
Innovation Effects in the EU ETS

**3rd Annual CEEM Conference
Emissions Trading – Getting Crucial Design Elements Right**

30th November 2007

Australian Graduate School of Management, UNSW, Sydney

Joachim Schleich

Fraunhofer Institute Systems and Innovation Research (ISI),
Karlsruhe, Germany

joachim.schleich@isi.fraunhofer.de

Virginia Tech University, Blacksburg, USA


Fraunhofer
Institute
Systems and
Innovation Research



Outline

1. Incentives for innovation at the macro level
2. Incentives for innovation at the micro level
3. Summary and outlook



1. Incentives for Innovation at the Macro Level

- **Cost** and **price effects** as drivers for innovation (**dynamic efficiency**)
- **Demand-oriented** technology **regulation**
- **Direct** and **indirect** (via higher product prices) **effects**
- Cap setting for ETS sector has ramifications for **innovation efforts necessary in other sectors**

Page 3



1. Evidence for Innovation at the Macro Level

Observations from Phase 1:

- **Generous allocation** provides little incentives for innovation (5% surplus (Kettner et al. 2007))
- Meaningful incentives only until Spring 2006
- Incentives for **fuel switch** dampened by high prices for natural gas
- Some evidence for **efficiency improvements** in existing coal power plants
- Overall: empirical evidence for Phase 1 is scarce; Buchner and Ellerman (2006) tentatively estimate abatement at 50-100 Mio. t CO₂e
- **Ban on banking** dampens incentives to invest early in new technologies

Outlook for Phase 2:

- **Stronger incentives** because of tighter budgets and higher expected prices
- **Unrestricted banking** provisions set incentives for early investments
- **Use of credits from JI/CDM** projects may limit internal innovation efforts

Page 4



2. Incentives for Innovation at the Micro Level

a) Allocation rules to existing installations

Theory

- **Auction preferable** (*efficiency*: double dividend, early price signal; *fairness*: polluter-pays, equal treatment; *innovation*: higher incentives to invest in new projects under closure rules of EU ETS, higher innovation effects than gratis allocation)
- **Benchmarking** may be **second best** (incentive to replace inefficient installations under current rules, early action)

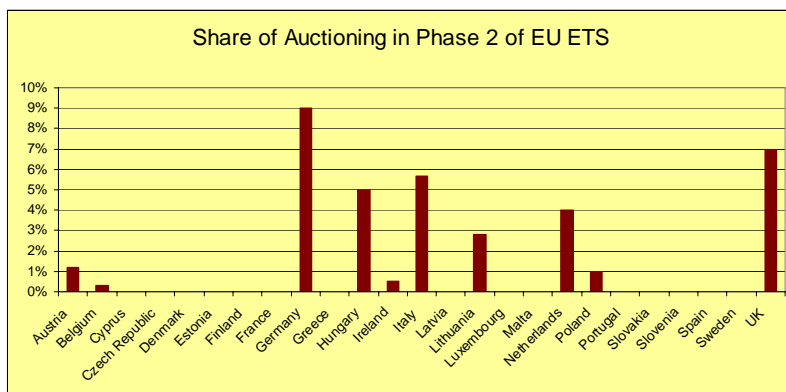
Reality

- **Conventional grandfathering** (based on historic emission levels) remains dominating method in Phase 2
- + **Increase in** (average) **benchmarking** for "sufficiently homogenous product groups" (power sector) – often differentiated by fuels (distributional issues!)
- Several MS use installation-level verified emission data 2005 in Phase 2 (**updating**)
- + **No longer ex-post adjustments**
- **Auction share** higher (and more countries) in Phase 2, but **well below maximum**

Page 5



2. Share of Auctioning in Phase 2 of EU ETS



Auction Share in Phase 1:

~0.2% (of 5% Max.)

Auction Share in Phase 2

~4.0% (of 10% Max.)

UK & Ger!

Page 6



2. Incentives for Innovation at the Micro Level

b) Allocation rules for closures and new projects

Theory

- Closures should keep and new projects should buy all allowances
- Otherwise: incentive to postpone closure; capacities too high; output subsidy; overall costs are too high

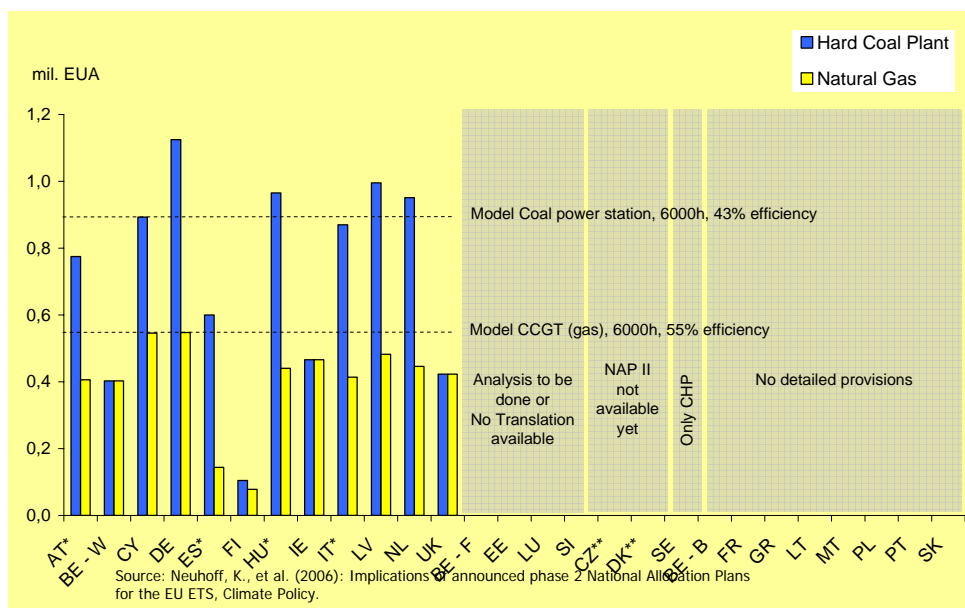
Reality

- Distribution of allowances usually terminated in year of closure
- Some MS: transfer rule for replacements to provide incentives to modernize
- In general: gratis allocation to new projects from NER (FCFS; RRR)
 - most MS: allocation is based on specific emissions and projected activity
 - increased use of benchmarks (BAT) and of standardized utilization rates; typically for power sector (but often differentiated by fuels/technologies)
- Allocation rules tend to subsidize and manifest existing production structures

Page 7



2. Example: Allocation to new power plants in Phase 2



Page 8



Conclusions

- **Cost and price incentives** for innovation at the macro level were low in Phase 1 and are expected to be higher in Phase 2 because of tighter budgets and no restrictions on banking
- **Use of CDM/JI credits** may dampen diffusion of energy-efficient technologies within the EU but create additional opportunities for **technology exports**
- Slow move towards more innovation-friendly regulations: "**path dependency**" of allocation rules at micro level; some convergence towards BM in terms of scope (power/energy) but not levels;
- **Coordinated/centralized approach required** for allocation rules for new projects and closures (including definition of "closure")
- **Auctioning share**: high minimum rather than low maximum share would be more effective;

Page 9



Literature

- Betz, R., Rogge, K. & Schleich, J. (2006). EU Emissions Trading: An early analysis of national allocation plans for 2008-2012. *Climate Policy* 6 (4), 361-394.
- Ellerman, A.D. & Buchner, B. (2006). Over-Allocation or abatement? A preliminary analysis of the 2005 Emissions Data, 139.2006, November 2006, FEEM Working Paper Nota Di Lavoro: FEEM.
- Kettner, C., Köppl, A., Schleicher, S. & Thenius, G. (2007). Stringency and distribution in the EU Emissions Trading Scheme – the 2005 Evidence. Nota di Lavoro 22.2007 Fondazione Eni Enrico Mattei.
- Neuhoff, K., et al. (2006): Implications of announced phase 2 National Allocation Plans for the EU ETS, *Climate Policy* 6 (4), 411-422.
- Rogge, K., Schleich, J. & Betz, R. (2006). An Early Assessment of National Allocation Plans for Phase 2 of EU Emission Trading, 01/06, Fraunhofer ISI Working Papers Sustainability and Innovation, Karlsruhe: Fraunhofer ISI. Retrieved on 1 August, 2007 (http://www.isi.fhg.de/n/Projekte/pdf/NAP2_assessment.pdf)
- Schleich, J., Betz, R. & Rogge, K. (2007): EU Emission Trading – Better Job Second Time Around? Working Paper Sustainability and Innovation Nr. S 2/2007, Fraunhofer ISI, Karlsruhe (http://www.isi.fhg.de/e/working%20papers/working-paper_eu-emission-trading.pdf)

Page 10

