

# Environmental challenges in Europe

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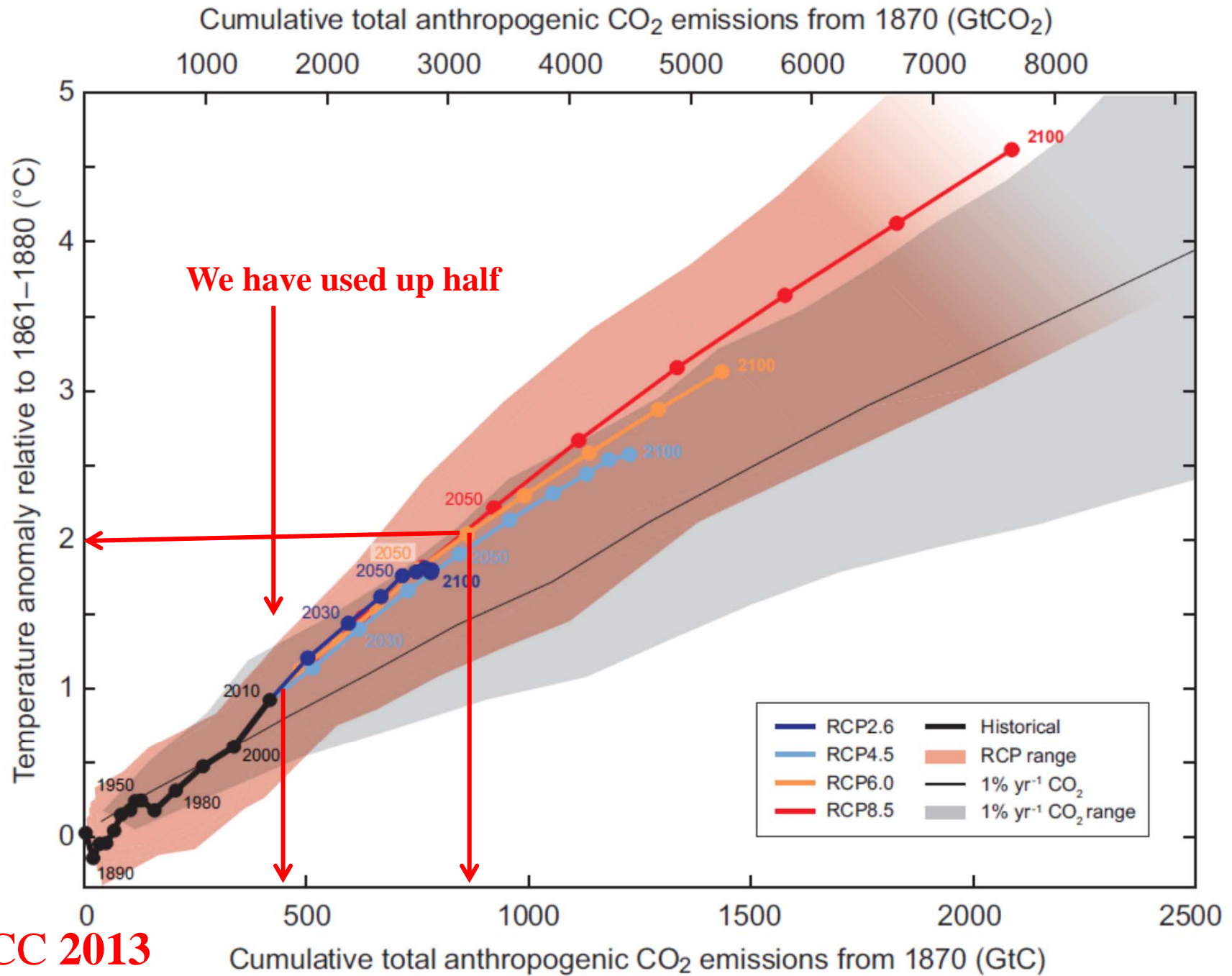
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# Outline

- Problems: GHG emissions, lock-in, R&D unfunded
  - Flawed corrections of market failures
- A better EU RDD&D policy
  - To finance SET-Plan, improve RES support
- EU 2030 proposals
  - Post 2020 objectives
- Exiting from RES subsidy regime
  - What is needed?

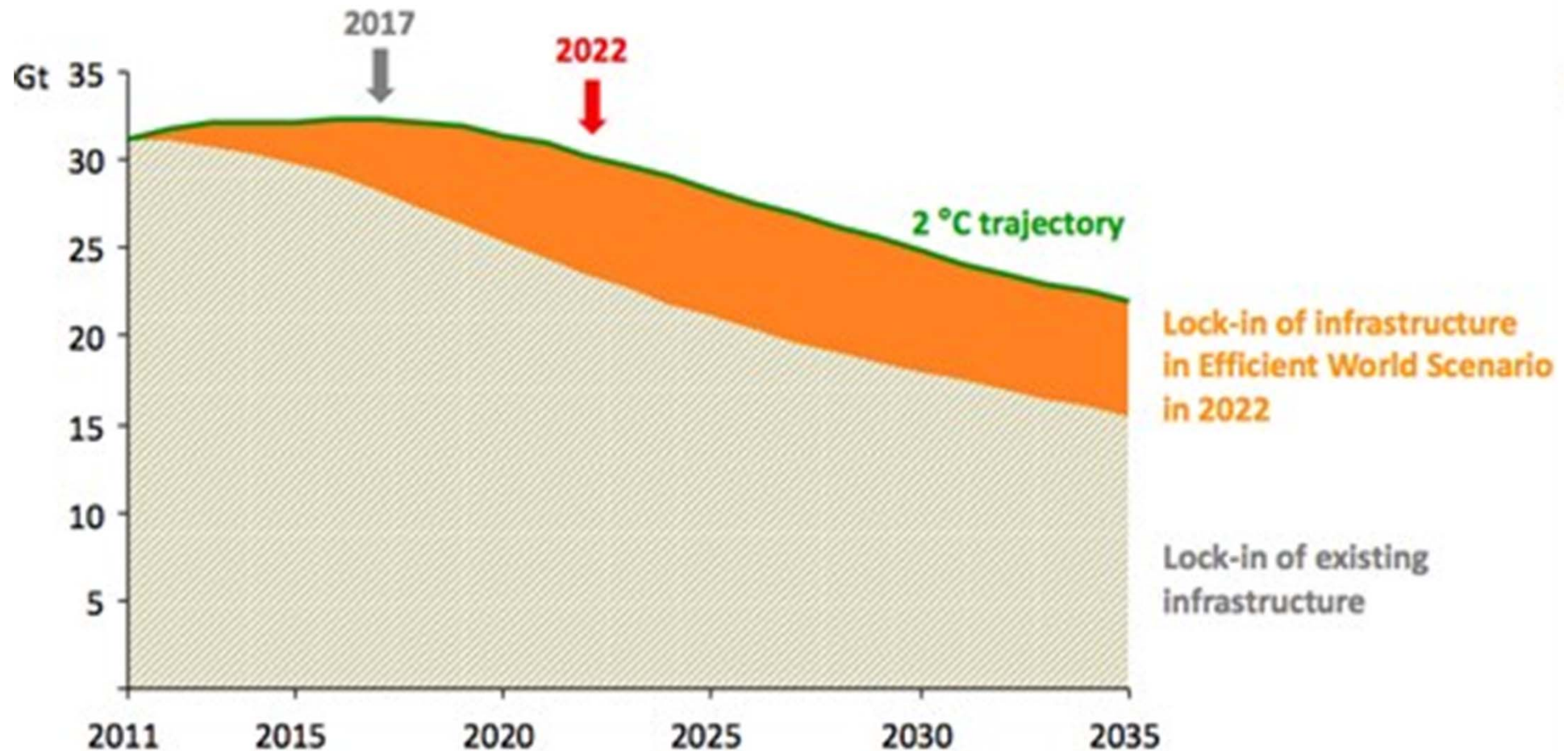
*Tackling CO<sub>2</sub> in a recession is doubly cheap*





IPCC 2013

# We are already locked in to high carbon emissions from past fuel choices



Source: IEA <http://www.carbonbrief.org/blog/2012/11/favourite-graphs-from-iea>

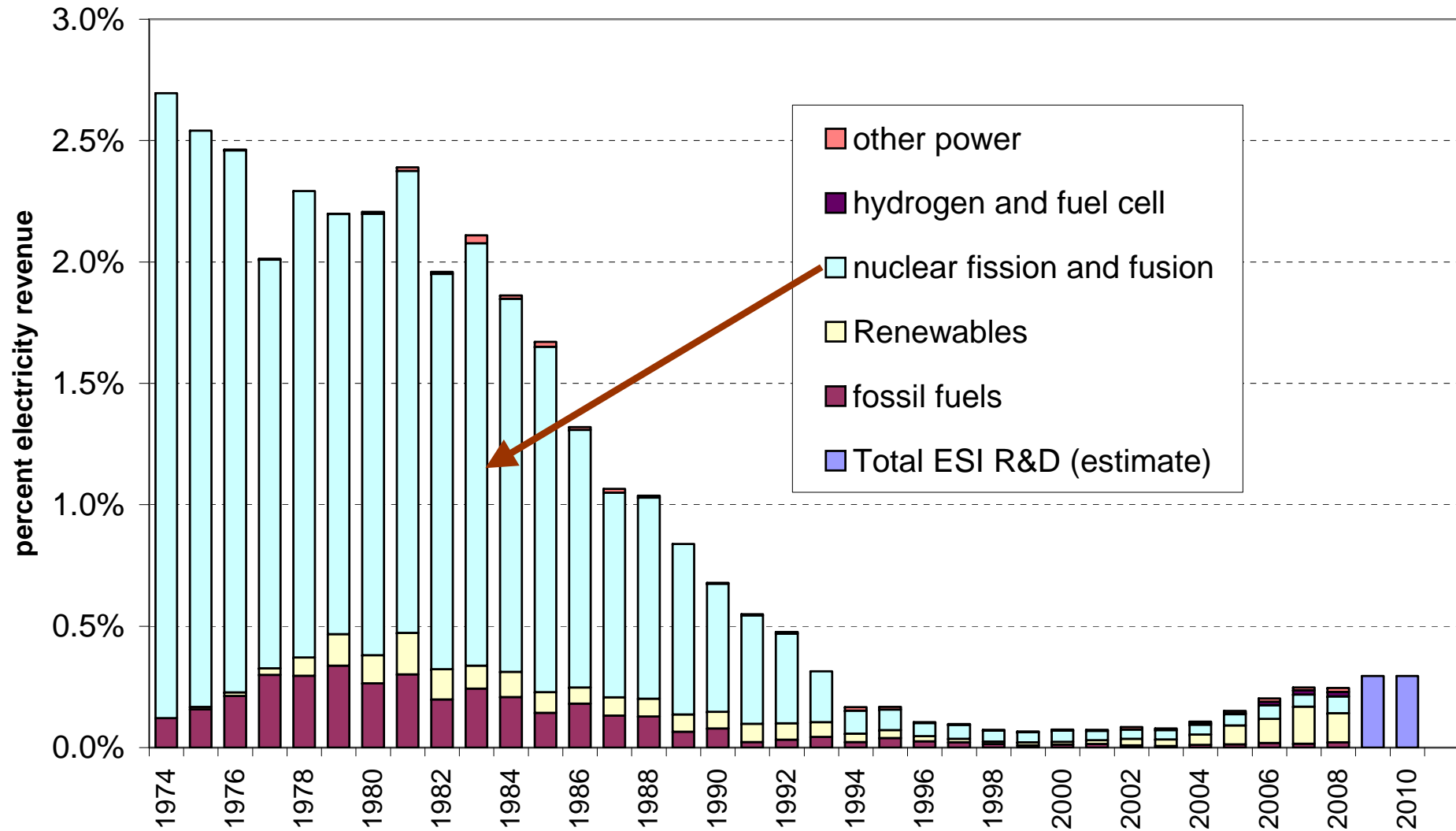
# Problems

- Carbon price not adequate, credible nor durable
  - Energy investments last 20-60 years
  - Public good needs collective action
- Immature technologies need R&D, demonstration, and deployment support
- R&D collapsed after liberalisation
- Debt discourages public investment
  - Real interest rates low, private borrowing hard

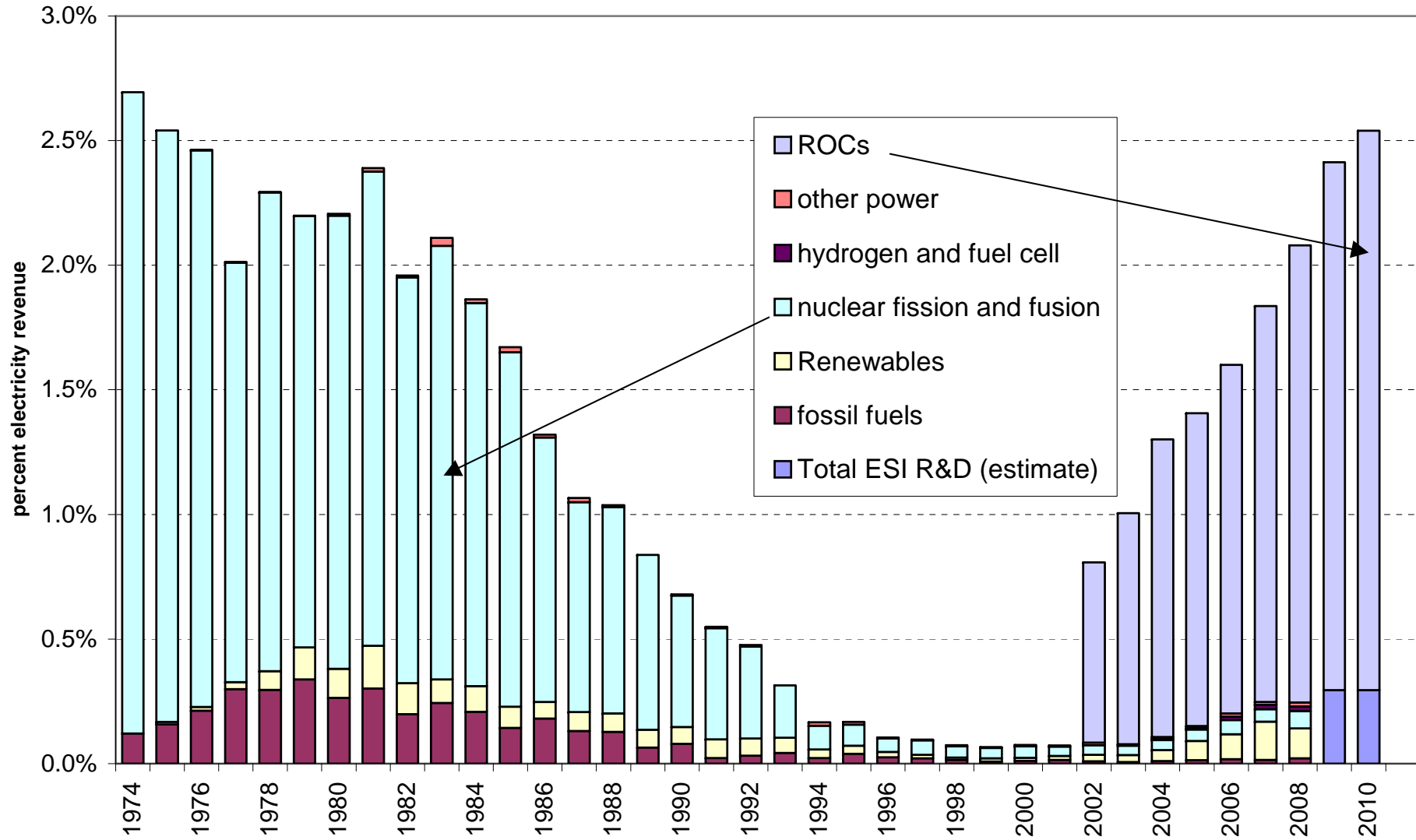


# R&D collapses with liberalization

## UK Electricity R&D intensity



# UK Electricity R&D intensity



# Correcting EU-wide market failures

- **ETS** to price CO<sub>2</sub>
  - to support **mature** low-C options
- **20-20-20 Renewables Directive:**
  - demand pull for **not-yet-commercial** renewables
  - justified by learning spillovers and burden sharing
  - Brilliant club solution to funding RES
- **EU Strategic Energy Technologies (SET) Plan** to double 2007 R&D spend
  - R&D to support **less mature** low-C options





# Policies are poorly designed

- **ETS** fixes quantity not price
  - Renewables Directive undermines EUA price
    - Does not reduce CO<sub>2</sub> emissions at all
  - Great Recession further undermines EUA price
  - Neither **adequate, credible nor durable**
- **Renewables Directive** sets country RES targets
  - Different supports by technology and country
  - Well-funded at expense of R&D?
- **SET plan** - driven by industry lobbies?
  - as it lacks funding and allocation criteria



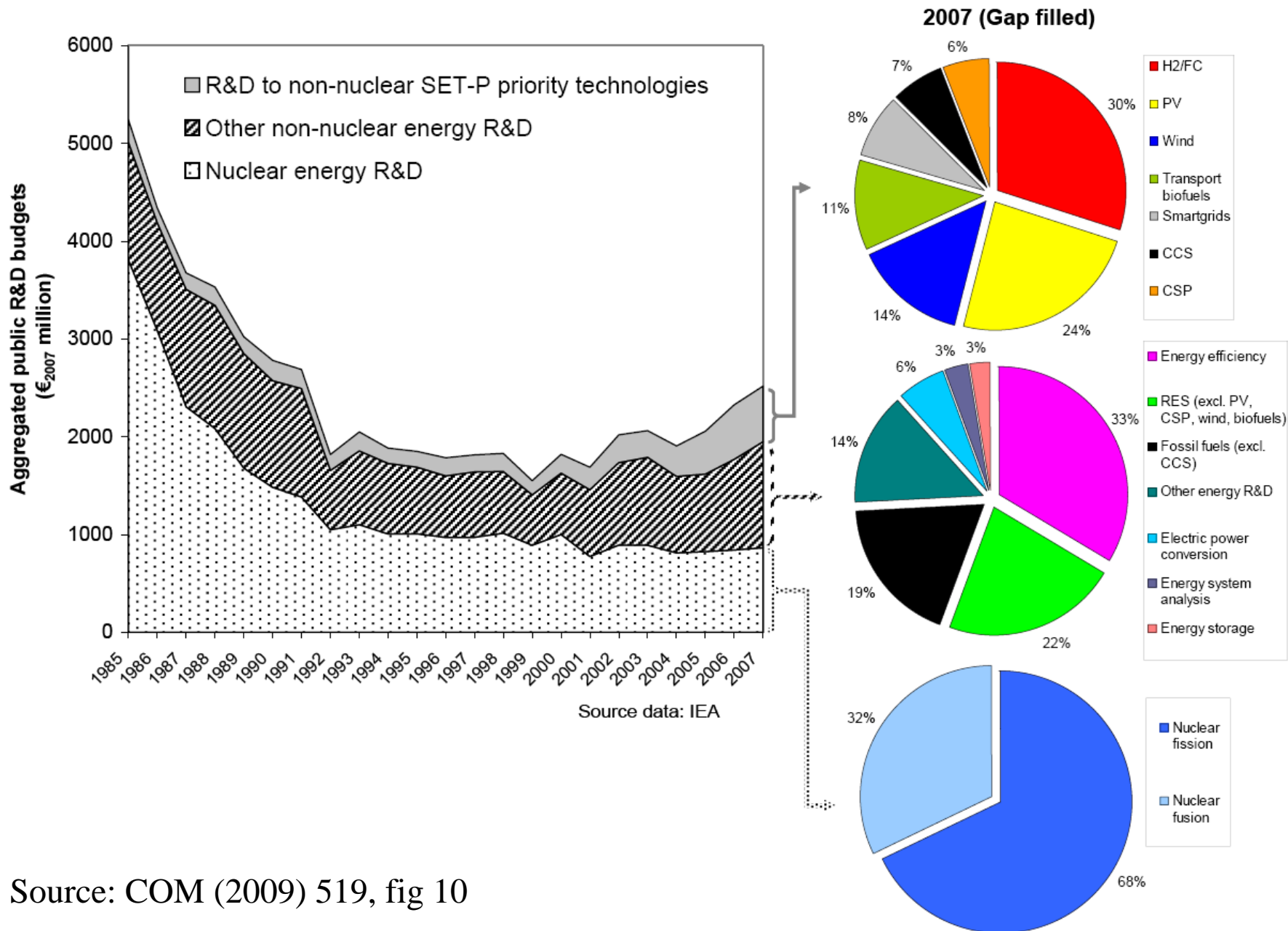
# Little recovery after backloading and tightening post 2020

## EUA price October 2004-January 2014



Source: EEX

# Aggregate EU public R&D funding



Source: COM (2009) 519, fig 10

## How should they be funded?

- Reducing carbon, creating learning and knowledge are all ***PUBLIC GOODS***  
=> finance out of public funds, **not levies** on electricity
- current policies exempt some industries in some countries from such levies
  - legally discriminatory, violates State aids, DG COMP cross
- => Solution = ALL industry should be exempt from distortionary taxes => fall on final consumers (VAT)

***Make Energy policy consistent with good public finance***



# A better EU low-C RDD&D policy?

1. Decide which technologies are promising
  - for R&D, demonstration or deployment
  - => develop a social cost-benefit method to value innovation
2. Determine initial total EU budget allocation
  - e.g. as in **SET-Plan road map**
3. Determine how/**when to stop**/reallocate budget
  - e.g. if the revealed rate of cost reduction too slow
4. Allocate **target** budget to Member States (MSs)
5. EU holds competitions to determine **EU value of support** by technology and category (R&D, D or D)
6. MS decide on projects (**EU valued**) to meet **target**



# RES system costs

- RO gives uniform wholesale price + ROC  
=> GB: locate in **Scotland=> congestion=> bootstraps £2b**
- CfD worse as detaches payment from value
- RES imposes balancing and reserve costs
  - Wind and PV need fast response reserves
  - PV delivers during low value hours
- Intelligent procurement would minimise system costs
  - Allowing for all additional system costs
  - Target support sensibly at capital cost, pay for availability
  - Valuing output according to time and place

=> FiT at **local output-weighted price less on-costs**



## RES and State Aid

- DG COMP's *State Aid Guidelines* intended to prevent market distortions April 2014
  - intervention justified by **irreparable market failures**
  - Test: “is the aid measure proportional - could the same change in behaviour be obtained with less aid?”
- ⇒ auctions for **premium** FiTs to reflect value of RES  
solar delivers when prices low
- But still need to reduce balancing risk - better contracts
- German feed-in tariffs look cheapest solution***  
***But conceal additional time/space subsidies***



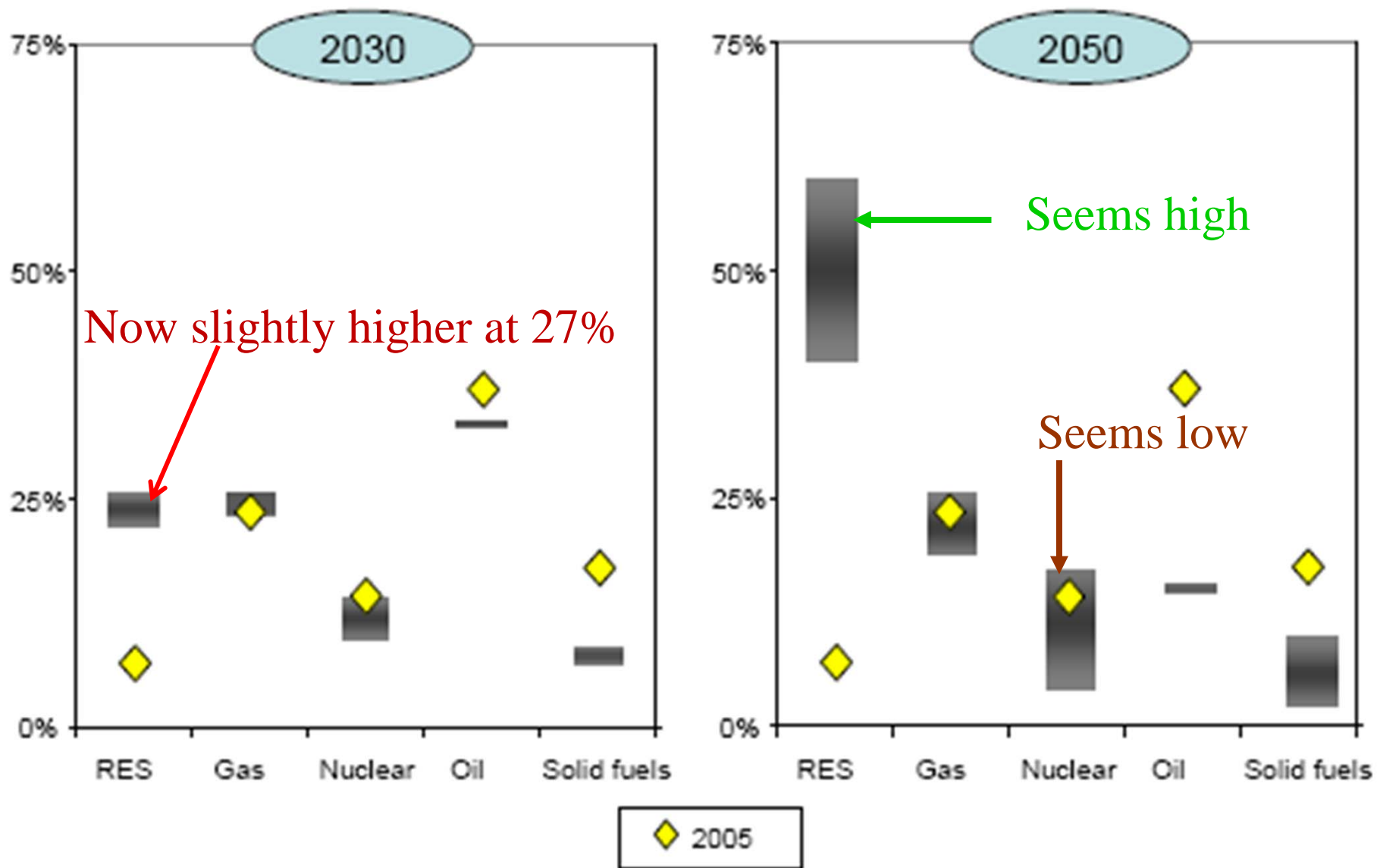
# EU 2030 proposals

- *Policy Framework for Climate and Energy 2020-30:*
  - 40% reduction in GHG emissions (from 1990)
    - 1990-2020 target = - 0.7% p.a., 2020-2050 = - 4.5% p.a.  
= 25% reduction from 2020 target in 10 years = - 2.8% p.a.  
⇒ too slow; 2030-2050 reduction of 66% = -5.3% p.a.
  - EU-wide RE target of 27%
    - Delivered by GHG reduction so no national targets
  - To be finalized after new Commission in post
- Context: Target Electricity Model complete
  - Efficient cross-border trade, Transmission plans completed





Graph 1: EU Decarbonisation scenarios - 2030 and 2050 range of fuel shares in primary energy consumption compared with 2005 outcome (in %)



# Post 2020 objectives

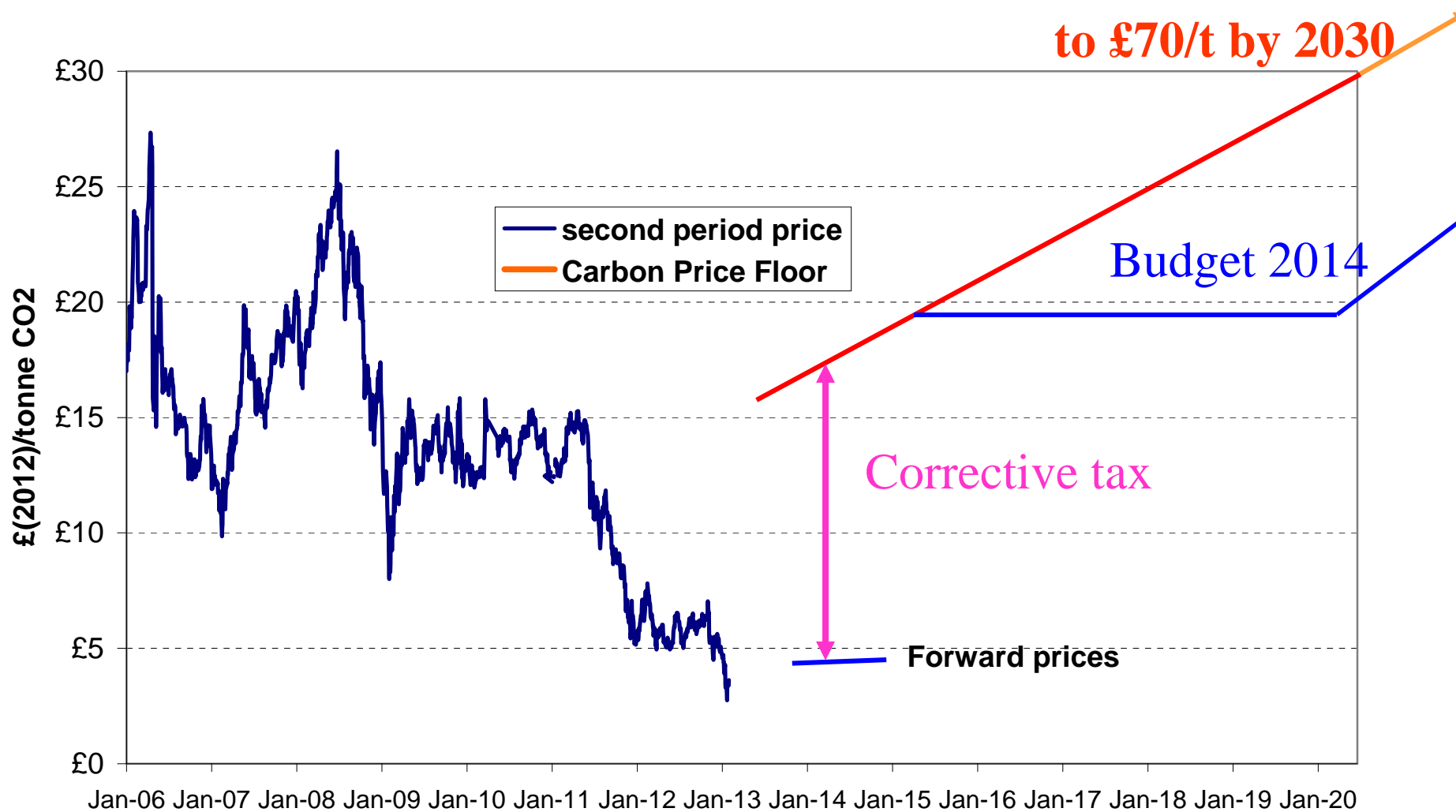
- Mature RES should not need subsidy
  - Provided CO<sub>2</sub> price adequate
- ⇒ Plan A: reform ETS, entirely auctioned
  - revenues support public finance, border tax adjustments
- Plan B: CO<sub>2</sub> price support on electricity as in GB
  - Ideally each MS adopts common level
- Plan C: emissions performance standard
  - Tonnes CO<sub>2</sub>/MW capacity per yr

***Subsidies restricted to R&D and demos***



# UK's Carbon Price Floor - in Budget of 3/11

EUA price second period and CPF £(2012)/tonne



D Newbery 2014

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Source: EEX and DECC Consultation

# Exit strategy from subsidy regime

- Aim at **adequate CO<sub>2</sub> price + R&D and Demo support**
  - But long-term futures markets lacking
- ⇒ still need long-term contracts for investment
  - Could be a CfD on carbon price ⇒ better short-term response
  - If not credible provide CfDs for nuclear, CCS
  - Locational FiTs for intermittent/uncontrollable RES
    - With incentives for providing ancillary services
    - In the money at right CO<sub>2</sub> price, provide risk hedge
- **Need EU mechanism to solve club good of R&D and D**

*SET-Plan adopts 20-20-20 funding model*



## Conclusions

- Economic principles exist to guide policy
  - Major problem is public good nature of emissions
- Central issues are to deliver adequate CO<sub>2</sub> price and to fund promising immature low-C options
  - And encourage global policies, failing which border taxes
- Aim to devolve decisions but solve club-good funding
  - Carbon pricing is a better revenue source than labour taxes
  - Low interest rates justify higher low-C investment
  - Higher investment => stimulates growth

***Tackling CO<sub>2</sub> in a recession is doubly cheap***  
***Delay risks lock-in, EU needs more investment***



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# Acronyms

CfD	Contract for difference
ETS	Emissions Trading System
FiT	Feed-in tariff
GHG	Green House Gas e.g. CO <sub>2</sub>
MS	Member State
R&D	Research and development
RDD&D	Research, development, demonstration and deployment
RES	Renewable energy supply
RO(C)	Renewable Obligation (Certificate) or Reliability Option
SET	Strategic Energy Technologies