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# EU ETS, phase 1: Was there abatement?


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# Some background issues

- Emissions will never exactly equal the cap
  - Especially with intra-period banking/borrowing
- A constraining cap will always result in long and short positions among installations
- Reasons for being "long/short":
  - "The" reason that motivates trading: differences in the marginal cost of abatement
  - Uncertainty (of economic activity, weather or any other factor affecting emissions)
  - Deliberate over- or under-allocation

# EU ETS phase 1

- Abatement in phase 1 of particular interest, because emissions were significantly lower than cap
- But: significant $CO_2$ price for almost two years until 'slack condition' became recognised
- In this period, did companies reduce emissions in response to the carbon price?
  - ⇨ To the extent they did, surplus was larger than it would have otherwise been

# Approach

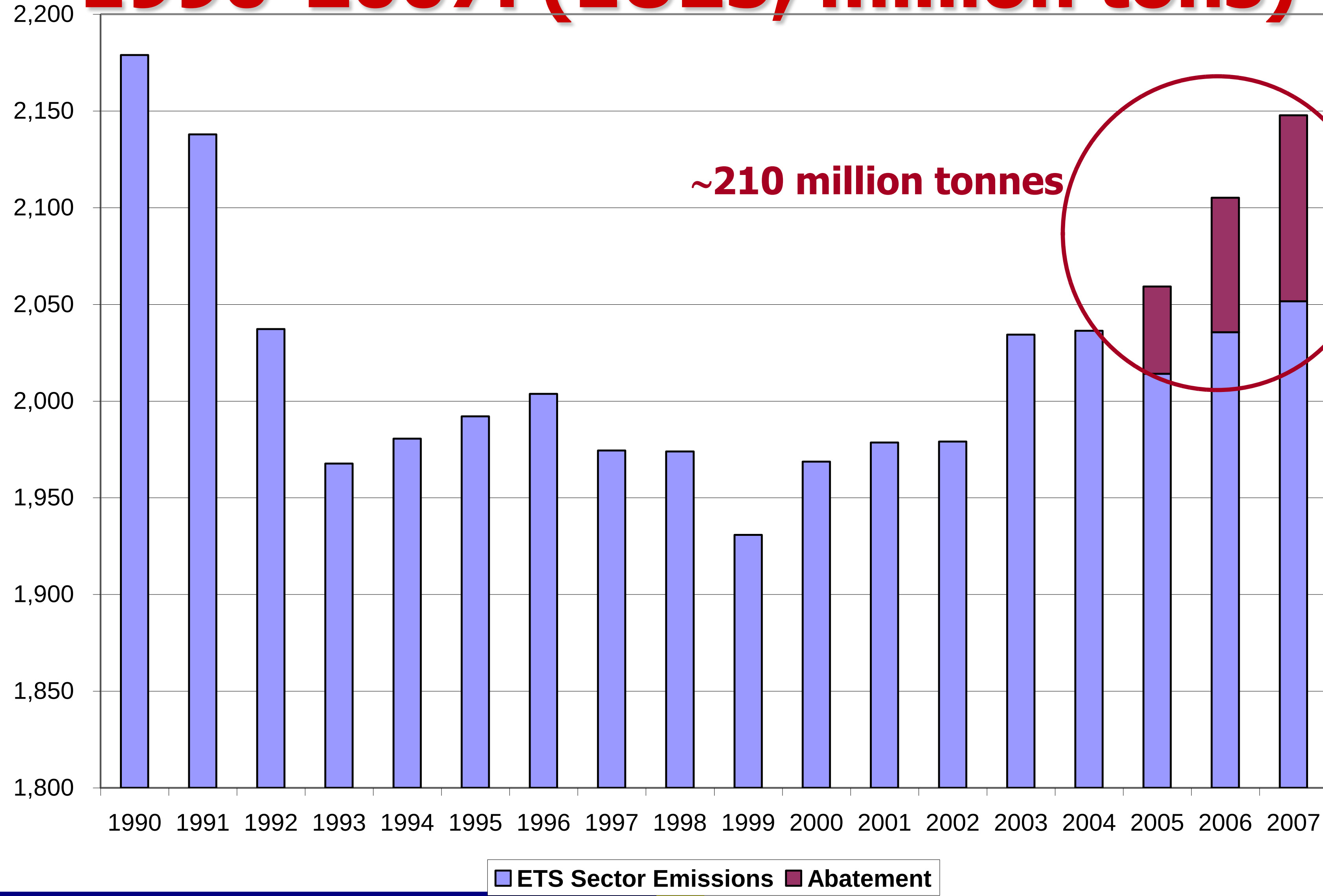
- How do 2005-07 emissions compare to historical emissions, not allowance totals?
- Level of economic activity: a major determinant of $CO_2$ emissions
  - Relationship between emissions and economic activity assumed to continue as without carbon price
- Two data sources for historical data: UNFCCC CRF data, data for baselines in 1st period allocation
  - Varying dates, but all centered on 2001-03
  - Potential bias (data collection process)
  - Also, some problems of comparability

# Annual rates of change in GDP, $CO_2$ emissions and intensity

| Period | GDP | $CO_2$ Emissions | | $CO_2$ Intensity | |
|---|---|---|---|---|---|
| | | Economy-wide | ETS Sectors | Economy-wide | ETS Sectors |
| **1995-2000** | + 3.00% | + 0.06% | - 0.24% | - 2.94% | - 3.24% |
| **2000-2004** | + 1.83% | + 1.00% | + 0.85% | - 0.83% | - 0.98% |
| **2004-2006** | + 2.69% | - 0.30% | - 0.02% | - 2.99% | - 2.71% |
| **2004-2007** | + 2.78% | NA | + 0.25% | NA | - 2.53% |

**Source: IMF, EEA, and CITL**

# EU ETS sector emissions, 1990-2007. (EU25, million tons)






Source: Ellerman et al., forthcoming

# The basic case for abatement

- A significant positive price is being incurred
- Rising GDP and real output
  - Taking into account also growth in ETS sectors
- Weather and relative prices of fossil fuels worked to increase emissions over 2005-07
- Emissions are lower than historical levels (even after allowing for plausible bias)

➡ Probably ~120-300 Mt over 2005-2007

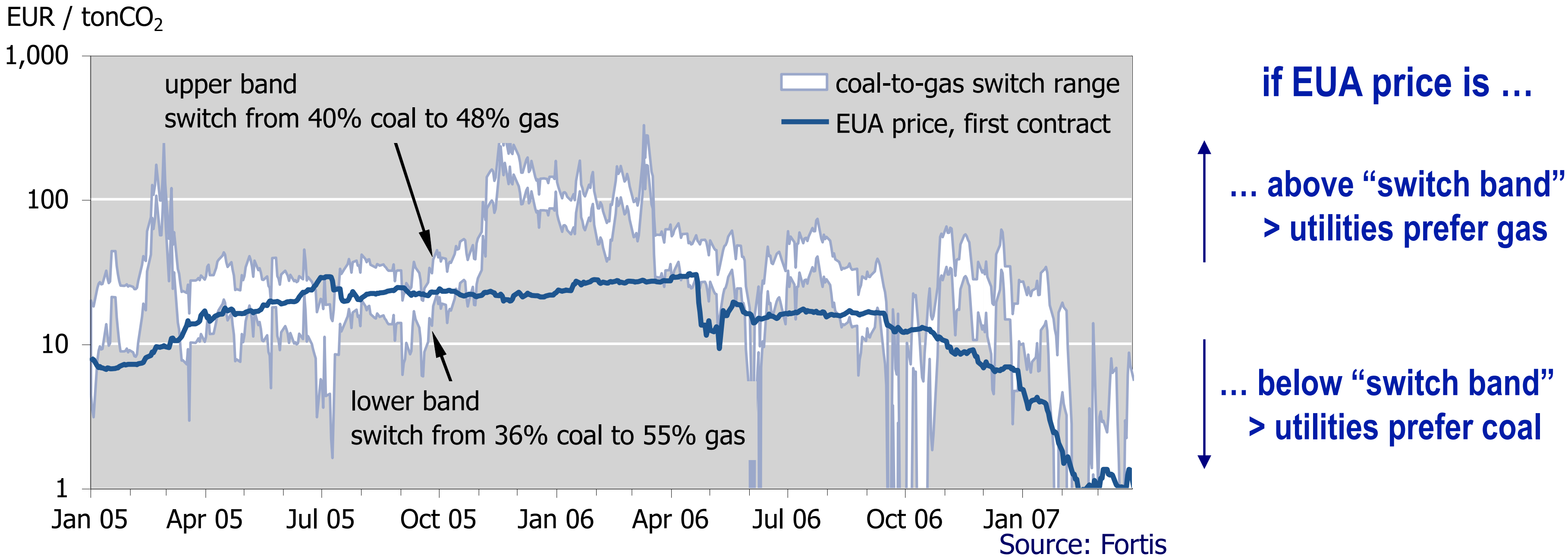
# Where?

- In particular, abatement happened
  - mostly in EU 15
  - both in electricity sector and industrial sectors
  - mostly (but not only) through fuel switching

Sources: Ellerman et al., forthcoming; Delarue, Ellerman, and D'haeseleer (2008); McGuinness and Ellerman (2008)

# Some emerging evidence

## Fuel switching in the EU power sector




- **without $CO_2$ valuation (EUA at €0/$tCO_2$) – no fuel switching; all utilities would have constantly preferred coal over gas**
- **$CO_2$ valuation gave a clear incentive for utilities to switch from coal to gas from March 2005 until October 2005**
- **abatement between 54 and 99 Mt in 2005 and 2006 in the power sector alone**

Source: Delarue, Ellerman & D'haeseleer, 2008

# Bottom line

- The carbon price has induced some emissions abatement in the EU ETS.
- Exact magnitude hard to pin down to due poor data and inherent difficulties
- However, a long position in not a per se indicator of over-allocation:

**Notwithstanding some 1st period over-allocation (and the lower price), not to mention other problems, the evidence suggests that the EU ETS did reduce $CO_2$ emissions**

# References


- **Ellerman et al, *Pricing Carbon*: The European Union Emissions Trading Scheme, Cambridge University Press, forthcoming.**
- **Ellerman, A.D. and B.K. Buchner, 2008. Over-Allocation Or Abatement? A Preliminary Analysis of the EU ETS Based on the 2005-06 Emissions Data, *Environmental and Resource Economics*, Vol. 41, N° 2, 267-287.**
- **Delarue, Erik, Ellerman, A. Denny and D'haeseleer, William. 2008. 'Short-term CO2 abatement in the European power sector'. MIT-CEEPR Working Paper 2008-008. Boston: MIT Center for Energy and Environmental Policy Research (June).**
- **McGuinness, M. and A. D. Ellerman, 2008. 'CO2 Abatement in the UK Power Sector: Evidence from the EU ETS Trial Period', MIT-CEEPR Working Paper 2008-010. Boston: MIT Center for Energy and Environmental Policy Research (September).**