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Can the future EU ETS support wind energy investments?

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Abstract

This article discusses how the future Emissions Trading Scheme legislation should be designed to allow the European Union to comply with the 20% CO_2 emissions reduction target, while at the same time promoting wind energy investments. We examine whether CO_2 prices could eventually replace the existing support schemes for wind and if they adequately capture its benefits. The analysis also looks at the effectiveness of the clean development and joint implementation mechanisms to trigger wind projects and technology transfer in developing countries. We find out that climate policy is unlikely to provide sufficient incentives to promote wind power, and that other policies should be used to internalise the societal benefits that accrue from deploying this technology: CO_2 prices can only reflect the beneficial impact of wind on climate change but not its contribution to the security of supply or employment creation. A minimum price of around €40/tCO_2 should be attained to maintain present support levels for wind and this excludes income risks and intermediation costs. Finally, CDM improves the return rate of wind energy projects in third countries, but it is the local institutional framework and the long-term stability of the CO_2 markets that matters the most.

Keywords: Emissions trading scheme; Wind energy; CDM

1. Introduction

Following the agreement reached in March this year by the Heads of State (Council of the EU, 2007a), the European Union has committed itself to achieving, by 2020, that 20% of the energy it consumes comes from renewables and that its CO_2 emissions are cut by 20% in comparison with 1990 levels (30% if other developed countries join the effort). The European Union is preparing a legislative package that tackles these aspects. On the one hand, it will table a modification of the Emissions Trading Scheme (EU ETS), to be implemented after 2012. On the other hand, a directive for renewable energies, with the details on how to split the 20% by country and by sector—biofuels, heating and cooling, and electricity will be included. Complementarily, it will contain a number of provisions for the sectors not captured by the EU ETS.

Yet the two targets are not independent: one major way of curbing CO_2 emissions comes from replacing fossil fuel energy by renewable energy, whose environmental impact is less. Any strategy to achieve the 20% CO_2 target needs to take into account the role that renewable energies will have by then.

This paper discusses how best the EU ETS and the renewable energy directives can be integrated, using wind as an example. Wind is the most dynamic renewable energy in Europe and in the world; it already covers 3% of electricity demand in the EU—up to 23% in Denmark and around 8% in Spain and Germany—(EWEA, 2007) and is the second largest attractor of energy investments after natural gas (Platts, 2007).

Section 2 of this paper is devoted to reviewing the current state of the EU ETS, and the flaws of that scheme, which has failed to encourage the necessary investment in renewable energies.

Section 3 covers the topic of whether CO_2 emission reduction certificates could eventually constitute a sufficient

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reward for wind energy investments, and thus replace the payment schemes that, under different modalities (feed-in tariffs, green certificates, tax rebates or tenders) are now granted to wind-produced kWh in each Member State. The analysis is done in several steps: we first discuss the rationale behind the support given to wind and the other renewables that produce electricity (RES-e), and whether the CO_2 emission reduction certificates can capture its benefits. Second, we make a hypothetical calculation on the minimum CO_2 price that would keep the level of wind support constant in the different Member States. Third, we introduce the effect of having highly volatile CO_2 prices, and their impact on the profitability of wind investments.

Section 4 deals with clean development mechanism (CDM) and joint implementation (JI) project-based schemes, and the role they have had in boosting wind investments in developing countries. This is accomplished through a review of the projects that have been registered until now by the United Nations and a series of structured in-depth interviews of the major wind energy investors in these areas.

Finally, some conclusions and recommendations on how best to use the future EU ETS to promote both CO_2 emission reductions and wind energy investments are put forward in Section 5.

2. Current state of the ETS and proposed changes for the post-2012 period

2.1. Approval and performance of the EU ETS directive (2005–2007)

In order to tackle climate change and help EU Member States achieve compliance with their commitments under the Kyoto Protocol (reduction of 8% of EU's greenhouse gases during the period between 2008 and 2012), the European Union decided to set up an internal market enabling companies to trade CO_2 permits. Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 established the EU Emissions Trading Scheme. This scheme is linked to the Kyoto Protocol's flexible mechanisms through Directive 2004/101/EC. On 1 January 2005 the EU Emissions Trading Scheme became a reality, and is being implemented in two periods: the first runs from 2005 to 2007 and the second from 2008 to 2012.

Since January 2005, some 12,000 installations across the EU-25 are capped in their emissions (Community Transaction Log, 2007) and the EU ETS has become the largest "cap and trade" programme worldwide: one billion tons of CO_2 equivalent worth €18.1 billion were traded in 2006 (Point Carbon, 2007).

Unfortunately, this market has failed to achieve some of its most important goals, notably encouraging investment in clean technologies and the use of CO_2 emissions reduction certificates as a market signal to regulate greenhouse gas (GHG) emissions. The main problems can be grouped as follows:

2.1.1. Political national influence and over-allocation of permits

Under the current system, a significant degree of freedom over the elaboration of the National Allocation Plans (NAPs) is retained by Member States (del Río González, 2006; Kruger et al., 2007).

Actual verified emissions in 2005 showed that allowances had exceeded emissions by about 80 million tons of CO_2, equivalent to 4% of the EU's intended maximum level (Ellerman and Buchner, 2007). This happened because Government allocation had been based on projected future needs. At the same time, participants had a strong incentive to overestimate their needs (ENDS Europe Report, 2007).

The publication of those figures provoked the collapse of the CO_2 prices to less than €10/tCO_2 in Spring 2006. By the end of 2006 and into early 2007 the price of allowances fell below €1/tCO_2 (€0.15/tCO_2 in May 2007) (http://www.pointcarbon.com). Moreover, the over-allocation of permits has hampered any initiative of clean technology investment, as it is clear that most companies regulated by the EU ETS need not make any change to their current production processes to meet the target they have been assigned.

2.1.2. Counterproductive allocation methods: free allocation and windfall profits for conventional power generators

The Emissions Trading Directive stipulates that at least 95% of issued allowances should be allocated for free for the period 2005–2007. For the next trading period, 2008–2012, this value is reduced to 90%.

One controversial feature of the EU ETS has been the resulting impact of emissions trading in the power sector, through the increase of electricity prices. This happens because the power generation sector sets prices relative to marginal costs of production. These marginal costs include the opportunity costs of CO_2 allowances, even if allowances are granted for free. As a consequence, fossil fuel power producers receive a higher price for each kWh they produce, even if the costs for emitting CO_2 only apply to a minor part of their merchandise. This effect is known as windfall profit.

The ability of the power generation sector to profit from the EU ETS is attributed to the price inelastic nature of electricity demand, the low trade intensity and hence high ability to pass-through CO_2 opportunity costs in electricity prices (Demailly et al., 2007). As illustrated in detail by the International Energy Agency (Reinaud, 2007), there is a strong correlation between CO_2 prices and electricity prices. However, national differences in electricity market structures and regulations means there is no universal answer to how the EU ETS has affected electricity prices. Pass-through of CO_2 prices into power prices varies across the different markets.

In the United Kingdom, the impact of CO_2 price on the power price has been one of 100% pass-through (Point Carbon, 2007). In Germany and the Netherlands, empirical and model findings show estimates of CO_2 cost