

SO₂ market exceeds expectations



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On 28 March this year, an economist from the Chicago Board of Trade sent a fax to the hotel I was staying at in California describing the results of the US Environmental Protection Agency (EPA) annual auction of sulphur dioxide (SO₂) emission allowances. I was properly advised of the need for confidentiality until our press conference at 10:00 a.m. central time the next day. The seven pages of results methodically provided an answer to a question that has been hotly debated during the past decade.

The 1990 Amendments to the Clean Air Act provided the enabling legislation for a two-phase 'cap and trade' programme designed to curtail US emissions of pollutants that cause acid rain in the United States and Canada. The first phase began in 1995. Following instructions established by Congress, the EPA allocated emission allowances to the 110 highest emitting power plants, affecting 263 combustion units. Each year the plants were required to cut aggregate emissions to conform to steadily declining quantified emissions limits. The second phase of the programme began in January 2000. Phase II extended the limits to include another 2100 units and the national emissions cap was set at approximately 9 million tons. This represents a 50% reduction from the 1980s.

It is well-documented that sulphur emissions fell faster than required, and the evidence

of economic success is also overwhelming.

The passage of the legislation depended on the hotly debated forecasts of the price of allowances. Table 1 presents a sample of some of the forecasts of Phase I prices.

It is important to emphasise that while the optimistic projections of Phase I prices were at, or just below, \$300 many predicted that allowance prices would double by Phase II. In 1992 the press reported that early Phase I trades occurred at \$300. The results of the first EPA annual SO₂ allowance auction, conducted by the Chicago Board of Trade in 1993, had a spot market clearing price of \$131. The results for the next five auctions further confirmed that early forecasts were significantly higher than observed prices. The apologists continued to assert that the early forecasts for Phase I were incorrect, and that they would ultimately be proven right when we entered Phase II. In fact, allowance prices in 1999 reached \$207 (see Figure 1).

The hotly debated question of the price of allowances for Phase II was answered in that seven-page fax. In fact, the spot price (for allowances usable in 2000 or later) averaged \$130.69 which was below the average price from the auctions held from 1993 through 1999. (Table 2 shows the first page of that fax). Even more persuasive were the results of the 'forward' market auction of allowances usable in years 2007 or later. The average price paid for those allowances was \$68.32!¹ Forward prices naturally reflect the time value of money (payment for these allowances must be made immediately) and the prospect for improved emission mitigation technology. At the same time, some argue that these particular prices reflect the

prospect of new regulations that would force power plants to change operations in ways that would also reduce sulphur emissions.

The success of SO₂ allowance trading in the US has a significant place in the debate surrounding market-based solutions to global warming. This programme is the largest successful market of its kind. Acid rain has been dramatically reduced and at a significantly lower cost than experts forecast. Moreover it continues to perform at very low cost even in the face of Phase II's stricter emission limits.

While we are only at the beginning of this second phase, the weight of evidence supports the argument that the core elements of the SO₂ market should be applied to carbon trading. These core elements simultaneously assure environmental integrity, cost reduction, efficient trading and valid price discovery. They include: clear rules on emission monitoring and non-compliance penalties; unimpeded trading; fully fungible trading instruments; public-private partnerships to achieve transparent prices. We hope those who are now working to set guidelines for carbon trading take a close look at these critical success factors.

I would like to thank Dr Michael Walsh for his assistance in the preparation of this article.

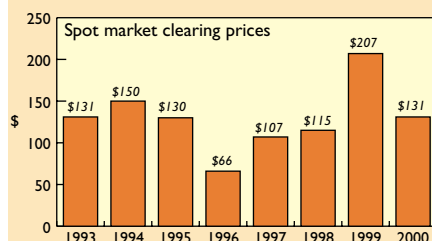
¹ It should be noted that most market participants focus on the auction 'clearing' price, the price at which the last available allowances are sold. By definition this price is lower than the average auction price.

Table 1. Pre-1992 forecasts of Phase I SO₂ allowance prices

Source	Phase I forecast (\$/ton)
United Mine Workers	981
Ohio Coal Office	785
Electric Power Research Institute	688
Sierra Club	446
American Electric Power	392
Resource Data International	309

Source: Hahn and May, The Electricity Journal, March 1994

I. US SO₂ allowance prices at EPA/CBOT annual auctions



Source: Environmental Financial Products LLC

Table 2. 2000 acid rain allowance auction results

I. ALLOWANCES AVAILABLE FOR AUCTION			
Origin	Spot auction	7-year advance auction	
EPA	125,000	125,000	
Privately offered	5,388	2,500	
Total	130,388	127,500	
II. SPOT AUCTION RESULTS			
Allowances	Number of bids	Number of bidders	Bid price
Bid for: 318,509	Successful: 51	Successful: 23	Highest: \$250.00
Sold: 128,388	Unsuccessful: 34	Unsuccessful: 13	Clearing: \$126.00
	Total: 85	Total: 36	Lowest: \$80.05
			Weighted av: \$130.69
III. 7-YEAR ADVANCE AUCTION RESULTS			
Allowances	Number of bids	Number of bidders	Bid price
Bid For: 210,224	Successful: 21	Successful: 6	Highest: \$200.00
Sold: 125,000	Unsuccessful: 3	Unsuccessful: 2	Clearing: \$55.27
	Total: 24	Total: 8	Lowest: \$40.57
			Weighted av: \$68.32

Source: US Environmental Protection Agency, Chicago Board of Trade