ELSEVIER

Energy Policy 34 (2006) 1473–1477

ENERGY POLICY

www.elsevier.com/locate/enpol

Viewpoint

Greenhouse gas emission trading schemes: a new tool for the environmental regulator's kit

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Available online 11 January 2005

Abstract

As the European Union greenhouse gas emission trading scheme (ETS) is emerging, it seems interesting to look back on previous experiments and to bring together a few elements of reflection about the pertinence of ETS as a new policy tool to regulate industrial pollution. So far, several regulatory tools have been used to decrease pollution. This article focuses on two of them, command-and-control (CAC) and ETS. There is no simple answer to which one is more efficient. It depends strongly on the context. Given a few elements outlined in this paper, the choice of an ETS to abate industrial emissions of greenhouse gases in the European Union (EU) can be considered pertinent. But, ultimately, what makes a scheme environmentally efficient is not the tool in itself (ETS or CAC) but the ambition of the target. Hence the design of the National Allocation Plans setting the emission caps are of paramount importance. They will make the EU ETS either a useless mess or an effective climate change mitigation policy tool.

Keywords: Emission trading scheme; Command-and-control; Greenhouse gases

Many publications about emission trading schemes (ETS) adopt an uncompromising standpoint. At one extreme, some ETS proponents write articles in which they assume that an ETS is always the best policy instrument since it enables to reach the same environmental targets as traditional command-and-control (CAC) regulation but in a much more cost-effective way. These papers are often very theoretical and forget many real-world difficulties. They most often overestimate the gains of an ETS: they assume, for instance that the allowance market works perfectly. They also most often underestimate its costs: they do not take into account all its working and monitoring costs. To be complete, ETS costs should cover the programme design and implementation, the information of all stakeholders (administration and private firms), the modification of some of their working patterns, the emission monitoring and control, the allowance trade control and the management of non-compliance.

At the other extreme, some emission trading opponents argue that environmental results of existing ETS are very poor and that much better environmental results could have been achieved with stringent CAC. But they too forget many real-world difficulties, including that very few countries have enough political will to impose as stringent environmental regulations as they wish.

As the European Union (EU) greenhouse gas ETS is emerging, it seems interesting to look back on previous experiments and to bring together a few elements of reflection about the pertinence of ETS as a new policy tool to regulate industrial pollution. In this article, we give first a brief overview of some of the existing emission-trading programmes. Then, based on the previous observations, we make suggestions on how to design an emission market, when to implement one and how to judge its achievements. We conclude with a few remarks about the European ETS.

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0301-4215/$ - see front matter © 2004 Elsevier Ltd. All rights reserved.
doi:10.1016/j.enpol.2004.11.018

1. Historic evolution

During the 1970s and the 1980s, many different market-based instruments have been experimented in the United States. Finally, the lead phasedown programme in the mid-80 s showed that quota trading could alleviate the costs of reaching environmental targets (Tietenberg, 2001). This seminal success paved the way to more ambitious programmes of a slightly different kind, cap-and-trade emissions markets. In this context, a cap represents the total amount of the regulated pollutant the participating units are globally allowed to emit during a given year. This cap is set on emissions and is then divided into emission allowances that are distributed between all the participating units. These allowances can be freely traded: if a unit emits during one year less than its allowances, it can sell its excess allowances; on the contrary, if it emits more than what has been allocated to it, it has to buy allowances to cover its excess emissions. This emergence of new schemes around the United States led to a few successes, such as the Sulfur Allowance Trading (SAT) programme (Burtraw and Palmer, 2003) and the Ozone Transport Commission (OTC) programme (USEPA, 2003), and to one great failure, the Californian RECLAIM market (Luong et al., 2002; Soleille, 2003).

The Sulfur Allowance Trading programme was created in 1990 and has been aiming at reducing the SO_2 emissions from power plants in the United States. A first phase has been running from 1995 to 1999 and a second one from 2000 to 2003. It is, at least up to now, widely considered as a success. Annual emission targets were over achieved in each year of the phase I (1995–1999). The total SO_2 emissions of the 263 units participating in the phase decreased by 51% between the reference year 1990 and 1999. Each year of the first phase all the 263 units were in compliance (which means they owned enough allowances to cover their emissions). During the second phase, approximately 99.9% of the 3000-odd participating units were in compliance.

Another important American programme is the one sponsored by the Ozone Transport Commission that has been aiming at reducing the NO_x emissions from industrial installations in ten states in Northeast of the United States, from 1999 to 2002. The targets (reducing NO_x emissions from the 1000-odd participating units during summer by 70% between 1990 and 2003) were over achieved. In 2003, this programme merged into a wider one, the Federal NO_x Budget Trading Programme, involving more than 20 states.

A third American programme, RECLAIM, had been aiming at reducing NO_x and SO_x emissions from various industrial installations in South California. It began in 1994 and has failed to work properly. It is now clear that it suffered from numerous flaws in its conception: it was hastily prepared; the market was not very important; there was a lack of involvement from the participating units; the penalty in case of non-compliance was not automatic and therefore, not dissuasive enough; banking of allowances was not allowed, which did not encourage installations in reducing their emissions more than what was just necessary for compliance. All these factors made the allowance market very tight in 2000. It could have overcome these difficulties had it not encountered a severe external shock: during summer 2000, California suffered from a serious power crisis. Already weakened by its conceptual flaws, the allowance market did not manage to adjust to the sudden rise in demand. Allowance prices skyrocketed to very high levels that were financially unacceptable for industrial installations that needed to buy emission rights. This led to a complete reform of the RECLAIM programme. Power plants, the most allowance demanding units, were excluded from the allowance market. Their emissions have ever since been regulated by stringent traditional CAC measures that require to install Best Available Retrofit Control Technology (BARCT) in order to decrease NO_x emissions.

In Europe, the development of ETS is more recent but has grown significantly, mostly in relation to climate change mitigation. The most important one is the European Union Trading Scheme. It aims at reducing greenhouse gas industrial emissions (Kruger and Pizer, 2004). The first phase is running from 2005 to 2007 and the second one will run from 2008 to 2012. There is also an emission-trading programme for SO_2 in Slovakia since 2002, a Danish one for CO_2 since 2001, a British one for greenhouse gases since 2002 and the Netherlands plan to introduce one for NO_x in 2005.

2. Importance of the design

Emission trading programmes are delicate to implement (Marcu and Pizer, 2003). If not carefully designed, they can be quite useless, or even counter-productive (as in the case of RECLAIM). The existing schemes give very fruitful insights into how an emission market should be implemented to work efficiently. The following points are essential when designing an ETS:

- The transaction costs have to be kept as low as possible. For this, the most usual operations (allowance trade, compliance verification, penalty application in case of non-compliance, etc.) must be facilitated as much as possible. Emission registers and allowance registers must be very easy to use.
- The market has to be active, so that demand and supply adjust with fluidity, thus decreasing price volatility. Different factors can contribute to the liquidity of the allowance market: the participating units should be numerous and important enough to