p_{\text{CO}_2} < 15 \text{ Euro/tCO}_2$
 - Reduce supply, pushes up price, implements price floor
- Governments avoid buying back allowances
 - Restrict issuing allowances to retain scarcity price

Robust solutions for post 2012 exist



We will find the best solution in an international dialogue.

Conclusions

- Avoid distortions from allocation
 - No more free allocation post 2012
- Ensure strong price till 2012
 - Stringent caps
 - Consistent JI/CDM limits
 - Allowance auctions with price floor
- Use economic instruments to create market confidence
 - Drives innovation
 - Banking / longer commitment periods difficult
 - Government issued financial option contracts
- More detail on www.electricitypolicy.org.uk/tsec/2