Electricity Policy Research Group

UNIVERSITY OF CAMBRIDGE

Energy White Paper: Overview

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BIEE Seminar

DBERR London

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http://www.electricitypolicy.org.uk

E·S·R·C ECONOMIC & SOCIAL RESEARCH COUNCIL

What has changed since 2003 EWP?

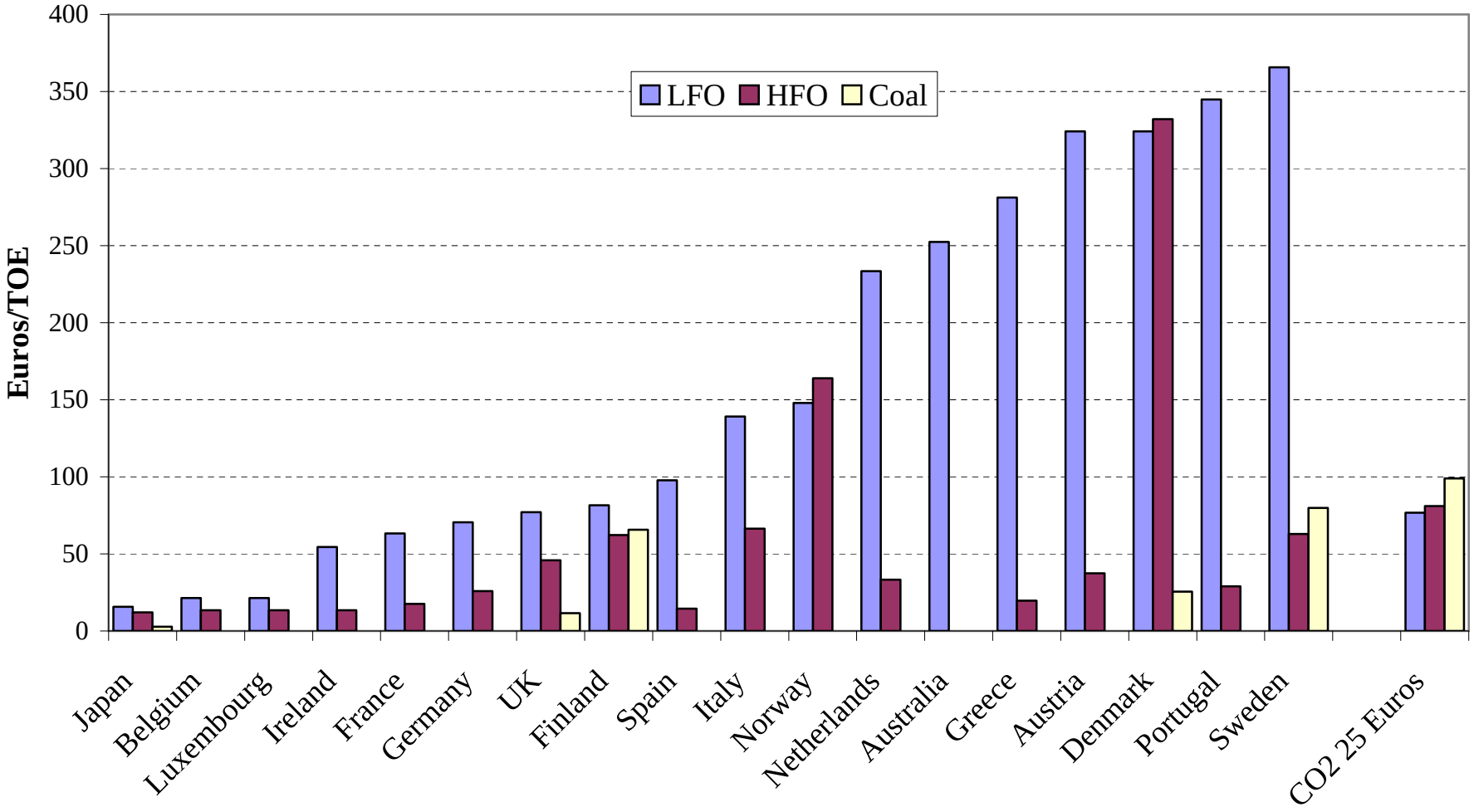
- *Stern Review*: international collaboration to cut GHGs even more important
  - India and China growing faster, coal-based
- ETS successfully launched, Kyoto ratified
- Future gas prices higher, UK gas decline faster
  - Russia flexing energy muscles more
  - but gas import supplies look more secure
- nuclear storage strategy defined

Comparisons: EWP07 vs EWP03

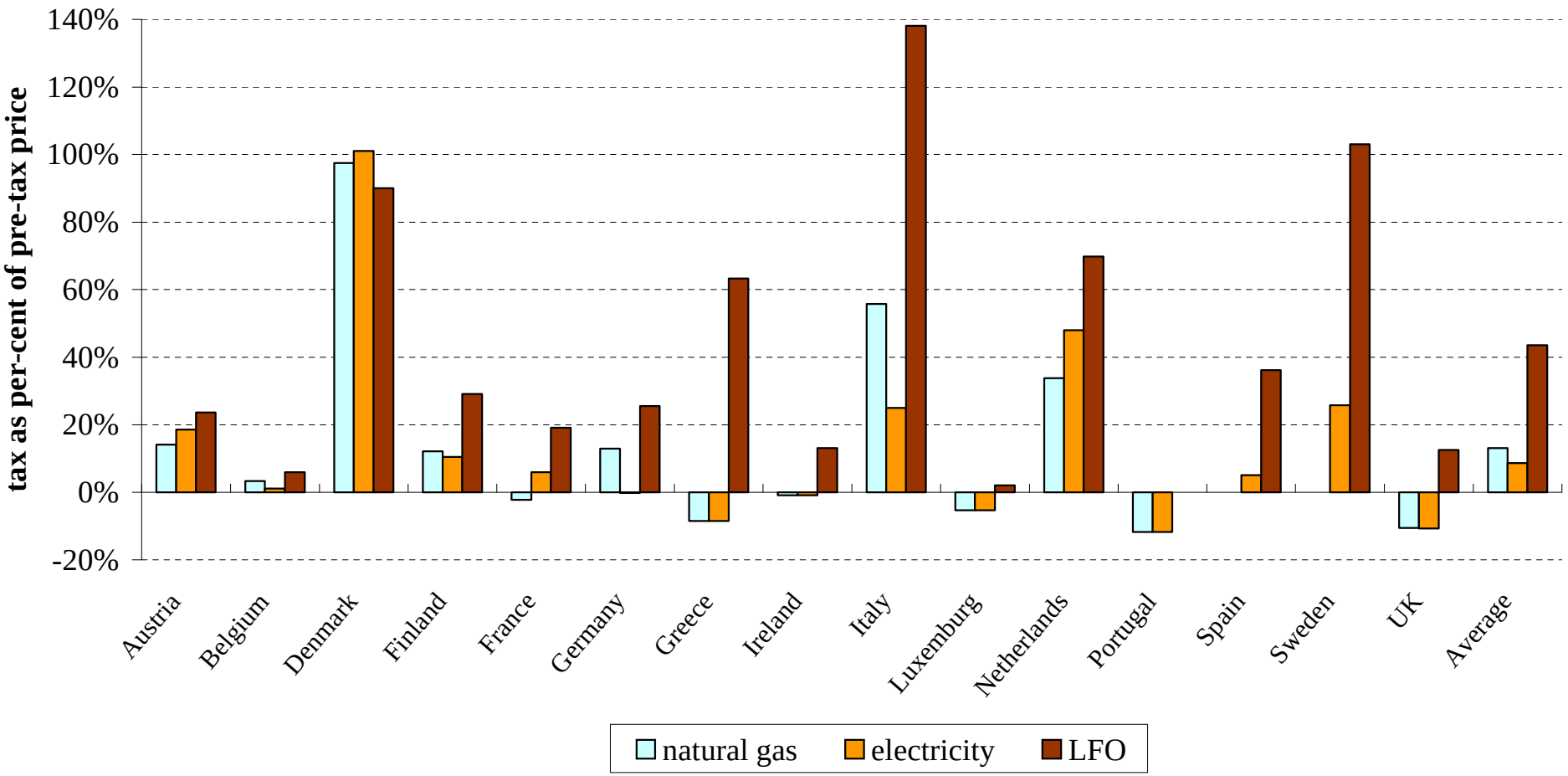
- EWP03: We have a problem and we should think carefully what to do
  - but don't mention energy taxes, even though they are potentially the obvious instruments
- EWP07: The problem is bigger than we thought and here are some policies
  - but still don't mention energy taxes

To reduce 23-33 MtC by 2020 (currently 169)

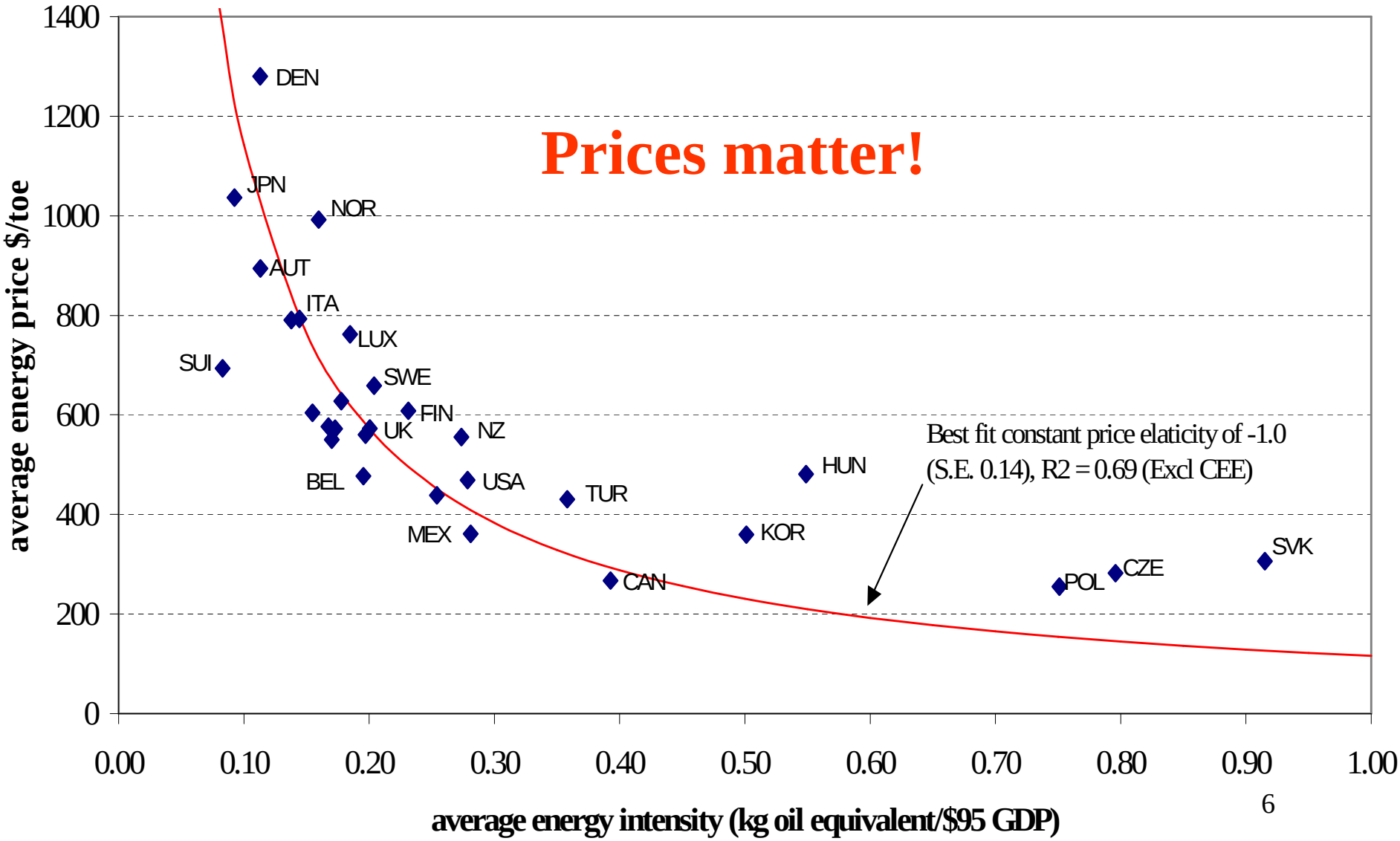
Industrial fuel excises 2003



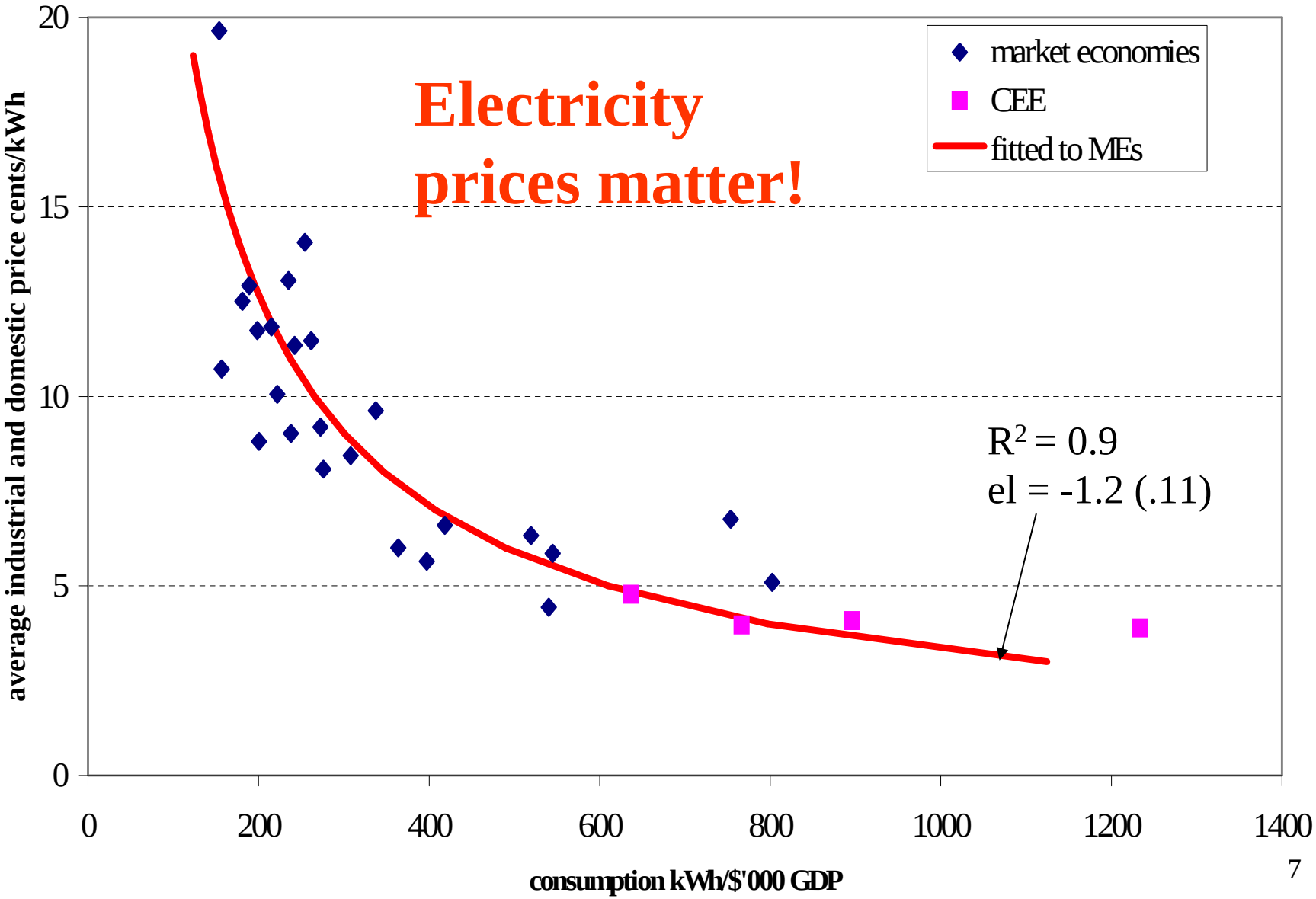
Domesetic taxes as percent of price 2002



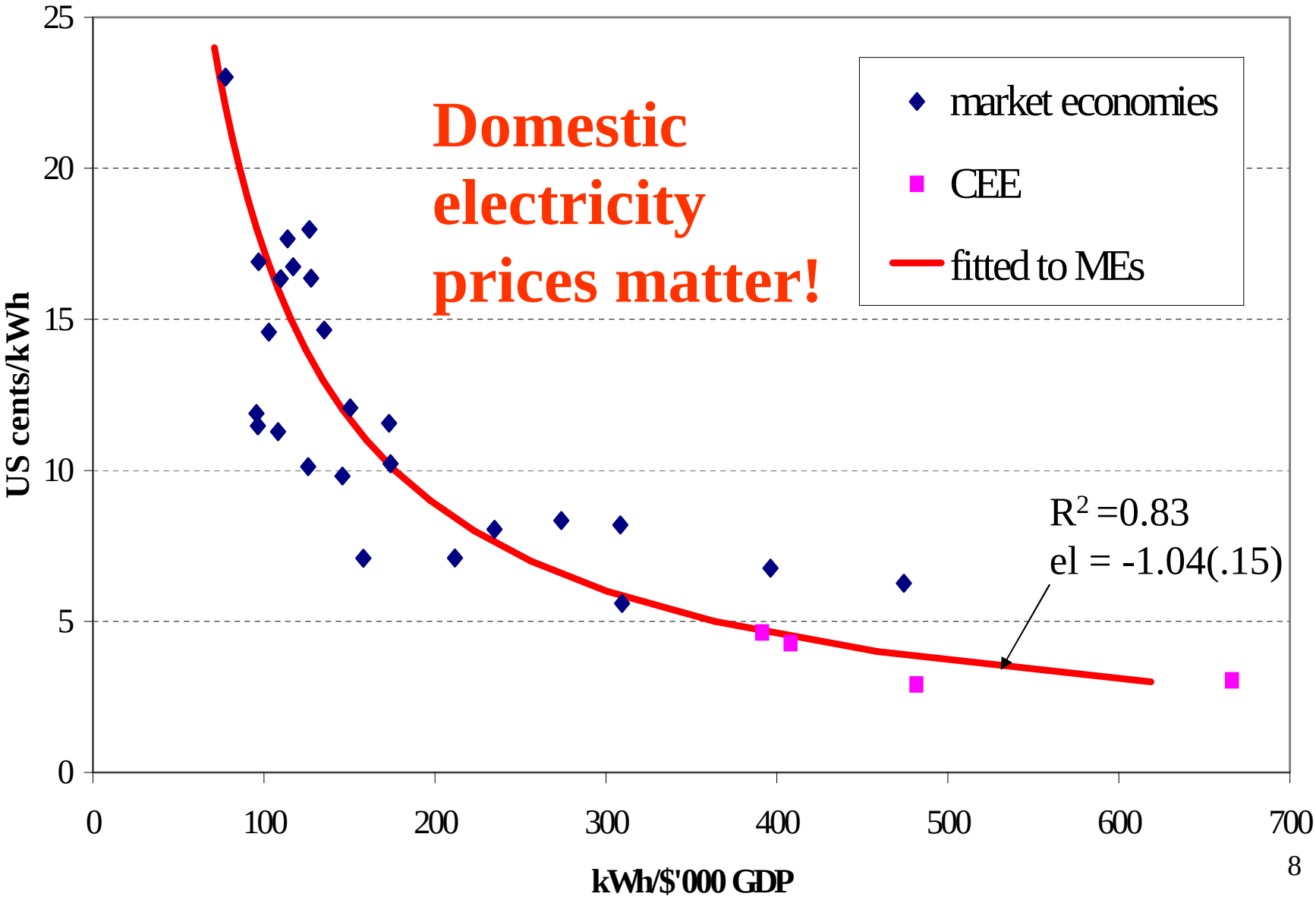
Cross-section relation between average energy intensity and average energy price 1993-99



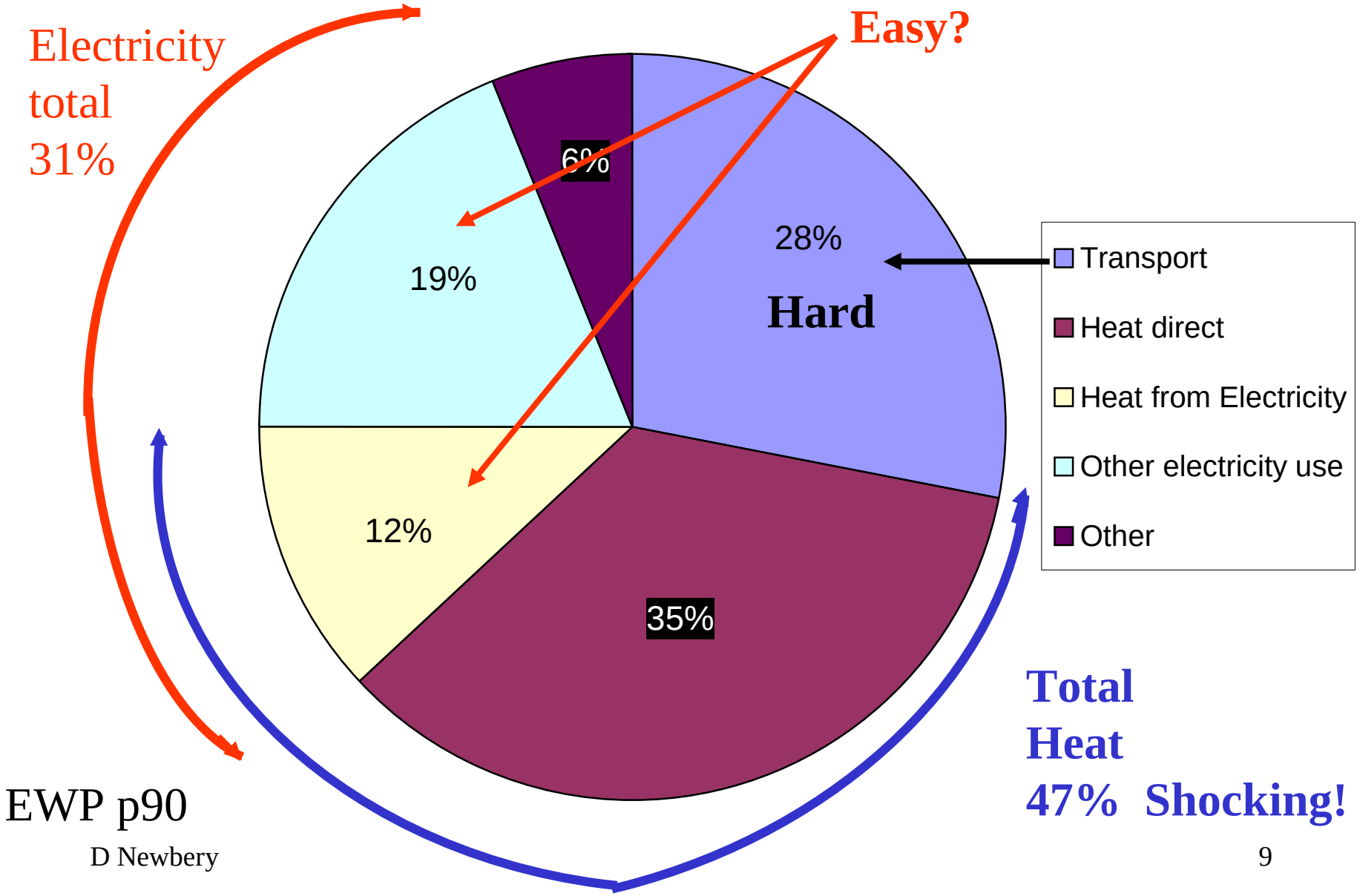
Electricity consumption and price 1993



Non-industrial electricity consumption and price

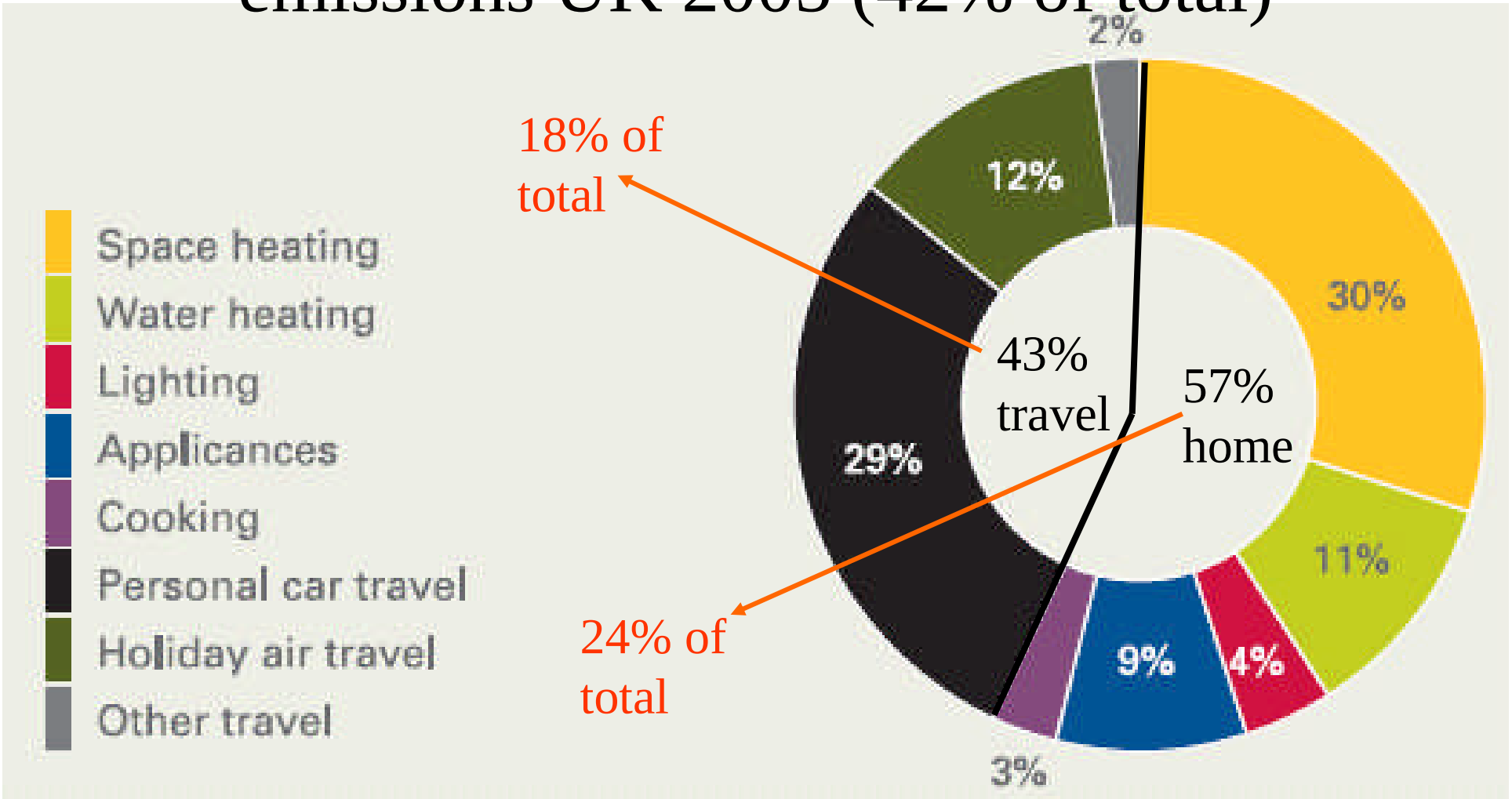


CO2 emissions by sector 2005



EWP p90

Shares of ***individually responsible*** carbon emissions UK 2005 (42% of total)



EWP p49

Policies to increase low-C investor certainty

- Support a strengthened ETS
  - wider coverage, with more auctioning
- Climate Change Bill
  - binding 5yr UK quotas on CO_2 for next 15 years
  - mandatory cap+trade of 1.2MtC/yr reduction for large commercial and public sector orgs by 2020 (=0.7% UK'05)
- RO to 20% by 2020 with banding
- better planning process

Are these the most effective way to reduce uncertainty for low-C investments?

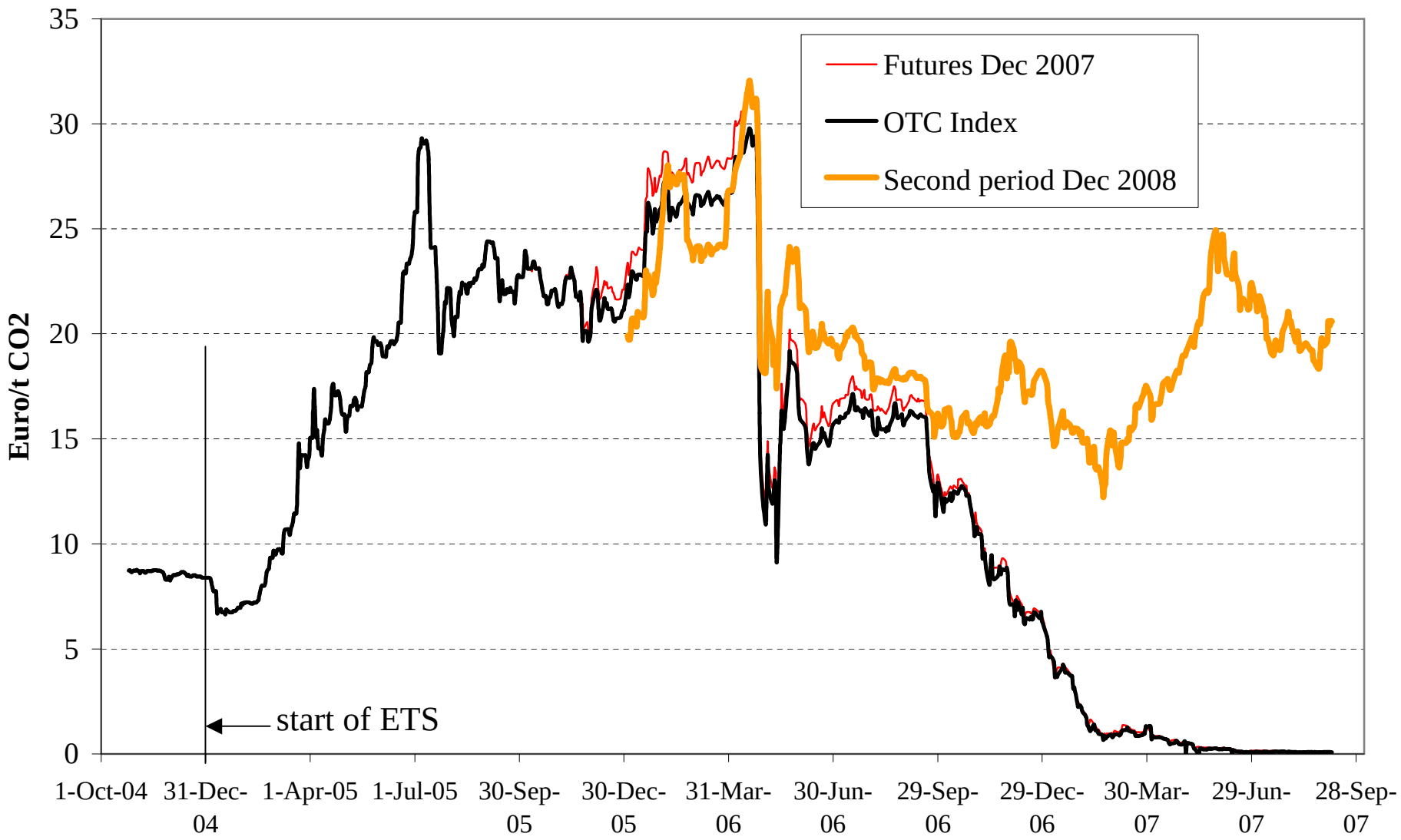
Carbon pricing

- "action to put a value on carbon" (p35)
  - "establishing a price for carbon" incentivises efficient energy use and investment
- Policy is quantity, not price, driven
- Quotas facilitate wider agreements
  - tighten caps for 20% (or 30%) reduction by 2020

  => predictable trajectory for emissions

not the same as predictable future price

EUA price 25 October 2004-7 Sep 2007



Security of supply

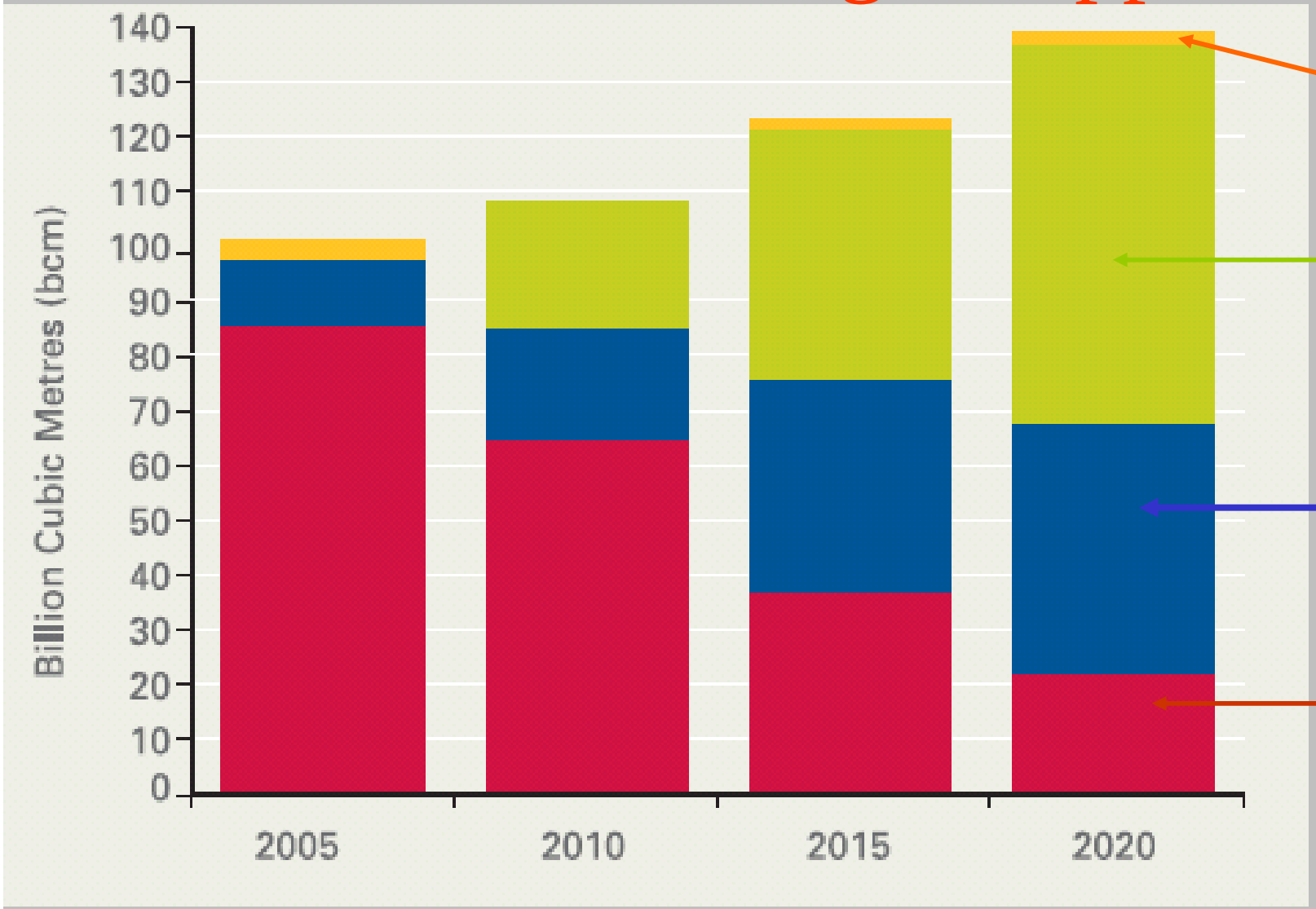
- Market friendly approach attractive but
- Continental liberalisation stalled
  - unimportant for UK?
  - Electricity interconnectors weak
  - Gas ICs - illiquid markets, poor access to IC

  => unreliable short-term reserves

  => more GB-storage and LNG?

UK better placed than Continent

Possible future gas supplies



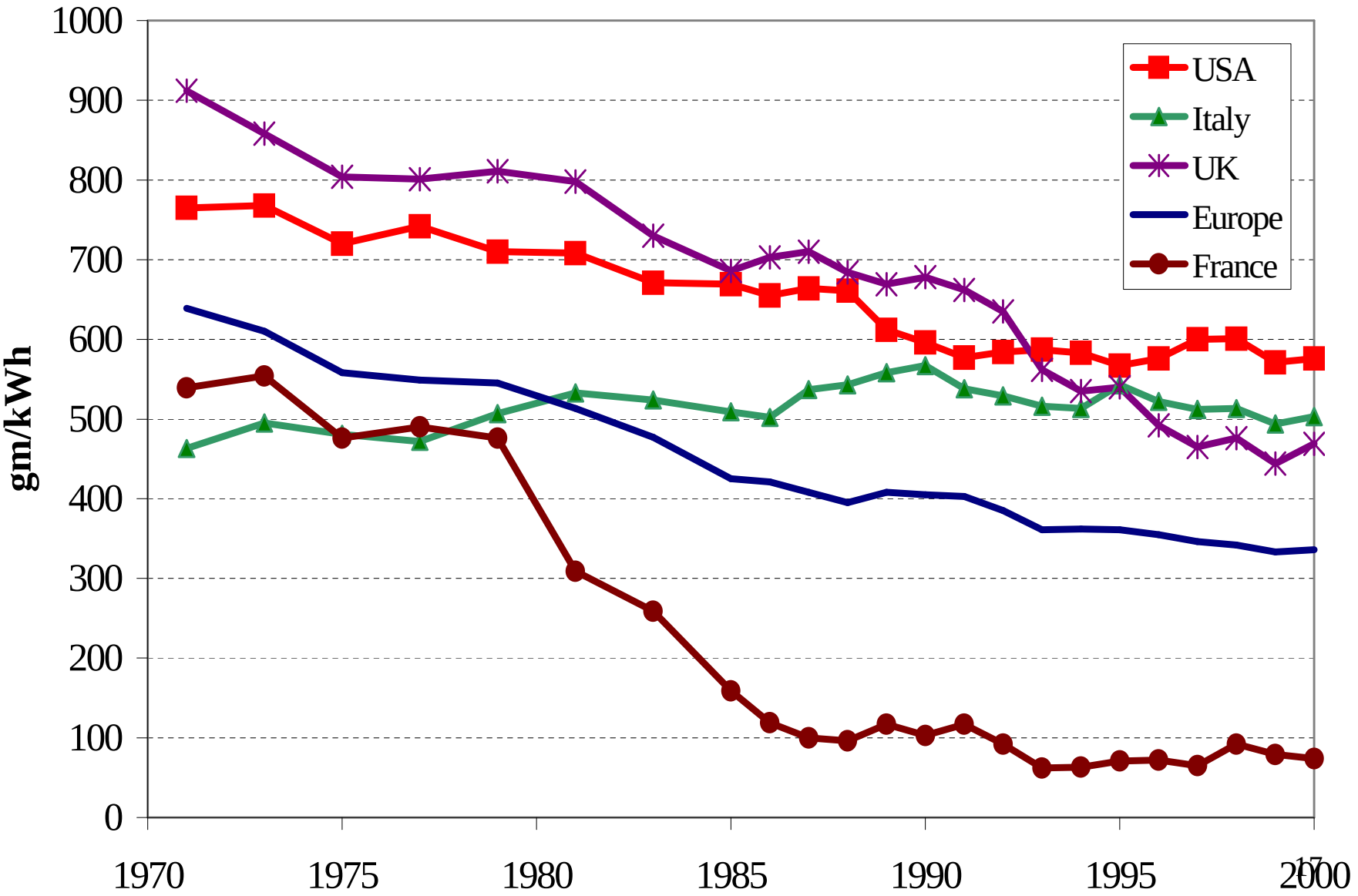
EWP p116

Electricity investment

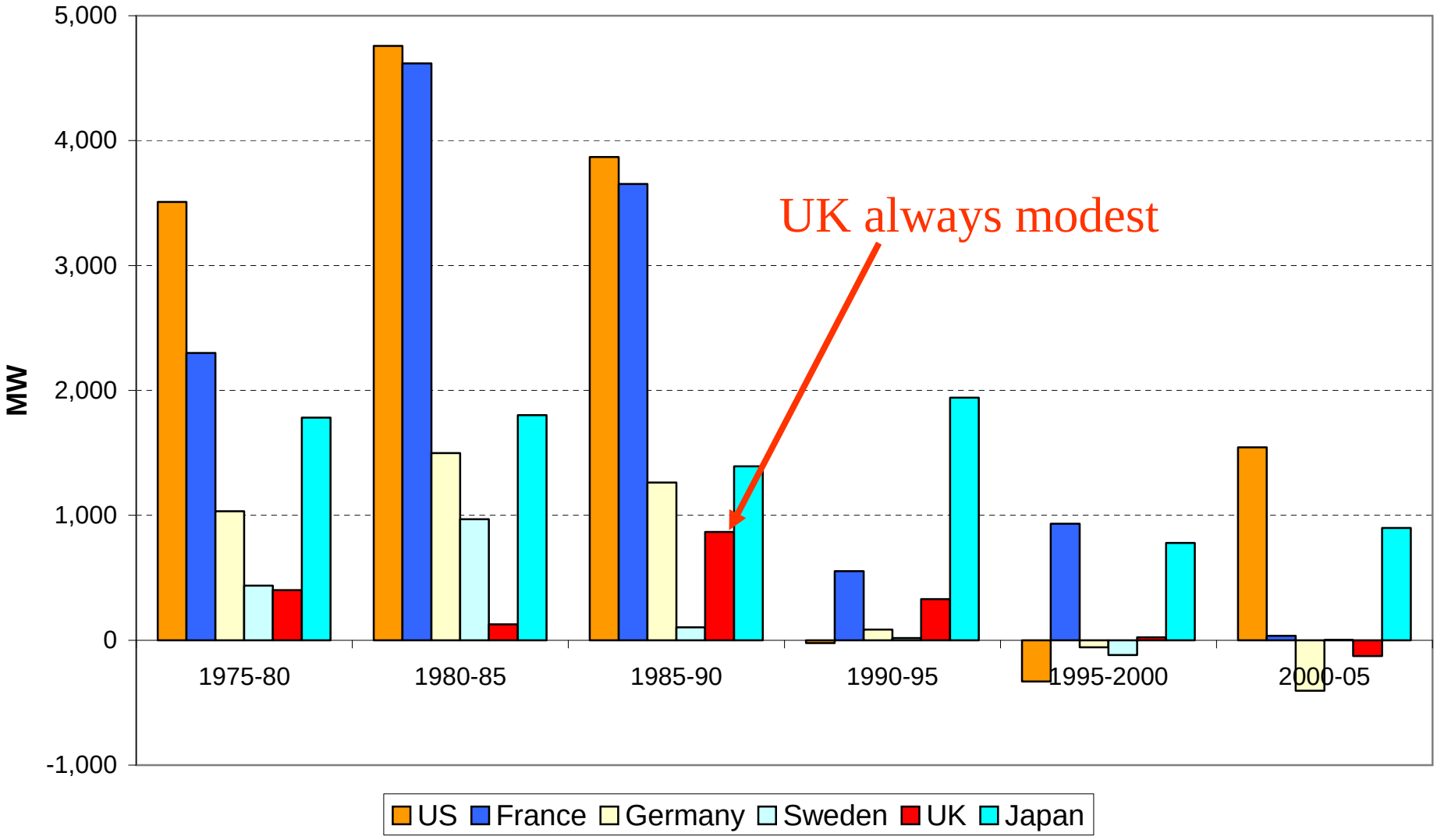
- 30-35 GW needed by 2025
- capacity will last beyond 2050 horizon
  - will lock in carbon intensity for long period
  - France managed to cut intensity 80% in 15 yrs by state-funded nuclear investment programme

Need credible future C price for markets

CO2 emissions per kWh 1971-2000



Average annual increment to nuclear capacity



Large-scale low-C generation

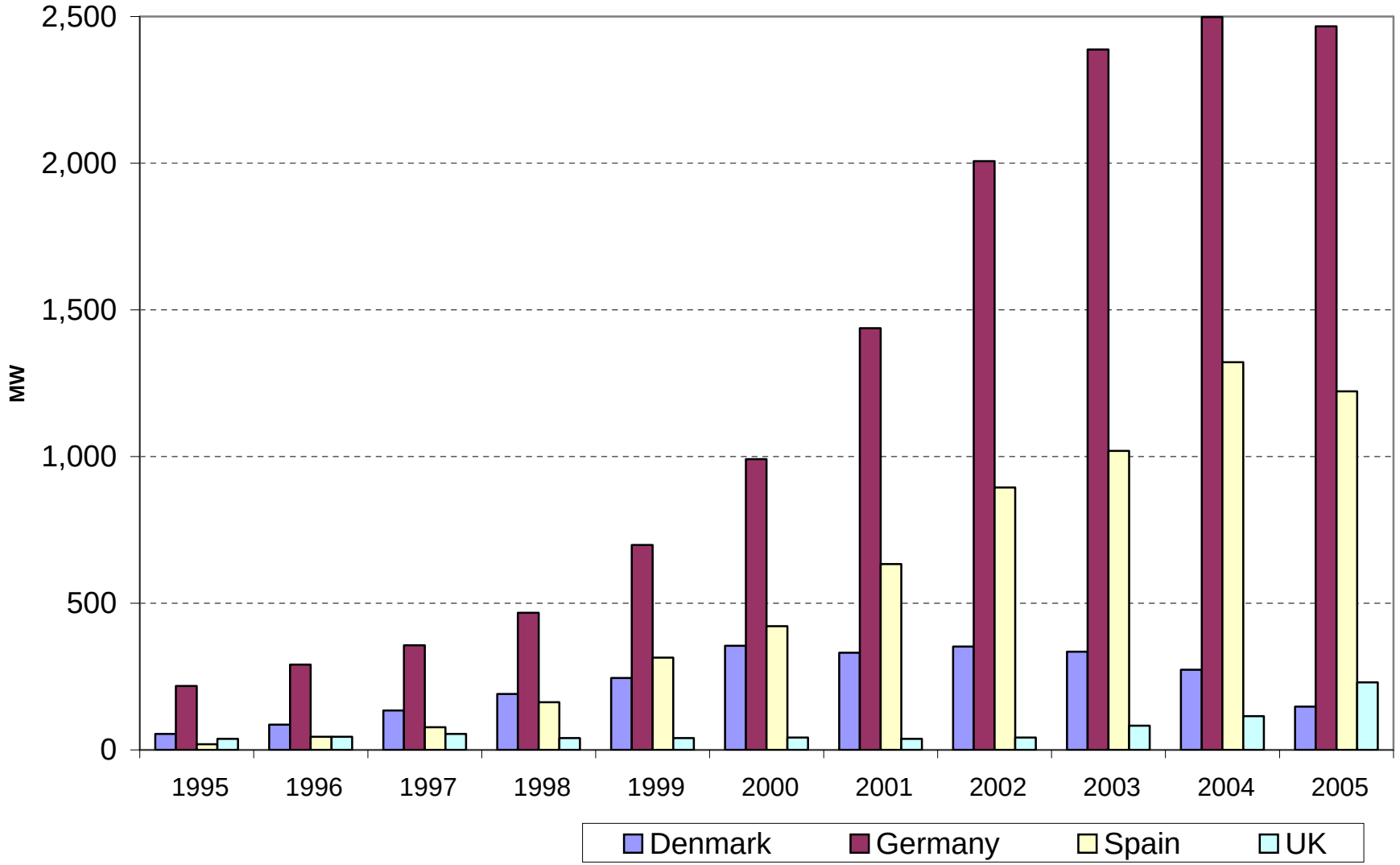
- Nov 2007 competition for CCS
  - but CCS uneconomic in all scenarios (p133)
- Nuclear
  - minded "to give private sector option of investing in new nuclear…" but
  - ".. Private sector to fund … meeting full costs"
  - not helped by judicial review of consultation

Silent on underwriting future carbon price

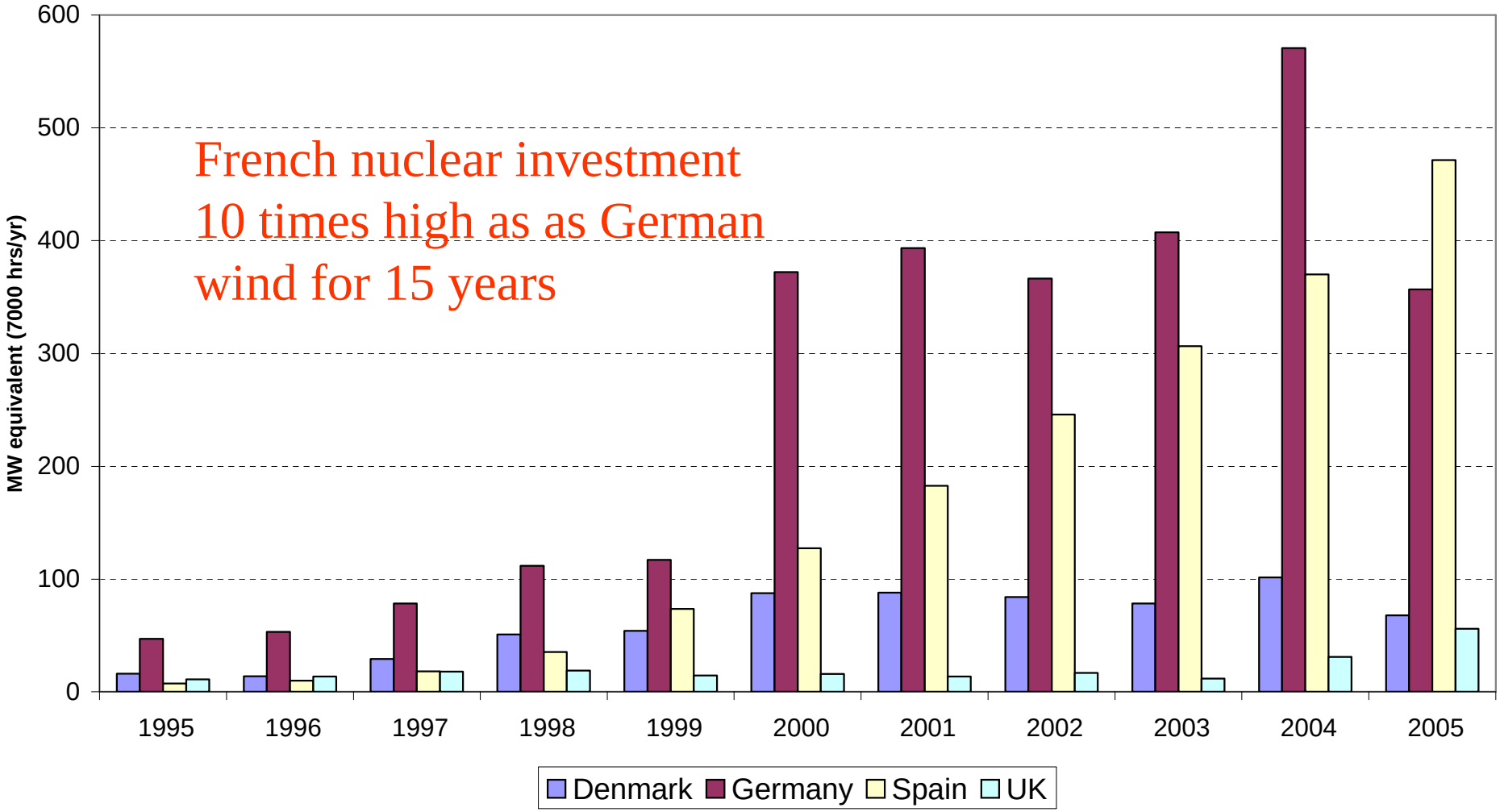
Wind?

- UK unlikely to get nuclear act together
  - planning, licensing require major changes
  - no chance of much by 2020
- So go for wind?
  - Applications for 16 GW on-, 8 GW off-shore
  - Active work on grid design
  - Tension over pricing for wind access
  - and over best support mechanism

Average increments to Wind capacity previous five years



Equivalent increment in effective wind capacity previous five years



Implications for energy prices

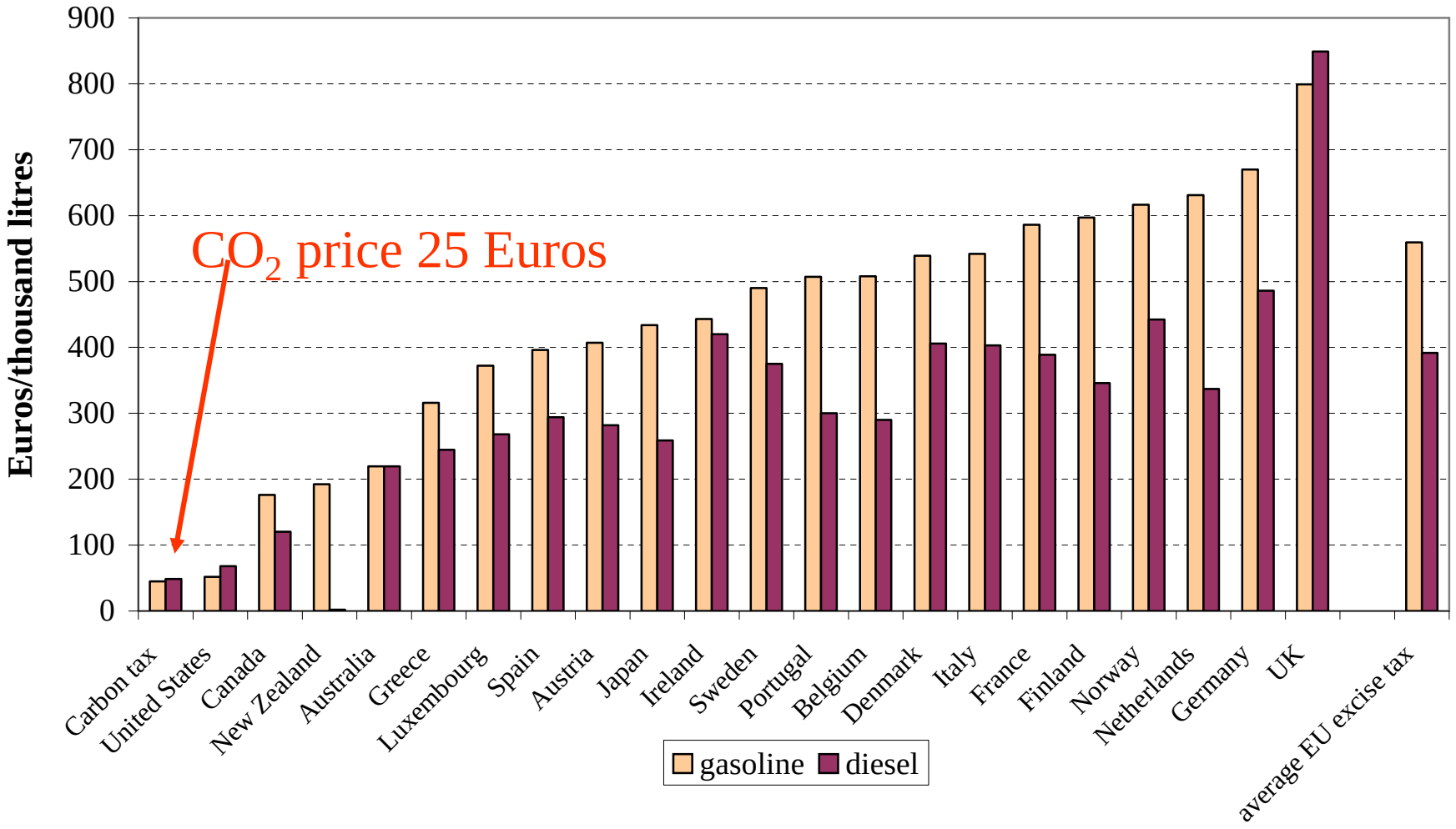
- ETS at £13/t CO_2 adds £6/MWh to gas-fired generation, £11 to coal-fired
  - about 10% for small industrial customers
- Other measures add
  - 4% to electricity prices
  - 3% to gas prices

Renewable Transport Fuel Obligation

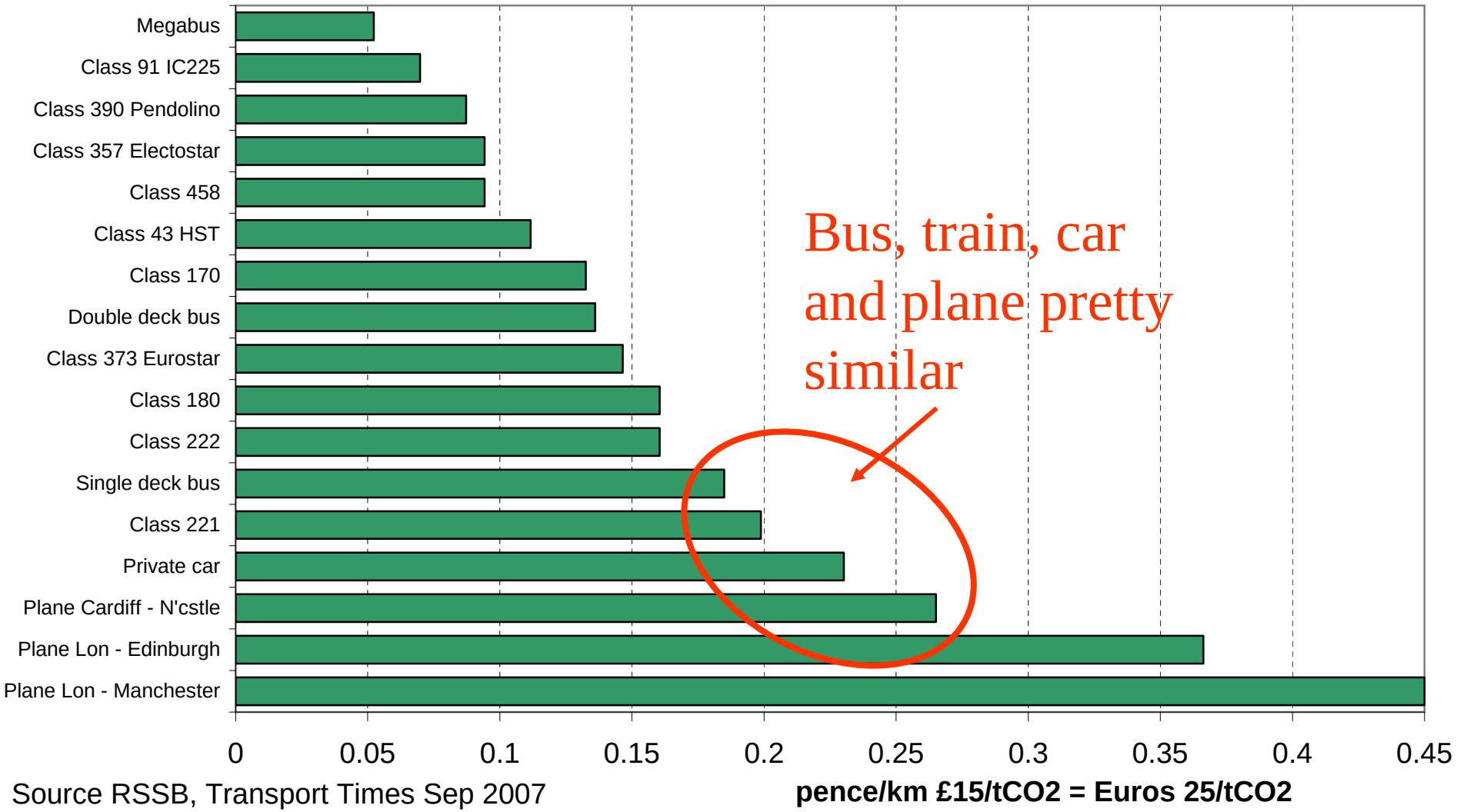
- From 2008-9, 5% by 2010-11
- Crazy if from CAP corn & sugar beet?
  - US biofuels cost \$500/t CO_2, EU \$5,000/tCO_2
  - drive up food prices in poor countries, induce loss of habitat, eco-systems, forests, wetlands
- Road transport fuel already heavily taxed
  - in contrast to domestic energy use

Cost of GHG saving in transport very high?

Road fuel excises 2003

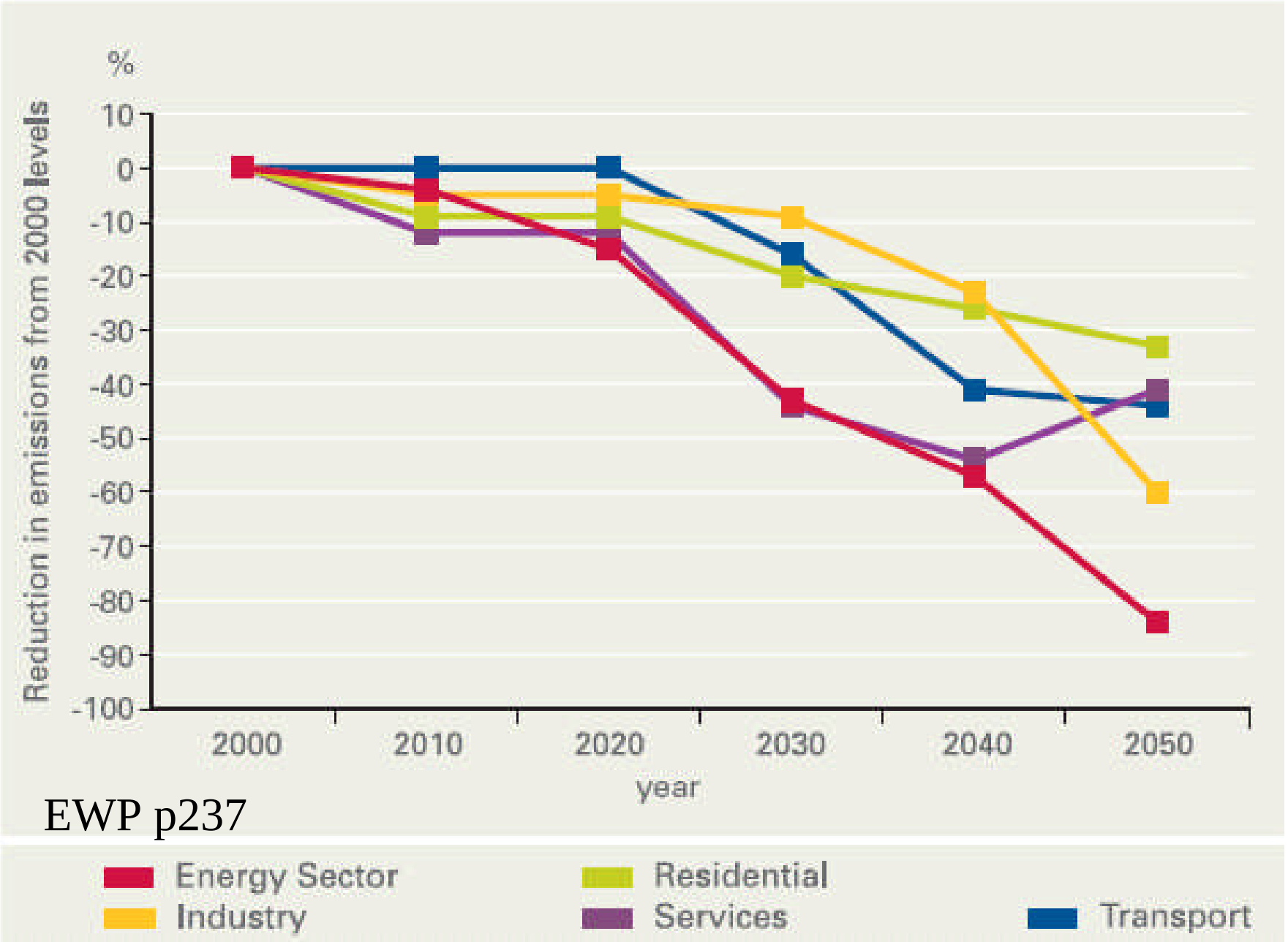


Intermodal comparisions of CO2 costs per km



Source RSSB, Transport Times Sep 2007

FIGURE 7.1. UK MARKAL MACRO CARBON EMISSIONS REDUCTION BY SECTOR – SCENARIO SHOWING LEAST COST ROUTE TO 60% REDUCTION BY 2050.



EWP p237

Conclusions

- Energy taxes/subsidies still not mentioned
- No reassurances of floor price to CO_2
- ROCs retained - but most costly solution
  - greater enthusiasm for cap & trade elsewhere
  - better: auctions for capacity and/or energy?
- Otherwise good intentions ...
  - nuclear consultation, planning, information

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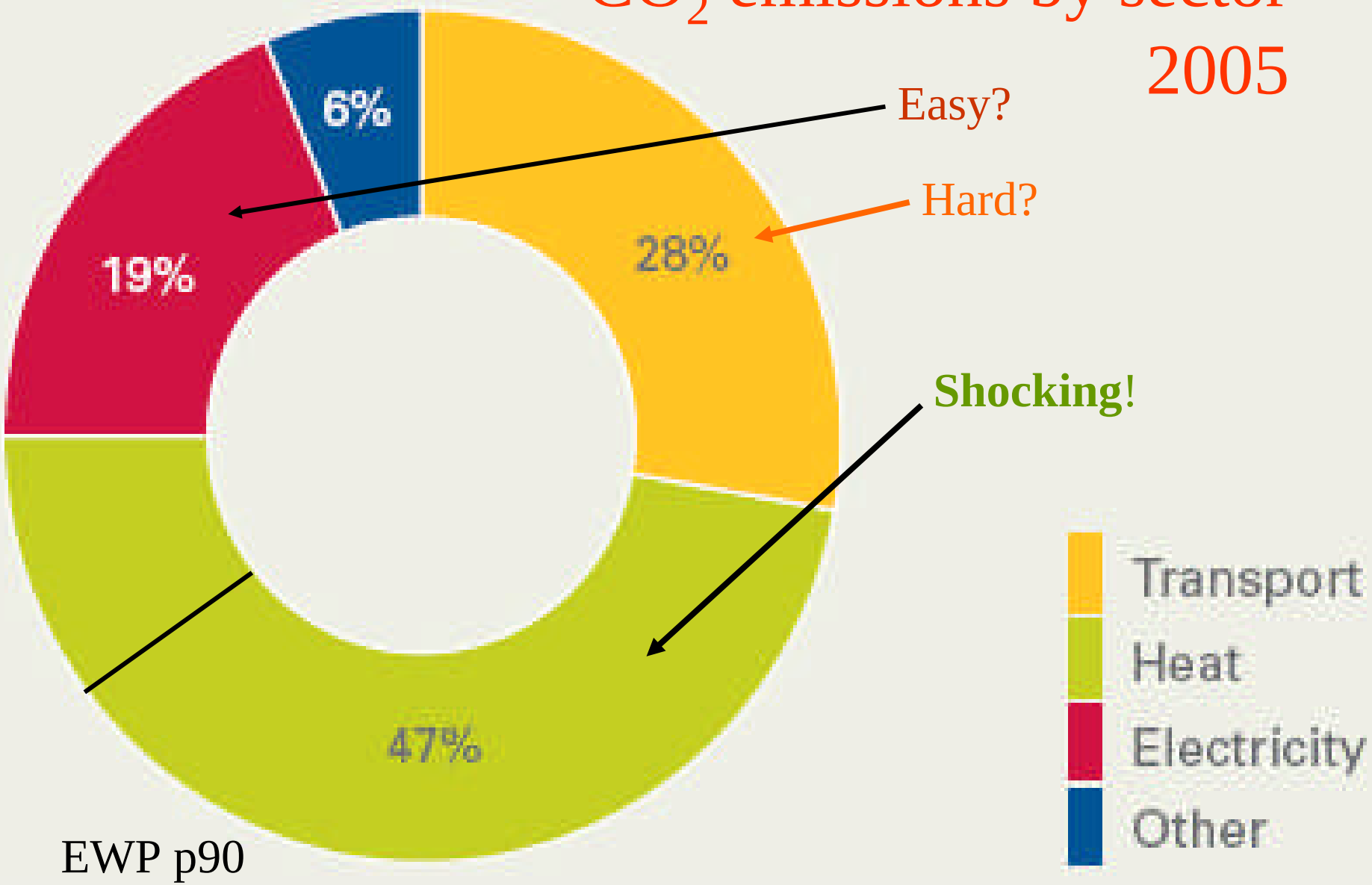

EWP p90