# Three and a big half:

## Policies to decarbonise UK electricity

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# Outline

- Context and vision
- Its prices *and* efficiency *and* technology-investment,
  - Energy Efficiency and the UK 'Carbon Reduction Commitment'
  - Offshore wind: blown off course?
  - Carbon price 'stability'
- .. And

# Combines high-level insights from several areas of research and engagement …

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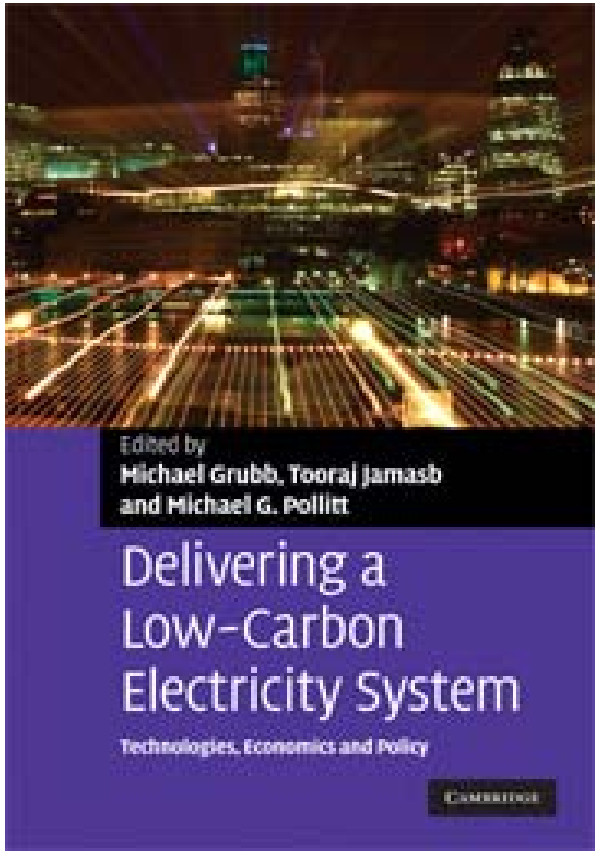



Committee on Climate Change

Building a Low-Carbon Economy –
The UK's Contribution to Tackling Climate Change

**www.theccc.org.uk**

University of Cambridge

www.electricitypolicy.org

# CCC Report (Dec 2008) recommended interim (now accepted) and intended carbon budgets out to 2020, and placed decarbonisation of electricity at the centre of the intermediate and long-term strategy

**Reducing power sector emissions:**

Renewables (Wind, solar, tidal and marine, biomass), nuclear, CCS

Application of power to transport and heat

**Reducing transport emissions:**

- Fuel efficiency
- Electric/plug-in hybrids

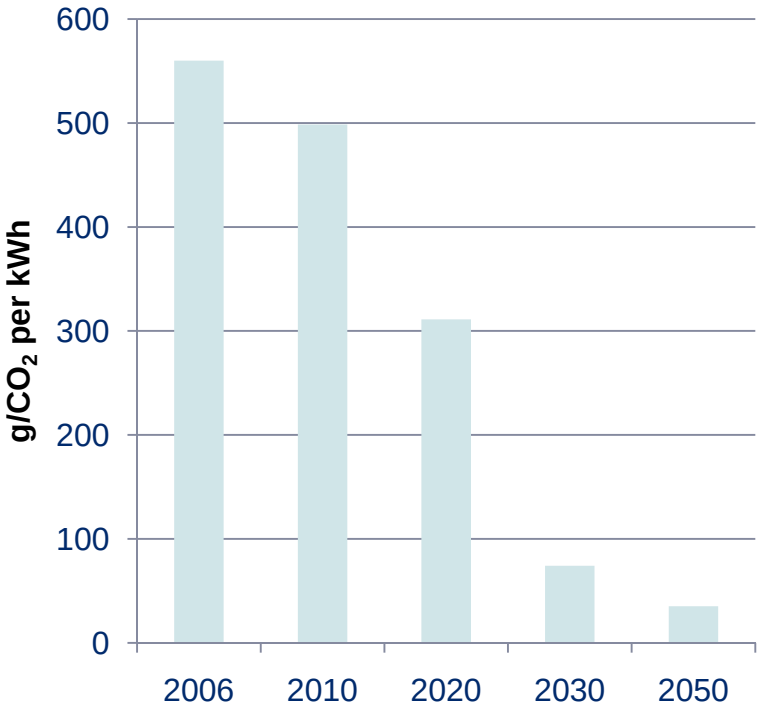
Bio fuels (first vs. second generation)

**Reducing heat emissions:**

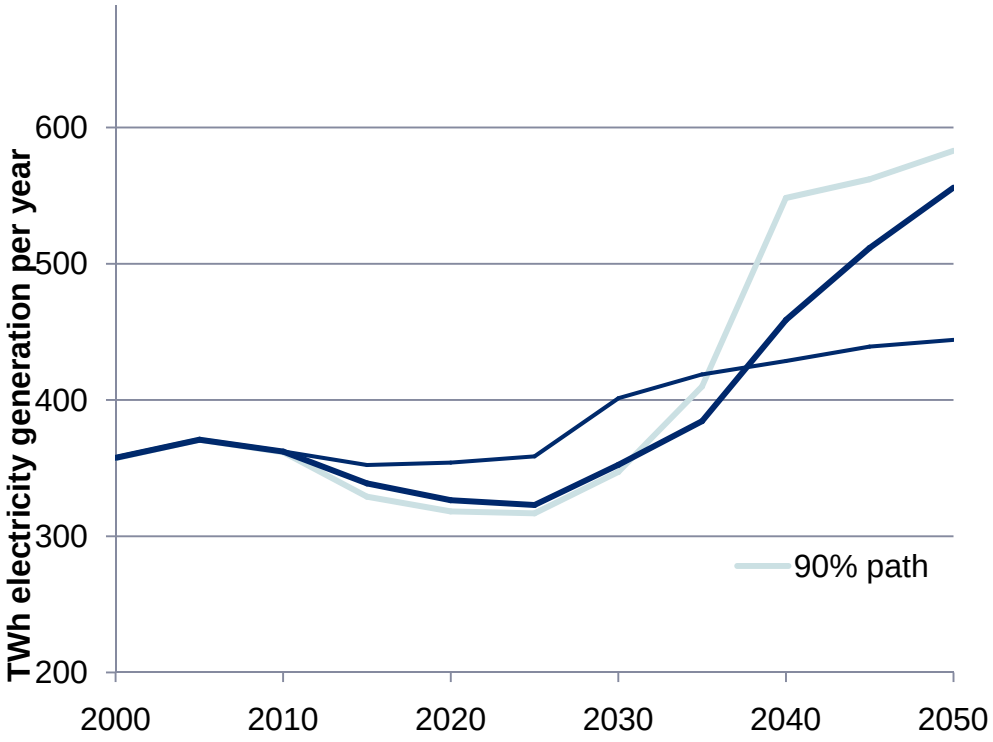
- Energy efficiency
- Lifestyle change
- Electric heat (e.g. heat pumps, storage heating)
- Biomass boilers
- CCS in industry

# The strategy requires *radical* decarbonisation of power sector

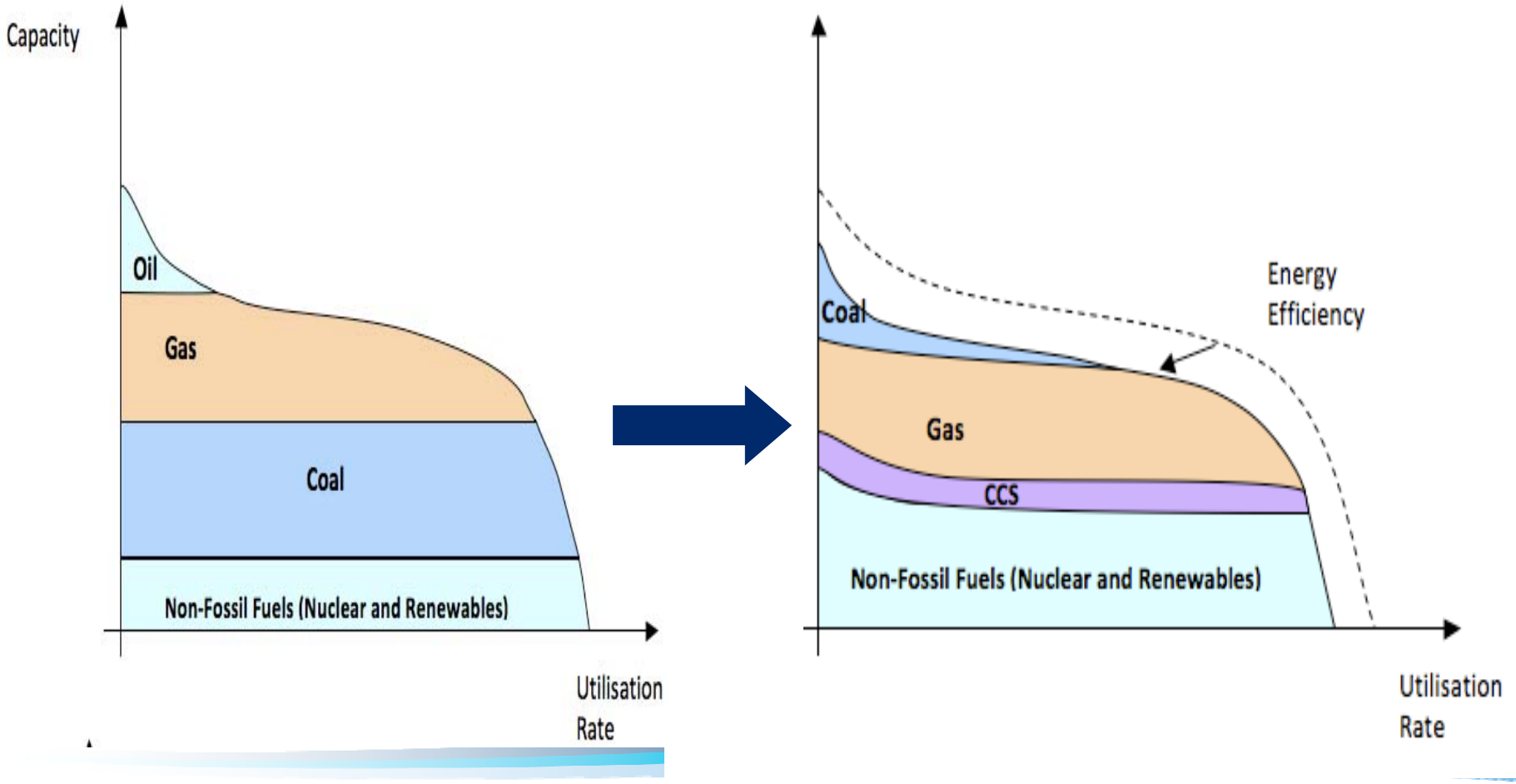
## Emissions intensity to 2050




## Power generation to 2050

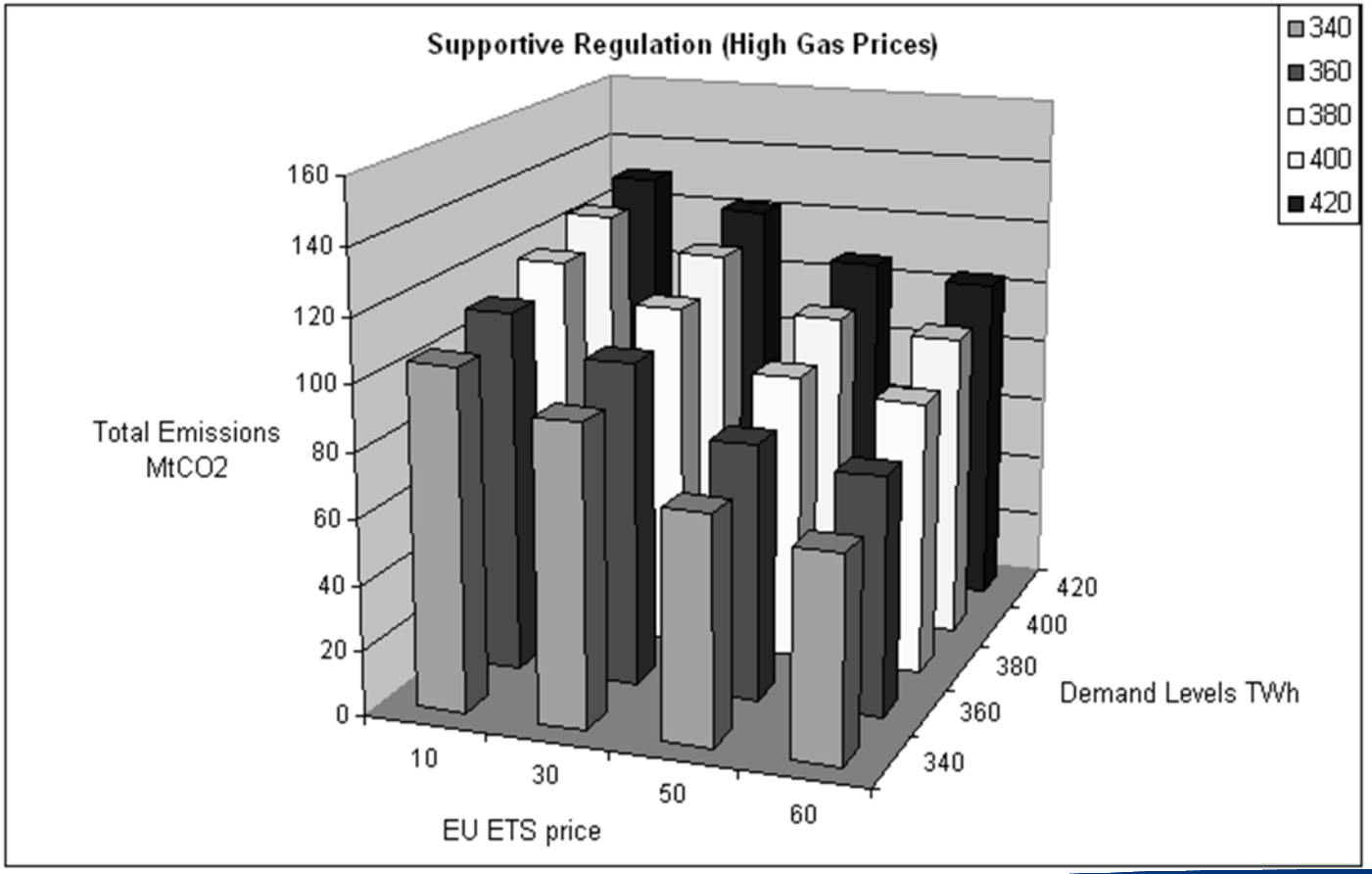


# Major decarbonisation is possible *if* there is sufficient low carbon investment, electricity end-use efficiency, and carbon pricing sufficient to 'invert' load curve



# Even for a given plant mix, CO2 emissions can depend powerfully on the combination of demand and carbon prices

- ‘Supportive regulation’ scenario with high gas price (5p)



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# Energy efficiency policy must understand and address the real-world barriers

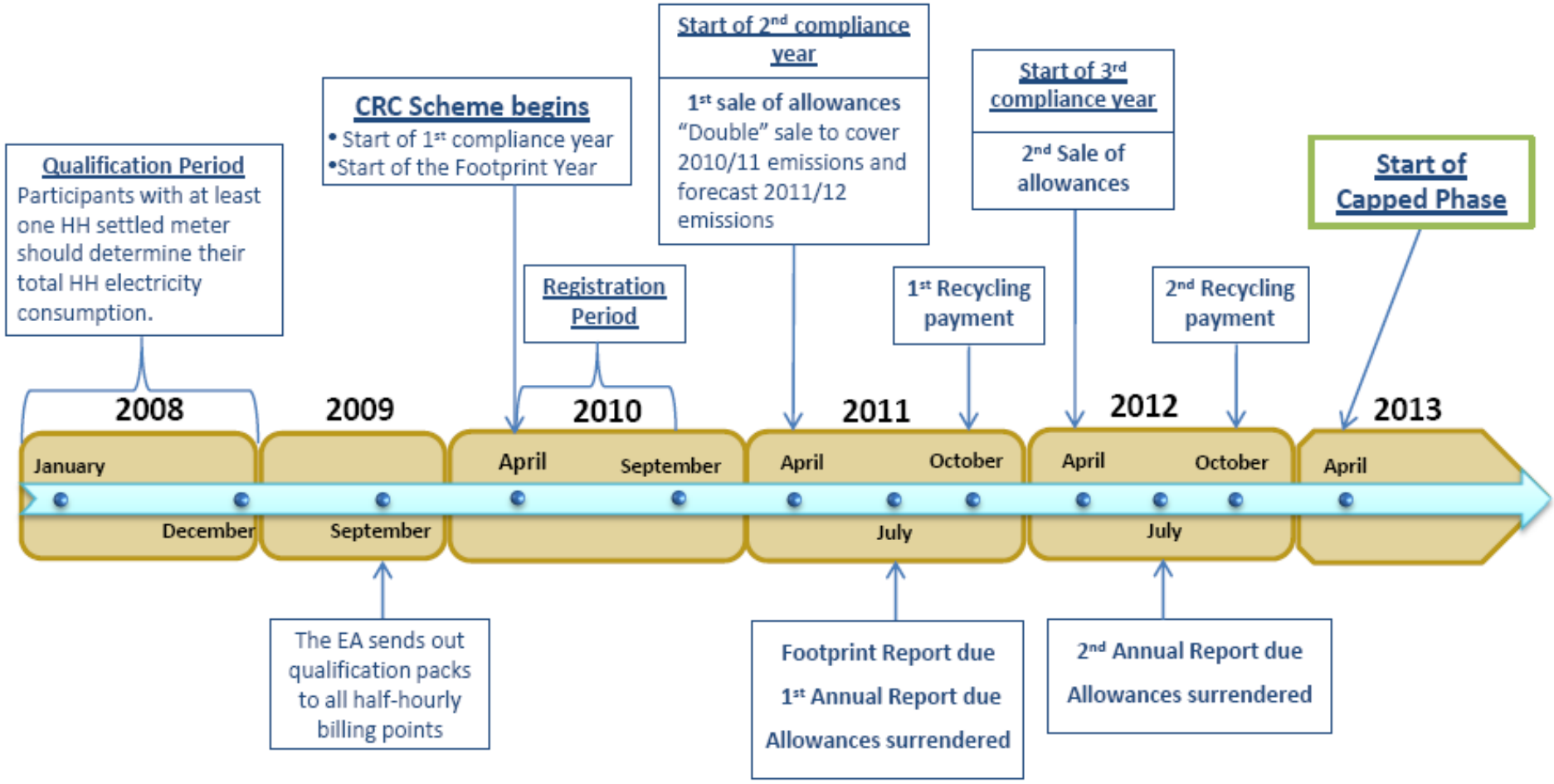
- A Consumption-based 'ETS' was proposed as a cost-effective way to target rapidly rising emissions associated with large non-energy-intensives

| | Core features | Rationale | Possible extension |
|---|---|---|---|
| **Sector coverage** | Apply to *large non-energy-intensive organisations,* particularly commercial sector | ▸ Exploits capacity of large firms to manage their energy and company commitments<br>▸ Addresses numerous small sites with minimal difficulty<br>▸ Sector rapid emissions growth, currently CCL only instrument | Public sector, some CCA sectors |
| **Emissions coverage** | Cover *direct and electricity-embodied* emissions | ▸ Electricity accounts for 70% of LNE sector emissions<br>▸ Enables rational trade-off with decentralised / local / cogeneration | Transport (eg. haulage) emissions |
| **Operation & incentive** | Purchase allowances to cover emissions, revenue to be recycled back to sector | Need to acquire allowances and verify will address the Behaviour & Motivation barrier far more effectively than just paying marginal electricity bill | Self-selection (opt-in) to escape rising CCL |
| **Allocation** | Most allowances to be bought from auction or from EU ETS | ▸Sectors are not energy-intensive: competitiveness not a concern<br>▸Greatly simplifies allocation process – no company-specific | EU ETS link may improve price & stability in EU ETS |

# UK government presented [EPC] as 'an option' in 2006 Energy Review, 'Carbon Reduction Commitment (CRC) decision in 2008 White Paper

- Targeted at large UK firms and public sector organisations that fall outside scope of EU ETS and CCAs
  - Based on Half Hourly metering and > 6000MWh/yr consumption
  - Covers about ? 5000 ? organisations
- Fully auctioned with revenues recycled to participants in part on basis of performance league table
- 2010-2012:
  - Price fixed at €12/tCO2
- 2013 onwards:
  - Auctioned with declining cap
- Expected to drive strong interest in energy efficiency services
- Projected to save over 1MtCO2/yr

# Carbon Reduction Commitment - timeline



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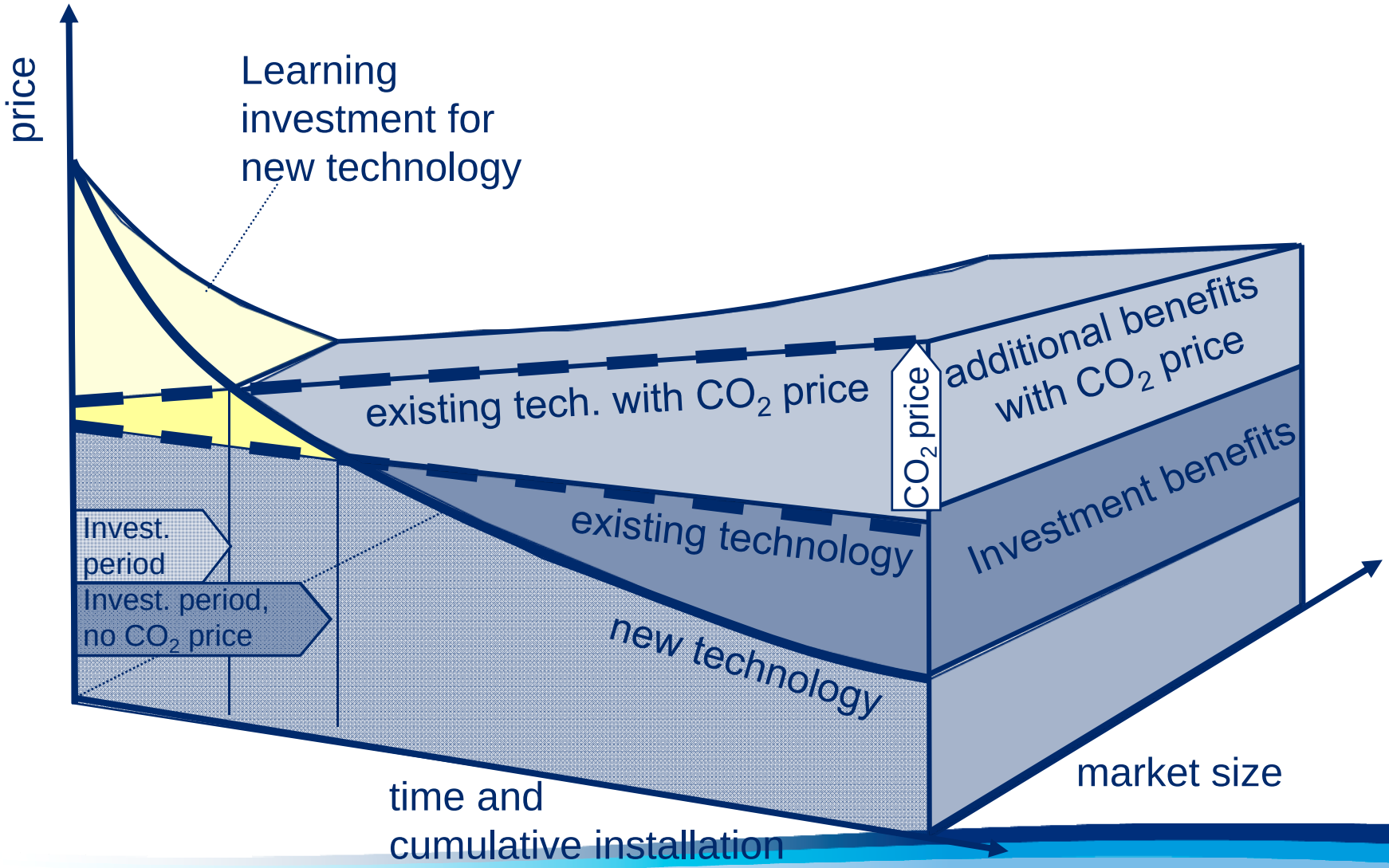
# A view of the economic ideal

- robust & rising carbon prices will drive the learning investments required



## In practice, widely accepted that additional supports needed, these have become increasingly complex and 'managed' over time

- Renewables Obligation Certificates (Portfolio Standard)
  - A 'market-based' approach to innovation support
  - Fell into 'first past the post' trap
  - Ended up as a complex way to generate a largely managed price
  - Banding introduced to support investment in less established technologies
- Growing Whitehall admission that feed-in tariffs are more effective
- Credit-crunch-induced crisis in the 'flagship' wind sector, projects that are 'ready for financial closure':
  - Around 3GW onshore
  - Close to 4GW offshore (Round 2)
  - Much more offshore (Round 3)
- 2009 budget proposed emergency measures to increase the crediting ratio for offshore wind to 2.0, declining to 1.75, then back to 1.5
- … and EIB capital finance ..?
- … and carbon price .. ?

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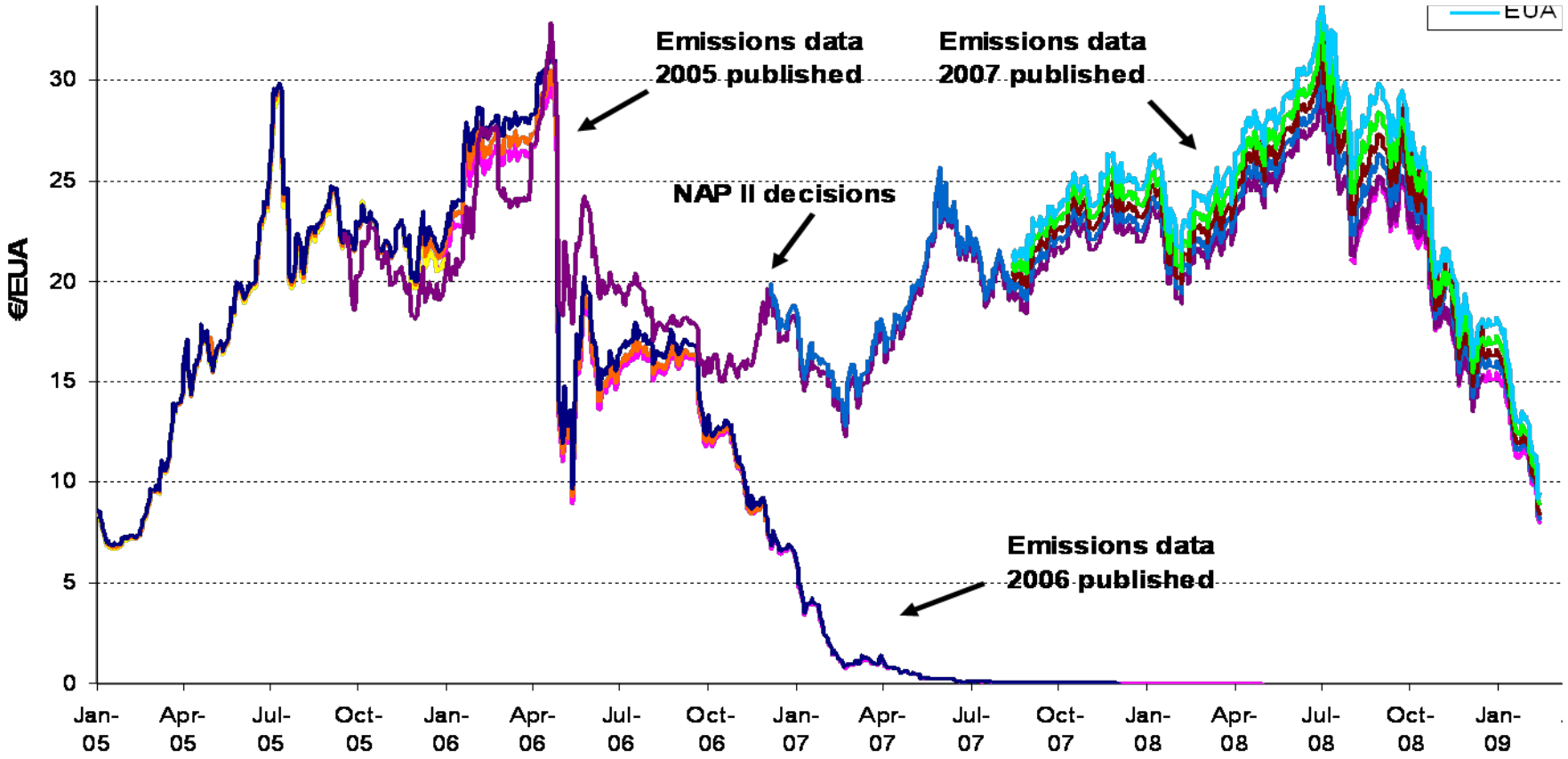
# EUA prices




Source: PointCarbon 2009



perspectives climate change

# Our analysis pointed to likelihood of Phase II price crash *before* scale of recession became apparent

## Supply:

- Known oversupply in Kyoto 'government' market
- Performance of CDM projects & pipeline estimates stabilising just below 2 Billion tonnes CO2 reductions by 2012

## Demand:

- Impact of:
  - Usual 'projection inflation'
  - Unprecedented energy prices
  - Other abatement measures ..
- CT Commissioned Camecon (Sept 08) to look at EU ETS projections 2008-12. Predicted negligible net demand
- Predictions of price collapse borne out even before full impacts of recession factored in

See *The Global Carbon Mechanisms: evidence and implications*, Carbon Trust, February 2009

# The ‘downside’ impact of low carbon prices must be matched against the ‘upside’ needs if the mechanisms are to contribute significantly

- One cannot reassure investor confidence on the basis that prices will be resurrected by a collapse in investment!!
- The 2GtCO2/yr by 2020 in our extrapolation is *modest* compared to the *overall non-OECD mitigation* implied by global abatement scenarios if non-energy sources are included (eg. 5-10GtCO2/yr, IEA WEO) and even smaller compared to eg. McKinsey potentials
- ‘Buy to bank’ now is unlikely to support high prices in a time of credit crunch anyway …
- .. Especially as ‘twice bitten, thrice shy’ – if EU ETS Phase II prices see sustained collapse, how much will business bet on governments getting it right next time?

# Policy ‘interventions’ to restore market … ?

- Economic & political fundamentals:
  - Clarity about objectives: quantity, investment and efficiency
  - Distinguishing features: governments establish market and quantities, and this offers tools not otherwise available

Undertaking further research on economics of cap v tax, price floors / corridors,

Practical (demand-side) options to support price:

- Entry of Canadian purchases
- Retiring units (of EU, or transition economies)
- Commitment to banking (EU)
- Early declaration on post-2012 targets
- **Reserve price on EU ETS auctions (esp. UK and German)**

# Germany and the UK could largely underpin carbon prices in Phase II just by setting reserve price on forthcoming auctions

- Dominated by the big two EU emitters (> 1/3rd EU CO2):
  - Germany (9%)
  - UK (7%)
- Plus lesser contributions eg. Netherlands (4%), Hungary (5%)
- Plus most (not all) of unused New Entrant Reserves (5.5% EU total; higher in Germany & UK)
- UK auctioned 4MtCO2 last year, due to auction total 25MtCO2 this year
- Germany yet to conduct first auction

See Grubb (2009), 'Reinforcing carbon markets under uncertainty', www.climatestrategies.org

# .. And the “big half ?”

*- Electricity regulation is based on a paradigm of competition in which short-run marginal costs drive price and hence investment and operational decisions*

*- Low carbon electricity systems are the opposite: they require long-term investment in infrastructure and capital-intensive, low marginal cost plant, in which risk deters or delays*

*- .. And those consuming industries who might pay, for long term, low risk and/or low carbon, are contractually unable to reap the benefits*

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