



# The UK Carbon Price Floor

**Daniel Radov**

Associate Director

*EPRG Winter Seminar*

*Cambridge*

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# Motivation for Carbon Price Floor



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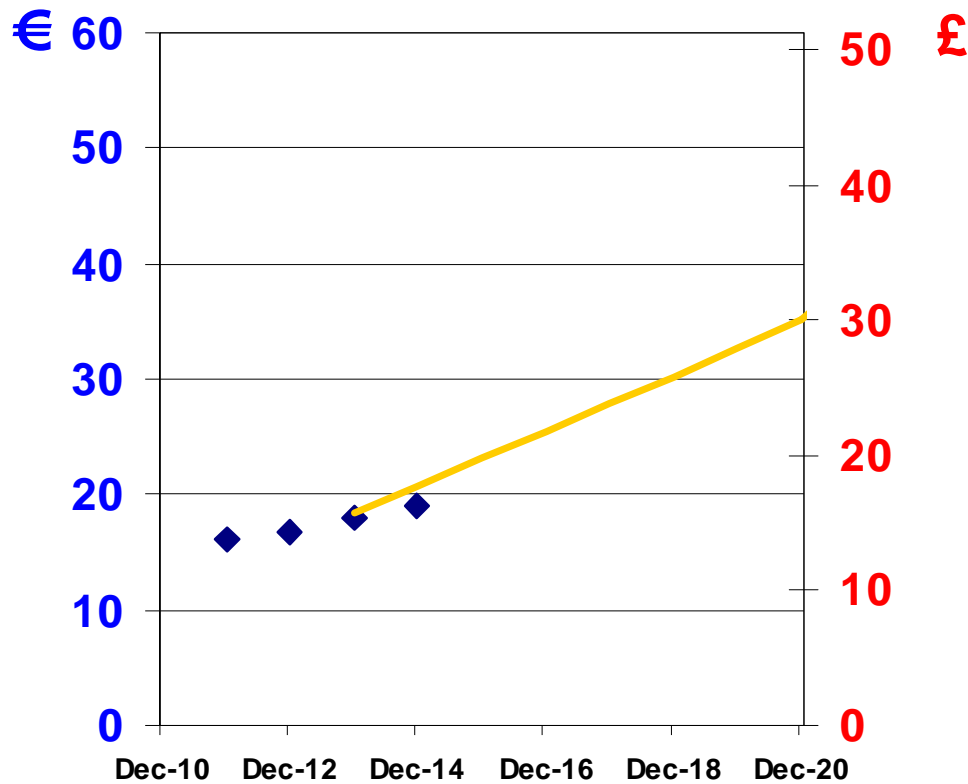
- § Prices initially declined, then levelled... and then the Euro-crisis kicked in
- § Forward prices suggest incentives rising over time, but not very quickly
  - Suggests ~5-7% cost of carry per year
- § è The EU ETS “isn’t doing enough”
- § The UK Government aims to spur low-carbon investment in power sector
- § Targets **90%** reduction in power sector carbon intensity by 2030
- § March 2011 budget: **“to drive investment in the low-carbon power sector”**

# Carbon Price Floor at (Naive) First Glance



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## Carbon Prices at Time of Budget



◆ EUA Forwards (€) — Floor Price

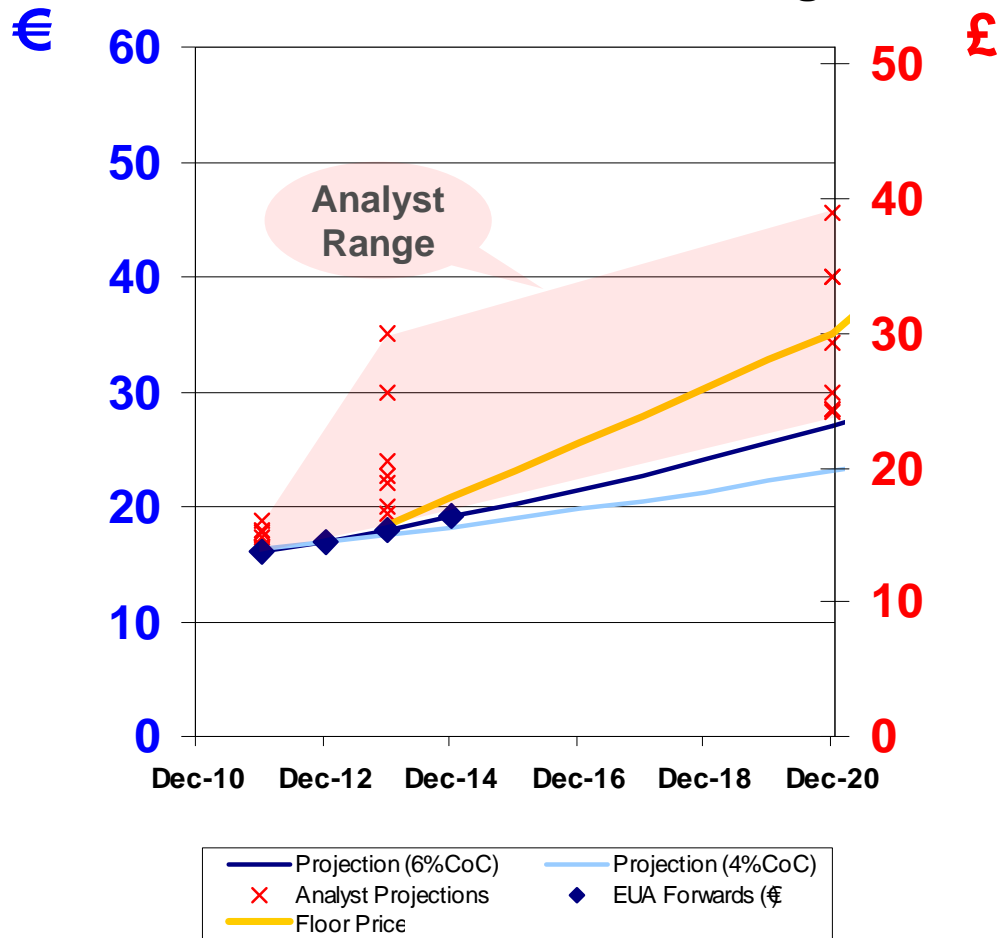
§ UK Budget 2011: “The carbon price floor will start at around £16 per tonne of carbon dioxide and follow a linear path to £30 per tonne in 2020.”

# Carbon Price Floor at (Naive) First Glance



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**Carbon Prices at Time of Budget**



§ UK Budget 2011: “The carbon price floor will start at around £16 per tonne of carbon dioxide and follow a linear path to £30 per tonne in 2020.”

§ Compared to prices projected forward at cost of carry, it was higher, but not dramatically so

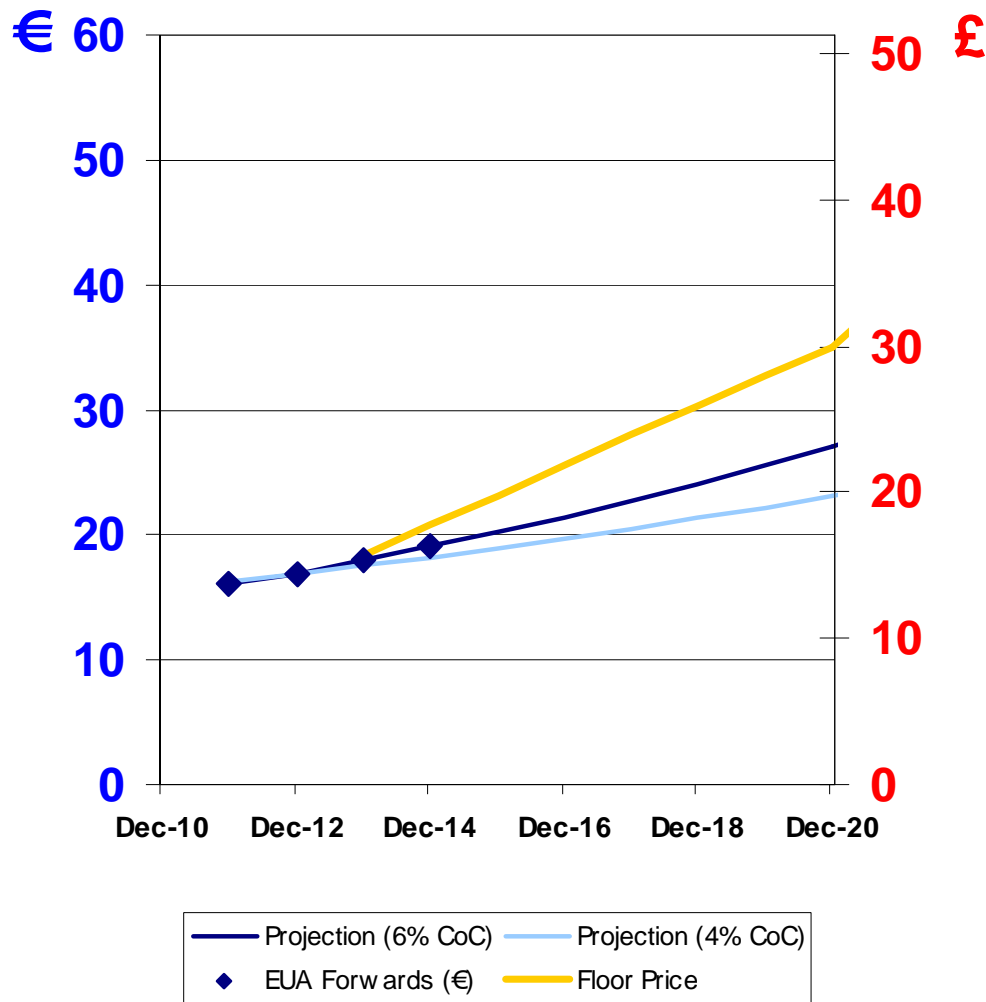
§ ...and compared to analyst projections it was in the middle of the expected range

# Carbon Price Floor at Second Glance



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## Carbon Prices at Time of Budget



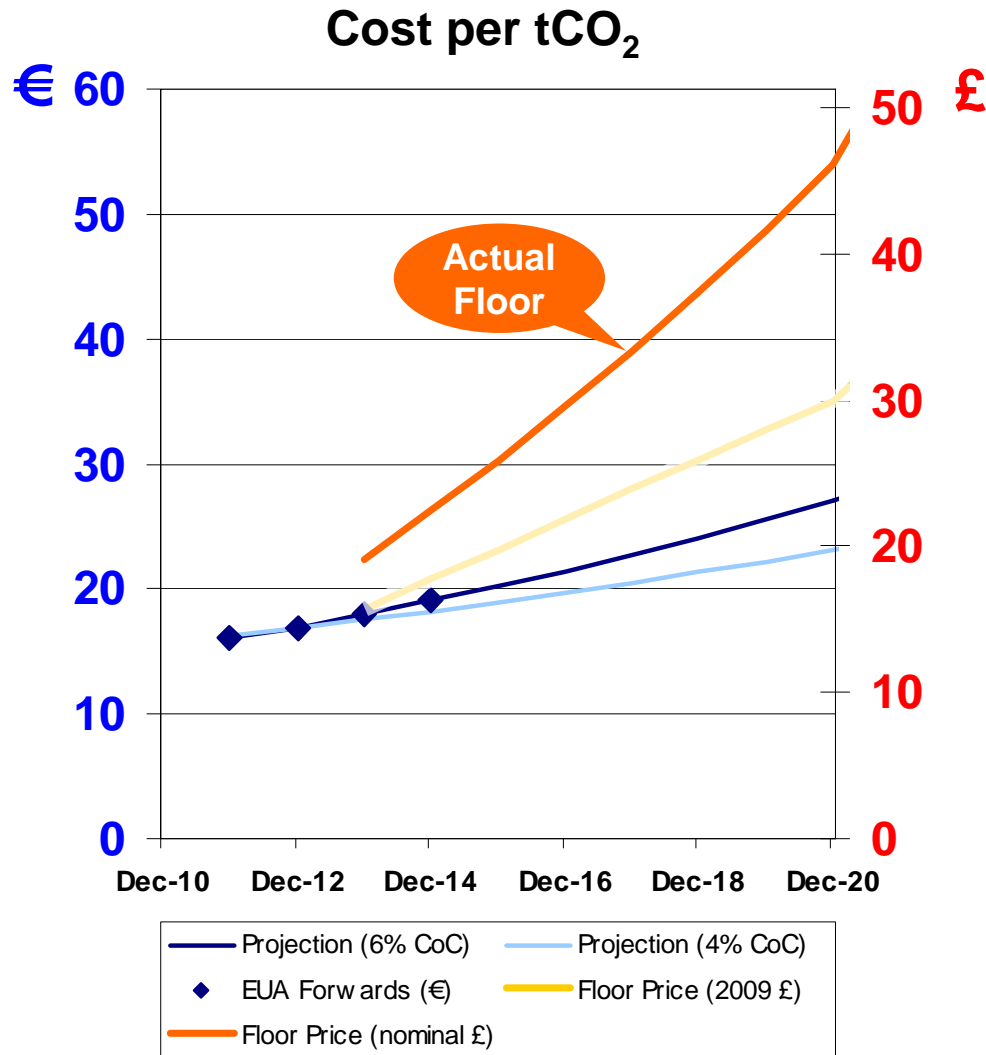
§ BUT...it's actually much more radical than that.

§ The floor price is expressed in *real* Pounds Sterling (2009 £).

- These will be increased at the rate of the Retail Price Index

§ Forward prices are *nominal*

# Carbon Price Floor at Second Glance



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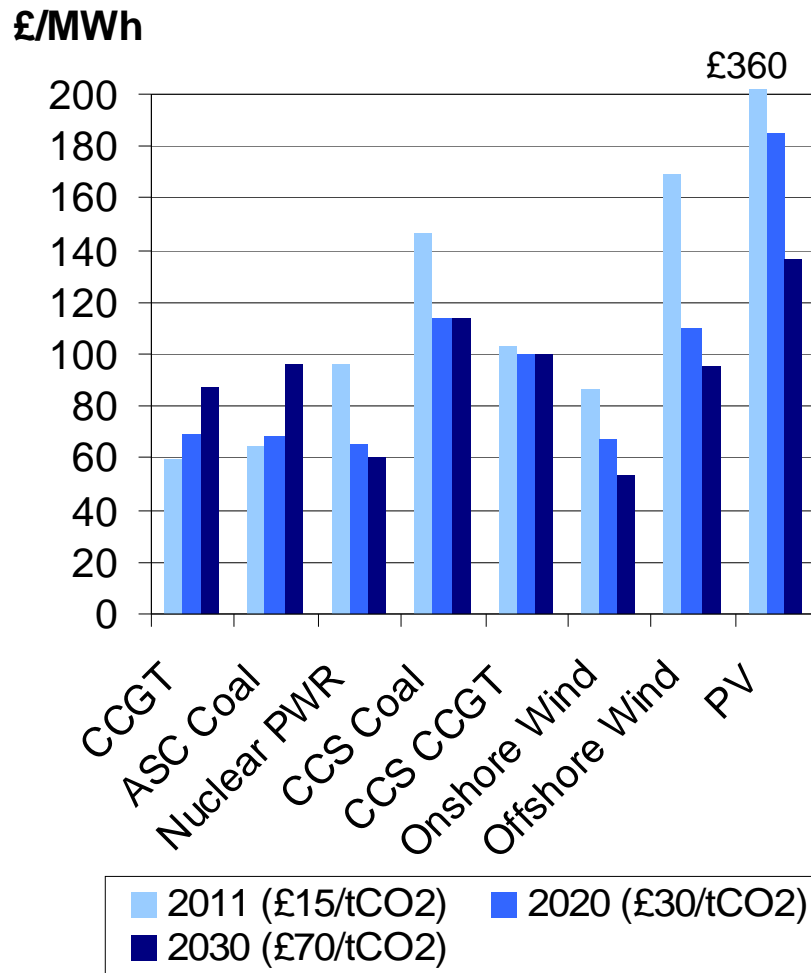
§ Converting our figure from real to nominal shows the CPF is much higher: €55/tCO<sub>2</sub> in 2020

§ By 2030, the nominal price is above €170/tCO<sub>2</sub>

# Implications for Generation Costs



## Levelised Cost of New Capacity



Source: Mott MacDonald (2011) and NERA analysis

### § Main impacts on UK power market:

- Pre-2020: limited impact on emissions  
– ~10 Mt/year
- Existing coal becomes unattractive after 2020
- Choice between nuclear and CCGT depends on nuclear cost and gas price

### § Under its Electricity Market Reform proposals, the UK Government is also contemplating *additional* support for low-carbon technologies, including nuclear

### § Construction of nuclear could lead to significant abatement, but after 2020

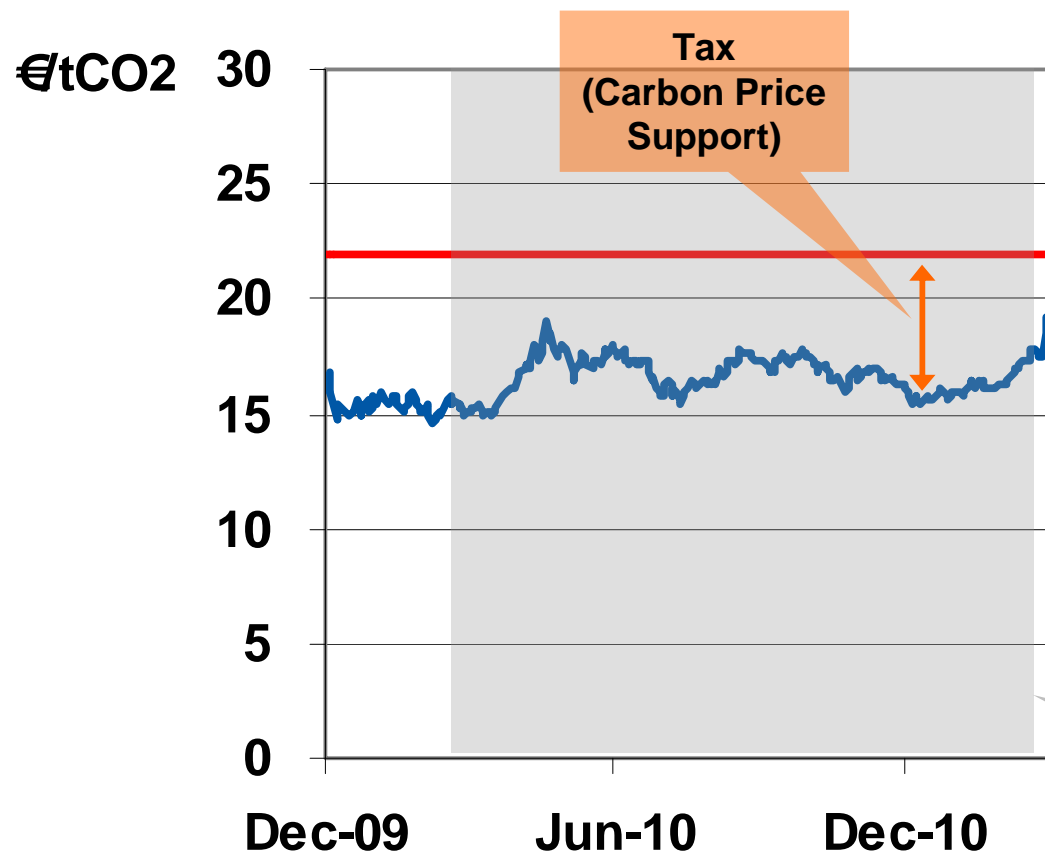
### § The carbon tax pushes up power prices, increasing profits for *existing* low-carbon capacity

# The Carbon Price Support: How the Tax is Set



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## Forward Carbon Prices, 2013



§ Floor price is implemented as a tax on fossil fuels, based on carbon content

§ Tax is announced two years ahead of the financial year

- **CPS** is set as the difference between the **floor price** and the **EUA price**
- 2013 tax of £4.94/tCO<sub>2</sub> is calculated based on average 2013 forward price during March 2010-February 2011

Period when tax is set

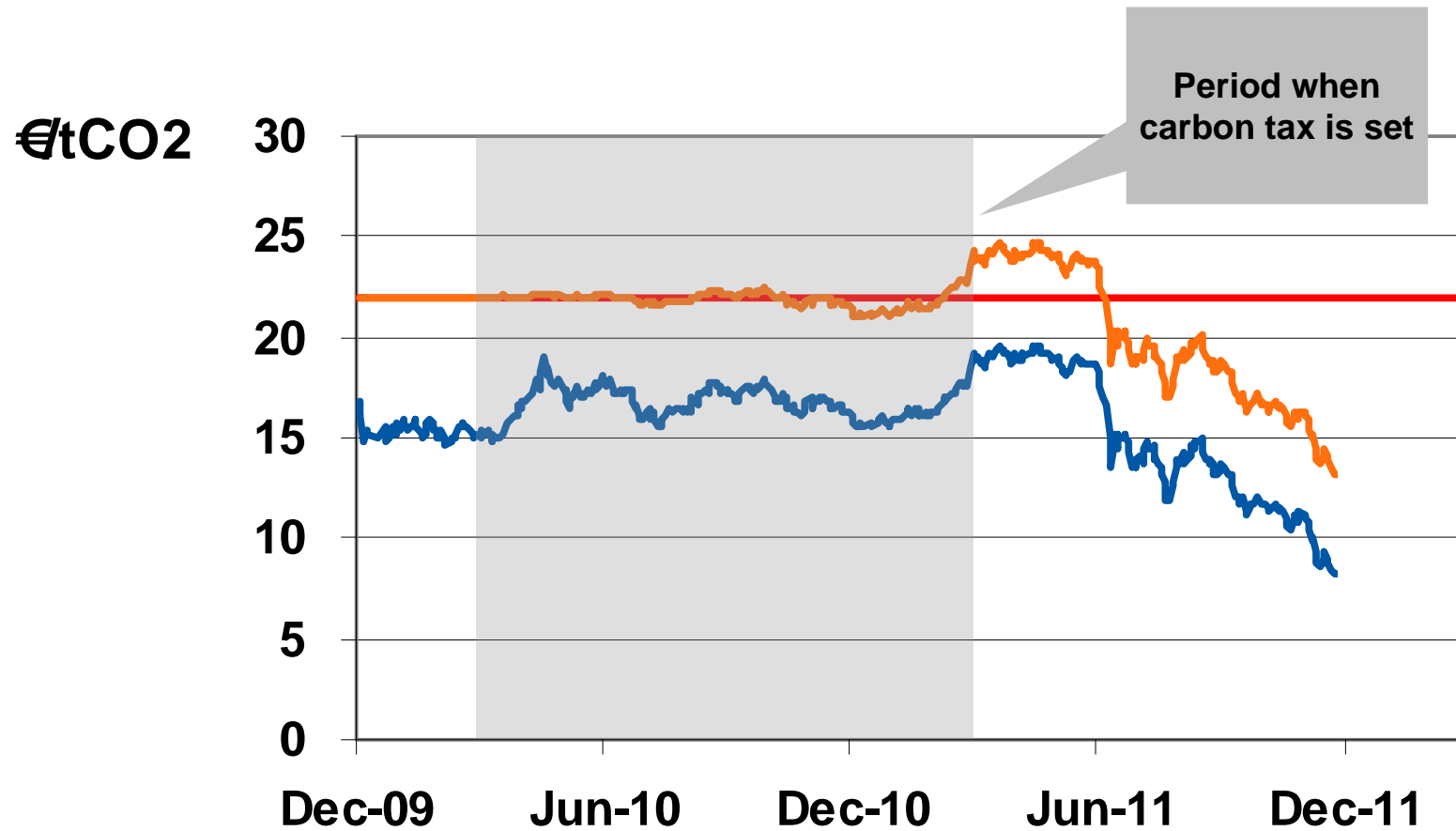


# Are Investors Reassured?



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## Expected Carbon Prices, 2013



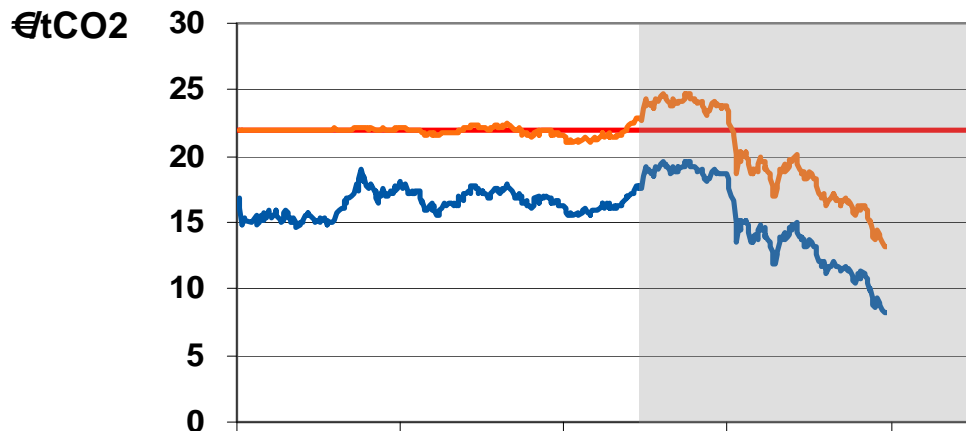
— Carbon Price Floor — EUA Price — Expected UK Carbon Price

# Considerations for Power Market: Added Risks to Generators

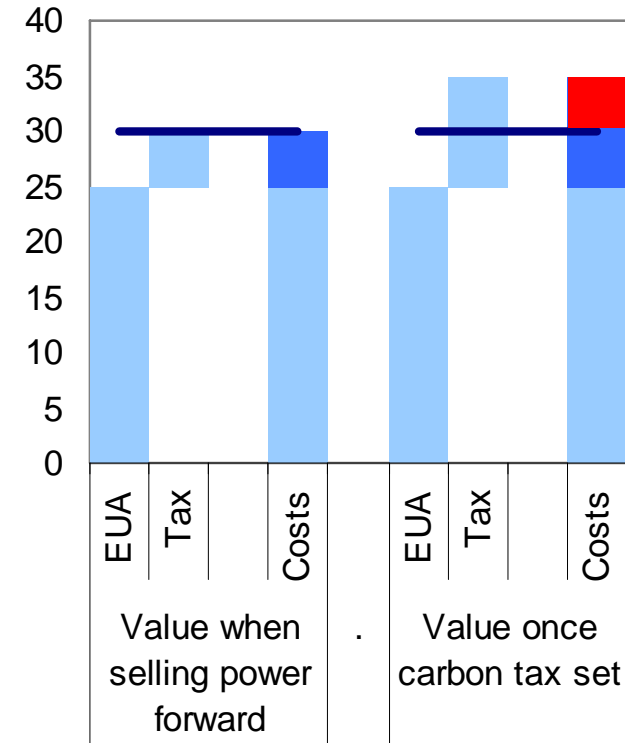


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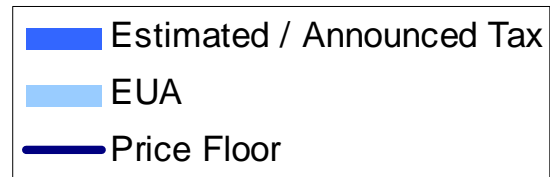
- § For carbon-emitting power sold forward 3 years ahead (or more), this creates a hedging risk
- § Emitting generators bear the risk that the CO<sub>2</sub> price fluctuates relative to expectation, even if they lock in forward prices at the time
- § Under the EU ETS, if power is sold forward 3 years ahead, generators or traders can simply contract for forward EUAs and hedge all price risk.
- § With the CPF, if power is sold more than 3 years ahead and the EUA price falls, traders can no longer hedge against the future carbon price



£/tCO<sub>2</sub>



Revenue shortfall

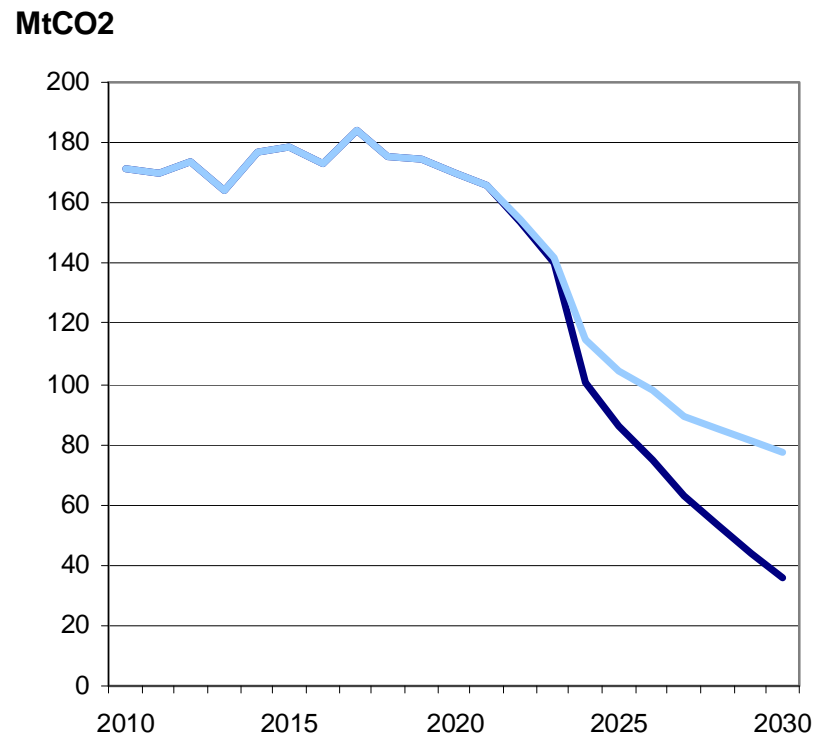


# Emissions Market Impacts



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## UK Power Sector Emissions



- § UK power sector emissions begin to decline significantly from 2020 as floor price starts to have a large impact
- § Scenario *assumes* that 15 GW nuclear is built
- § Decline in output (and emissions) from existing coal
- § As with renewables and energy efficiency policy, emissions allowances freed up from lower power sector emissions will be available for sale to other EU emitters
- § Implies a bearish impact on allowance prices
- § A revenue grab by the UK at the expense of the rest of the EU? (EU auction revenues are lower, but HMT revenues are up... at the expense of electricity consumers.)

# A coda: Mission Accomplished?

## Phase I (2015) of “Supergrid”



Source: [www.friendsofthesupergrid.eu/](http://www.friendsofthesupergrid.eu/)

- § EU Supergrid seen as necessary to reach EU potential for renewables
- § UK has major offshore wind ambitions, supported by Renewables Obligation and future policy
- § 1 GW BritNed connector completed earlier this year
- § Map shows the “Phase I” proposal for 2015
- § Goal is to facilitate transmission of offshore wind... but other power could also flow.
  - If only those using the new infrastructure pay, costs would be ~€20/MWh
  - But if costs are averaged (“socialised”) across all consumers they fall to just €2/MWh
- § At that cost level, there would be incentives to build new CCGT “offshore” to supply the UK
- § Suddenly UK power market is not so clean

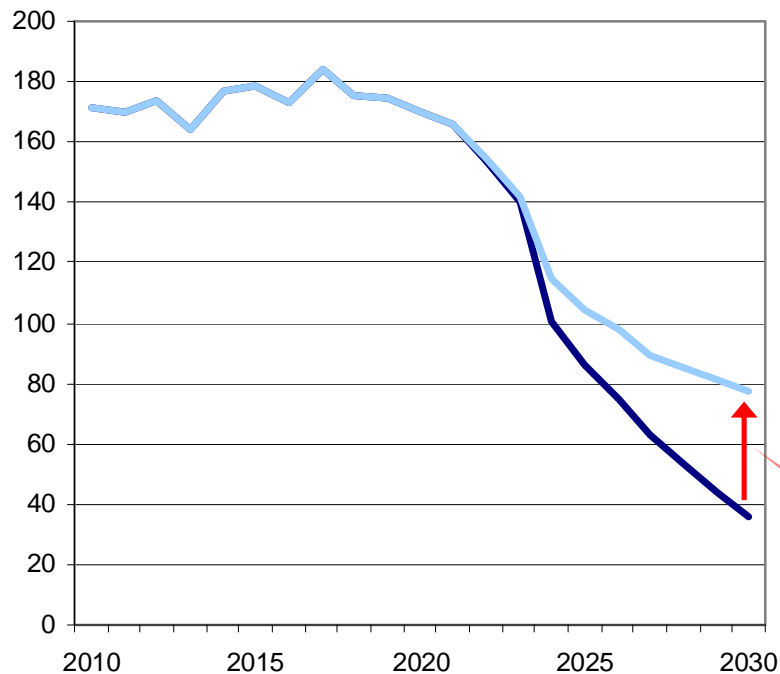
# Accounting for Carbon Leakage



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## UK Power Sector Emissions

MtCO<sub>2</sub>



— Price Floor Scenario with emissions "outsourced"  
— Price Floor Scenario with UK "owning" leakage

- § Assumes significant new interconnector capacity (consistent with early "super-grid")
- § After 2020, start to see significant decline in output from UK gas due to CCGT "off-shoring"
- § By 2025, significantly reduced new build CCGT in the UK (relative to baseline) because of off-shoring

UK  
Emissions  
Leakage

# Summing up



- § UK carbon tax is higher than it looks
- § Impact to 2020 on UK emissions is borderline – depends on relative prices of coal and gas
- § Post-2020 impact is more significant, but...
  
- § It's hard to out-manoeuvre a well-functioning market – look out for unintended consequences!



# Contact Us

**Daniel Radov**

Associate Director  
NERA—London  
+44 207 659 8744  
[Daniel.Radov@nera.com](mailto:Daniel.Radov@nera.com)