Work-package 2

"GHG Price Scenarios for 2000-2012: Impact of Different Policy Regimes"

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Natsource Background

- Market leader in natural gas, electricity, coal, weather, emissions (>$2 billion by volume in emissions transactions)
- Global reach: US, Canada, Australia, Japan, Europe
- Pioneering GHG trading – early VER trades, first UK allowance trade, etc.
- Advisory services: EC, Netherlands, UK, World Bank, Pew Center, corporations

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Overview

- Objectives: Sought to refine expectations based mainly on model outputs
- Methodology:
  - Surveyed model outputs
  - Identified impacts of additional variables
  - Reviewed lessons from US SO2 market
  - Reviewed real GHG pricing data
  - Drew it all together to yield predictions

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Model Outputs – Full International Trading

Table 1. Prices Under Full Global Trading

Model	Permit Price in 2010 (1998 US$ per ton CO2e)
Rose	1
ZEW	3
ECN	4
RICE-98	5
POLES	6
G-Cubed	7
GREEN	7
EPPA	8
GEM-E3	8
MS-MRT	10
AIM	12
GRAPE	13
MERGE	22

Source: Adapted from Springer 2001

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Model Outputs – Annex I only

Table 2. Prices Under Annex I Trading

Model	Permit Price in 2010 (1998 US$ per ton CO2e)
Rose	3
Wage	4
ECN	5
WorldScan	6
GEM-E3	16
POLES	17
G-Cubed	18
GREEN	18
RICE-98	18
AIM	21
GRAPE	22
MS-MRT	29
GTEM	36
EPPA	44
Oxford	70

Source: Adapted from Springer 2001

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Identification and Impacts of Key Variables

- Some variables addressed only by few of the models, so broad comparisons of results not possible
- Some variables changed as a result of recent negotiations in Bonn

“Pre-Bonn Variables”

- Regulatory Structure
- Sectoral coverage
- Number of gases
- Banking
- Penalties
- Surplus permits in EITs
- Market power
- Nature of obligation
- Extent of harmonization

“Post-Bonn” Variables

- Sinks
- Compliance reserve
- Supplementarity
- Tax on trades
- US participation

Net Effects

- Consideration of additional variables reveals opposing forces
- Net effect depends on unknown relative impact of each
- In section on predictions, we speculate about how these are likely to play out

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SO2 experience: projections

Table 3. Pre-Implementation SO2 Allowance Price Estimates

Source (year)	Price (1995 US$/ton)
ICF (1989)	722-1005
ICF (1990)	564-740
NAPAP (1990)	603-881
EPRI (1992-3)	516
EPRI (1994-5)	389-566
ICF (1995)	533

Source: data from sources indicated above, compiled in Smith et. al (1998)

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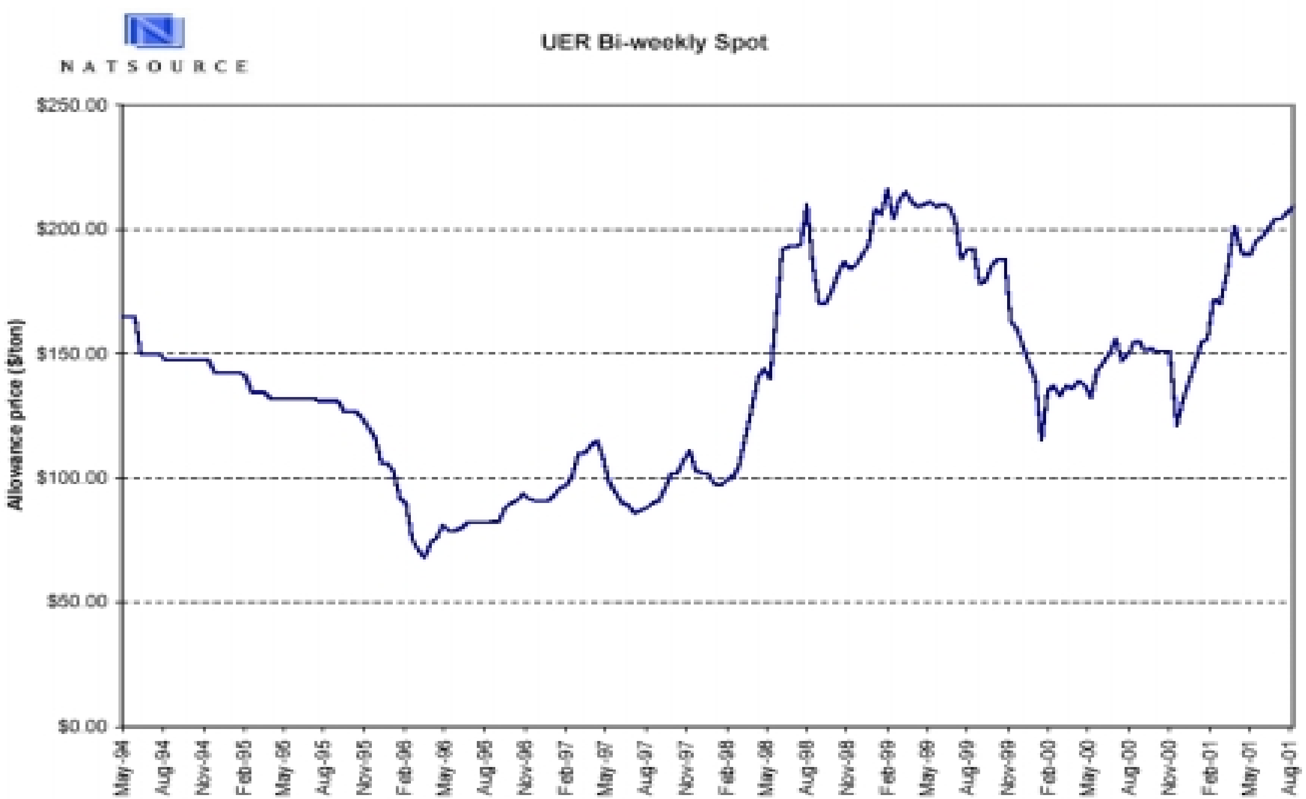
SO2 experience: actual prices

Figure 1. Historical SO2 Allowance Prices



Source: Utility Environment Report biweekly reports of spot price, compiled by Natsource

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Factors contributing to overestimation

- Rail deregulation and low-sulfur coal
- Expectation errors and irreversibility of investments
- Political pressure to abate
- Amortization
- Technological progress
- Asymmetric corrections
- Relevance: some may apply also to GHG

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GHG Prices

Table 3. GHG Prices by Commodity and Vintage (US$ per ton CO2e)

Commodity Type	Vintage Year	Price per ton CO_2E (US$)
VERs		
Annex B VERs	1991-2007	$0.60-$1.50
Annex B VERs	2008-2012	$1.65-$3.00
CDM VERs	2000-2001	$1.75-$3.00
ERs		
ERs	1996-2012	$1.00-$2.70
Compliance Tools		
Dutch ERUs	2008-2012	$4.40-$7.99
Danish allowances - Bid/Offer	2001-2003	$3.55-$4.14
UK permits - Bid/Offer	2002	$6.50-$9.15
UK permit Call Option - Bid	2002 (expiration Feb. or Mar. 2003)	$12.03 (strike), $0.86 (premium)

Source: Natsource. Prices updated August 31, 2001

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Price Scenarios ('00-04)

- Period characterized by
  - ongoing uncertainty surrounding Kyoto
  - some domestic legislated markets
  - commodity split between VERs and compliance tools
- Some shift from VERs to permits, but lingering VER demand. Prices will probably remain at roughly their current levels.

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’00-04 continued

- UK: first trade at ~EUR 5-10
- During voluntary stage, participation expected mostly from “longs”
- So we expect prices to remain at or below current levels

’00-04 continued

- Denmark mid-market price ~EUR 4
- Cap at ~EUR 6
- Projections say that emissions may exceed allocation in 2003, so prices may rise then

Price Scenarios ('05-07)

- Period characterized by:
  - Pre-Kyoto
  - Possible EU-wide trading
- EU-wide trading models predict 2010 prices from ~EUR 33 to 44
- '05-7 likely to be considerably lower, perhaps EUR 10 or lower
  - Targets likely to be less restrictive than '08-12
  - Program may be voluntary
  - Models may overestimate prices

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Price Scenarios ('08 to 12)

- Models converge in range of ~EUR 10 to 20
- Actual prices likely to stay below EUR 10
  - Absent or diminished US demand
  - Model overestimation
  - Sinks supply
  - Low current prices

Conclusions

- Our predictions amount to educated speculation
- Absolute levels may well be entirely wrong
- Even in this case, analysis of additional information that sheds light on prices constitutes a useful, unique exercise

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