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CAMBRIDGE | **Electricity Policy  
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# Integrating wind in integrated markets

David Newbery

**DG ENER Workshop**

Brussels 21 May 2010

<http://www.eprg.group.cam.ac.uk>

# Logic of 2020 Directive

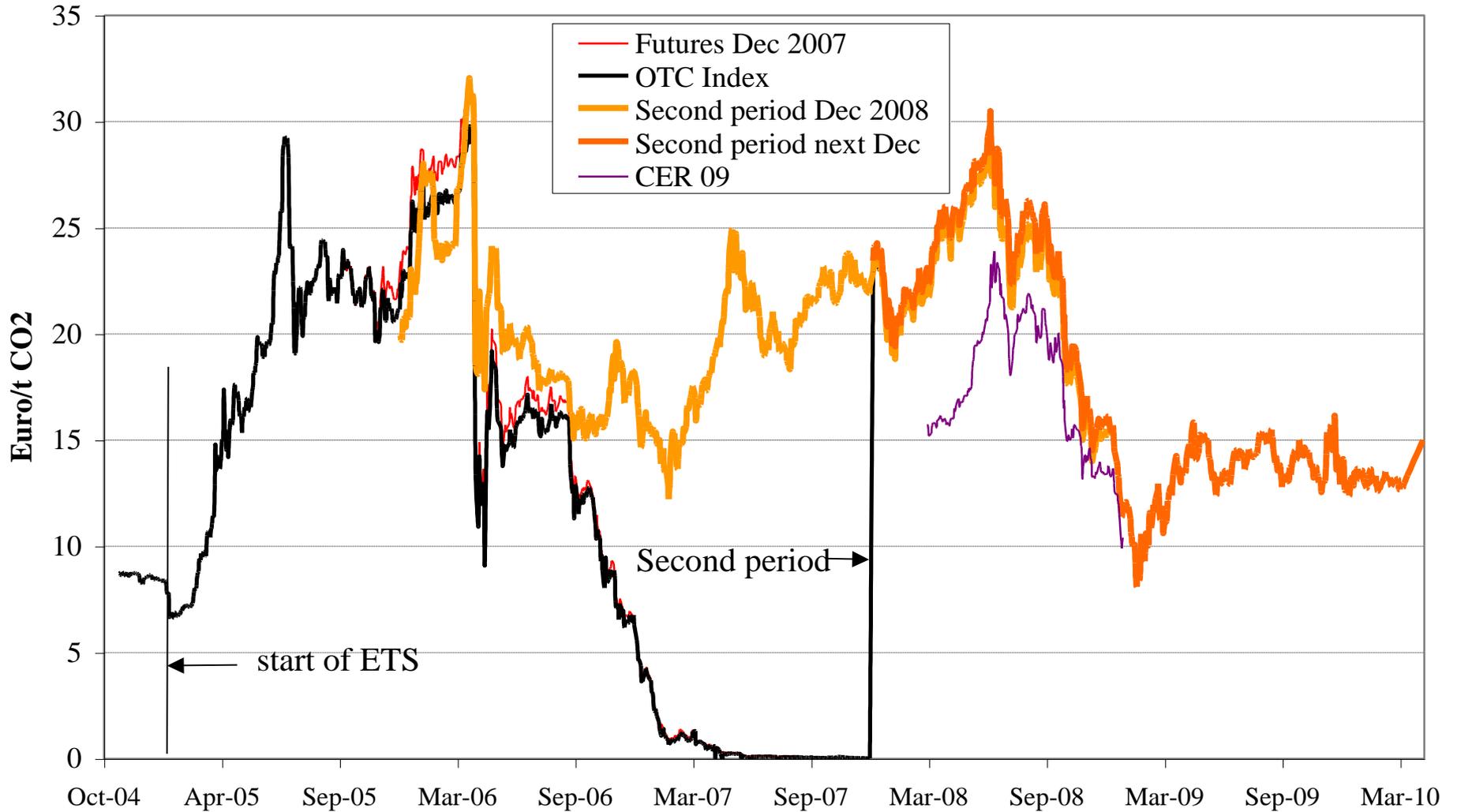
- Not to reduce CO<sub>2</sub> - ETS ensures no impact
    - ETS intended to price CO<sub>2</sub>
    - **but fails miserably to give credible signals**
  - not to support low-C generation, only RES
- => support to RD&D to drive down costs of RES**
- How? Support investment or generation?
  - Learning comes from:
    - design (cost, reliability, controllability, etc)
    - production, installation, siting/planning, grid integration

***but not from operation (provided reliable)***

# Implications for wind

- Should not be induced to bid negative prices
    - Given that wind can be rapidly reduce output
      - => **support should be for availability, not output**
  - Should not have automatic priority
    - merit order should be based on avoided costs
- => if wind is more costly than alternatives (including balancing, redispatch), **back it off**
- => foregone RES generation should count to RES target (as it has no CO<sub>2</sub> credit)
- ***unless ETS reformed to support CO<sub>2</sub> price***

# EUA price October 2004-April 2010



# Permits vs Taxes

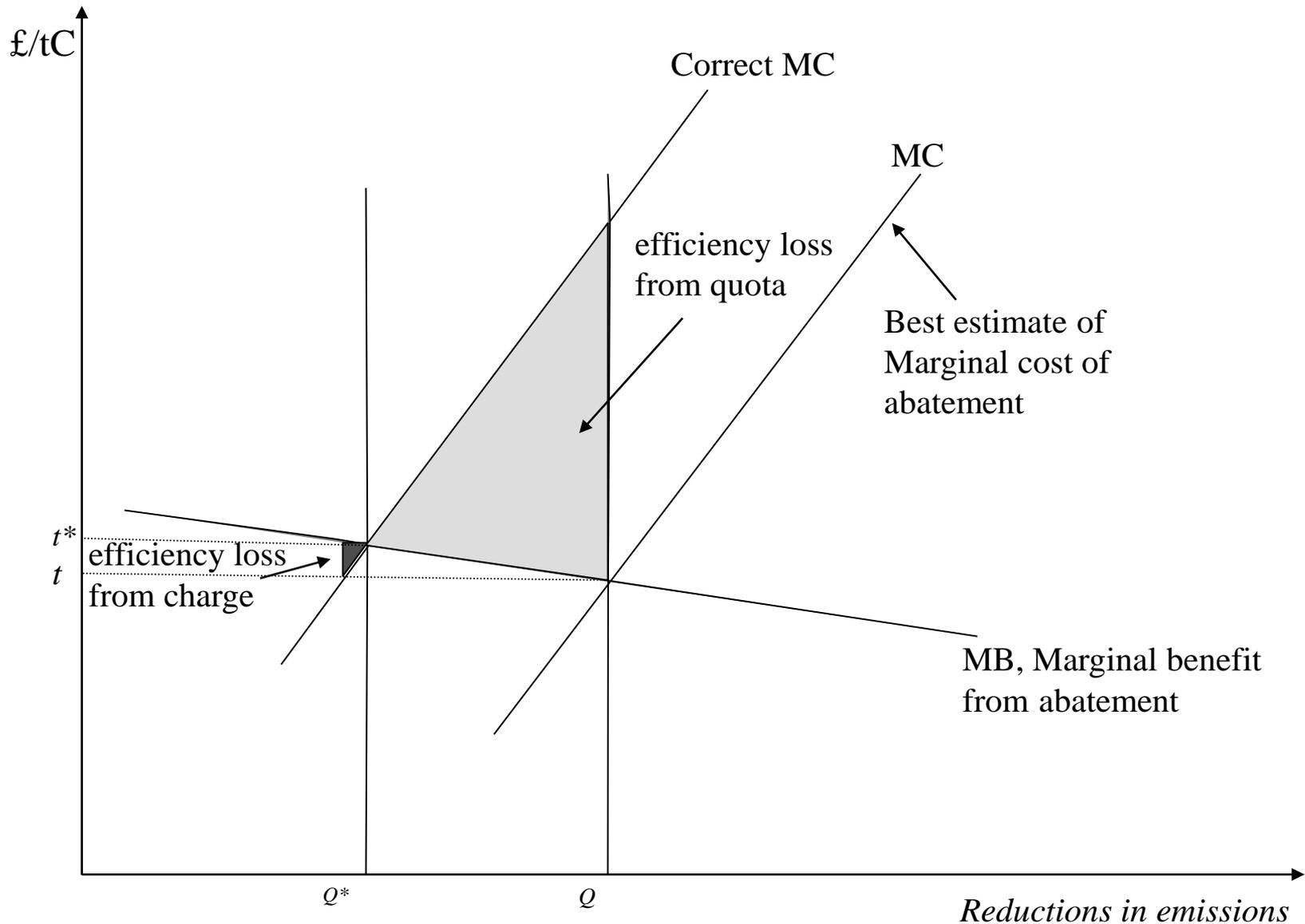
Weitzman: Taxes superior to permits unless MB of abatement **steeper** than MC

CO<sub>2</sub> is a *global persistent stock pollutant*

- CO<sub>2</sub> damage today effectively same as tomorrow  
=> marginal benefit of abatement essentially flat
- marginal cost of abatement rises rapidly
- hazard of global warming very uncertain, as are the future abatement costs

***Carbon tax superior to tradable permits  
but permits easier to introduce***

# Costs of errors setting prices or quantities



# Failures of ETS

- Current ETS sets quota of total EU emissions
- Renewables Directive increases RES
  - => increased RES does not reduce CO<sub>2</sub>
  - => reduces price of EUA (perhaps by €10/tonne)
  - => prejudices other low-C generation like nuclear
- Risks undermining support for RES

*Solved by fixing EUA price instead of quota*

*Helped by proposed 30% reduction target*

# Reforming ETS

- Reform EU ETS to provide **rising price floor**
  - sufficient for nuclear *or on-shore wind if cheaper*
- Commitment to raise CO<sub>2</sub> price at 3% p.a. over life of plant may suffice
  - €25/EUA 2010 => €34 in 2020, €61 in 2040 ...
- Making it credible: write CfD on this path
  - offer CfD at €45/EUA for 20y from commissioning?

***makes extra carbon savings additional***

# Conclusions

- Renewables Directive should be about **reducing cost** of renewables, **not generating power**
  - ⇒ no negative prices for RES
  - ⇒ no necessary **dispatch** priority unless least cost
- CO<sub>2</sub> price is too low
  - **need to support floor price**
- RES Directive undermines ETS
  - and risks bringing ETS into disrepute
  - **auctioning will not help, raising target to 30% will**



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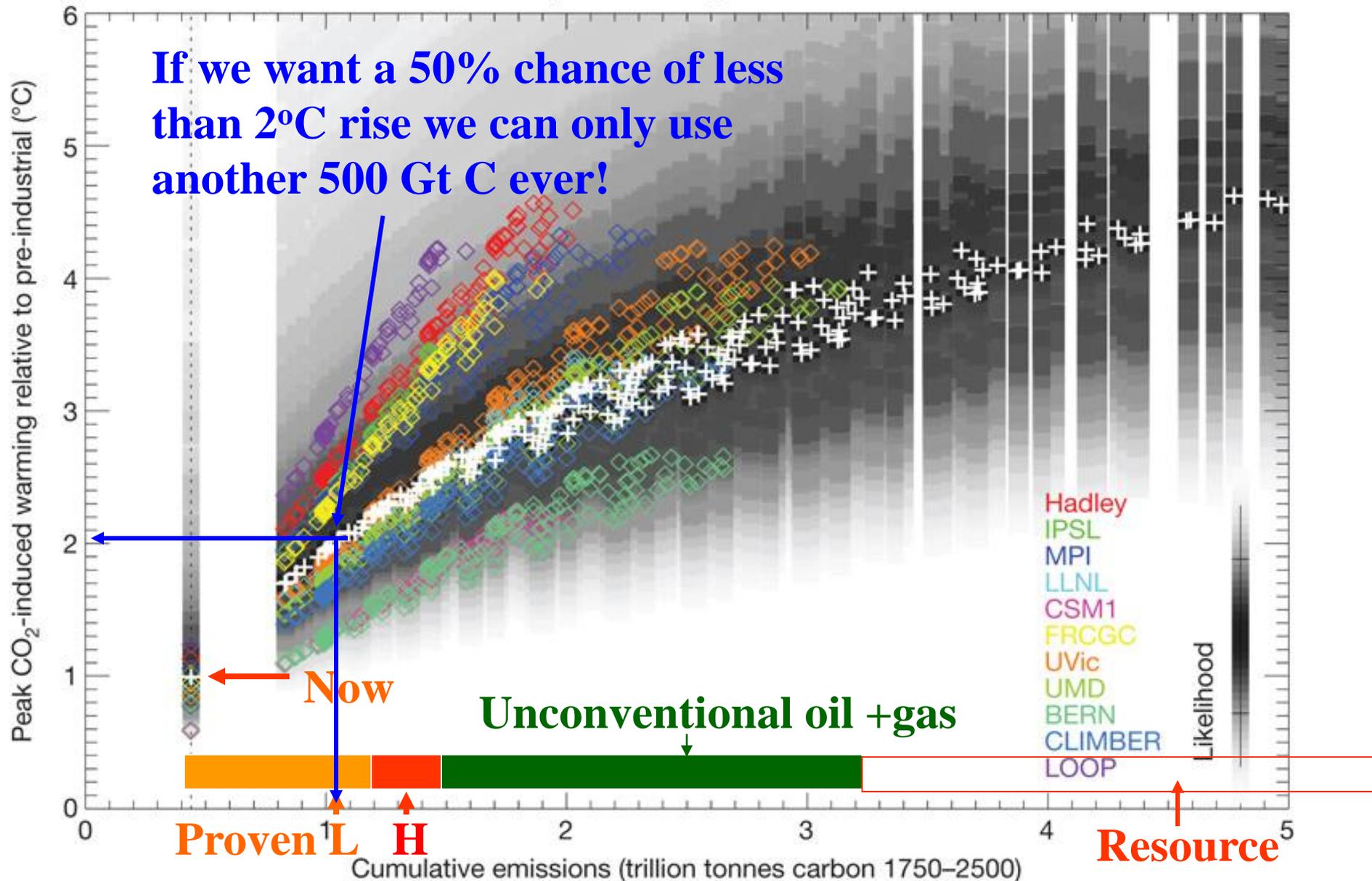
# Appendix

The next slide shows that arguably the cumulative stock of GHG (in Carbon equivalents) is the major determinant of global warming and that to remain below 2°C with a 50% probability (the white crosses) we should not emit more than about 1000 GtC (a trillion tonnes) of which we have already emitted half, and the remaining C in fossil fuels considerably exceeds the absorptive capacity of the atmosphere. Note reserves are proven, and resource includes coal reserves currently uneconomic at today's prices but which may become available - and the open box goes way off to the right.

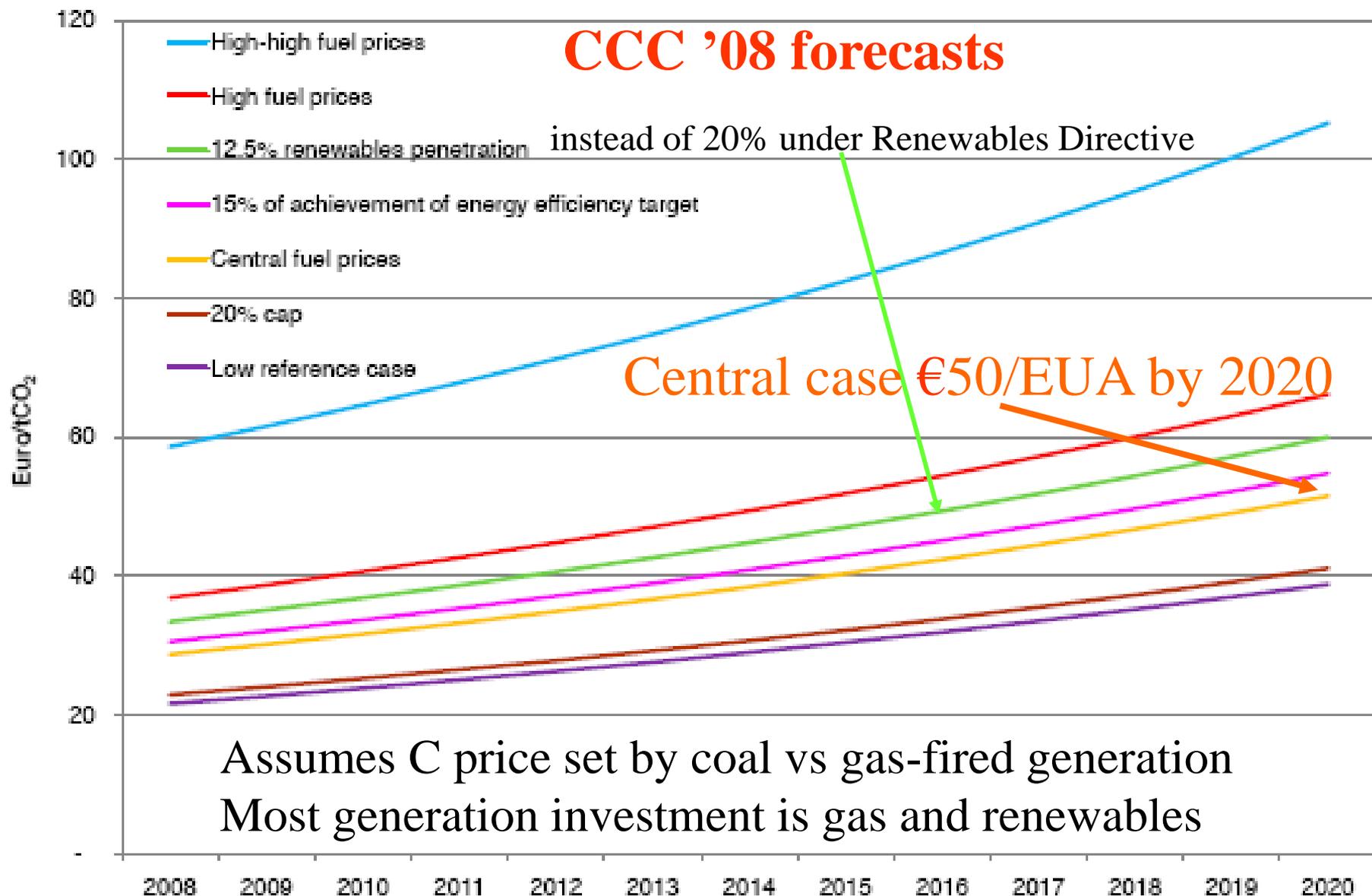
Last slide is the estimated impact of an increased EU renewable target on carbon price (as at 2008 pre recession, high fuel prices)

# Peak CO<sub>2</sub>-warming vs cumulative emissions 1750–2500

Relative likelihood of peak warming versus cumulative emissions



**Figure 4.8** EU ETS allowance price projections 2008–2020



Source: Outputs from DECC EU ETS marginal abatement cost model, based on CCC scenarios  
Note: All price projections are based on central fossil fuel price projections except where stated