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From the Editor

The Bundeskartellamt (German Federal Cartel Office) has issued a warning to electricity company RWE about pass-through of costs arising from the EU Emissions Trading Scheme. The analysis underlying the warning raises many questions about the Bundeskartellamt's view of how markets work. Economic theory suggests that competing producers will take into account the full opportunity costs of such a Scheme when setting their prices. The Bundeskartellamt suggests that such behaviour might be an abuse of a dominant position. Although the degree of competition in Germany's power market is debatable, the Bundeskartellamt's analysis of the interactions of emissions trading with the power market is not based on sound economics. Daniel Radov, Associate Director and Per Klevnas, Consultant in NERA's environmental economics team, examine the Bundeskartellamt's view, explain how it threatens the cost-saving potential of the Scheme and expose flaws in the Bundeskartellamt's understanding of how competitive energy markets are meant to work.

—Graham Shuttleworth, Editor

CO_2 Cost Pass-Through: German Competition Regulators' Shaky Economics

By Daniel Radov, Associate Director and Per Klevnas, Consultant

The German Bundeskartellamt (Federal Cartel Office) issued a warning on 20 December 2006 to RWE, one of Germany's largest electricity companies, about the way that its prices to industrial customers reflect the costs of carbon emissions under the European Emissions Trading Scheme. The Bundeskartellamt accused RWE of abusing its dominant position to raise prices substantially more than was justified. Energy giant E.ON is also being investigated. Unfortunately, although the Bundeskartellamt's analysis purports to be based on economic reasoning, the arguments appear flawed and could undermine the cost-saving potential of the trading programme.

Background on the EU ETS

The European Union Emissions Trading Scheme for Greenhouse Gases ("EU ETS", or "the Scheme") is one of the EU's main policy tools to reduce emissions of carbon-dioxide and avoid climate change. It is the largest emissions trading programme in the world, covering emissions from 12,000 EU facilities (or "installations") including electricity producers as well as many large industrial sites and smaller facilities.

The EU ETS is a "cap-and-trade" scheme. The total amount of allowed emissions is fixed in advance, capping the carbon dioxide emissions from covered installations in the EU. At the end of each year, installations must surrender allowances corresponding to their total emissions for that year. Participants have been awarded emissions "allowances"—which confer the right to emit one tonne of CO_2—but these free allowances may not match their actual emissions for the year. Allowances can be bought and sold, so that companies needing more allowances can buy from those who have a surplus—or from those who are able to free up some

allowances by reducing their emissions. The market price for CO_2 allowances will therefore reflect the cost of reducing CO_2 emissions.

In Germany, allocations to combustion installations—which include the power sector—totalled 382 million allowances, but 2005 emissions were just 373 million tonnes of CO_2. Thus the power sector received nearly all of the allowances it needed—if not a surplus—for free.

Bundeskartellamt Warning to RWE

Electricity prices rose significantly in European countries during 2005, which was also the first year of the EU ETS, because of a number of factors, including rising fuel prices. The EU ETS also played a role, as electricity companies appropriately included the cost of CO_2 allowances in electricity prices from January 2005 when the EU ETS went into effect and CO_2 emissions acquired a cost.

In 2005, German heavy industry associations complained to the Bundeskartellamt, alleging that the price increases resulted because electricity companies were abusing their dominant position in the market. In particular, they claimed that price increases attributable to the introduction EU ETS were unwarranted. As electricity companies received allowances for free, they argued, the Scheme should not lead to increased electricity prices.

On 20 December 2006, the Bundeskartellamt appeared to support industry's position. It stated that a preliminary evaluation had found RWE abusing its market power by passing through too much of the cost of CO_2 allowances to the electricity price for industrial customers. RWE has until 22 February 2007 to respond to the accusations. The Bundeskartellamt also stated that an announcement on a similar case against E.ON was imminent.

The Bundeskartellamt analysis rests on three major arguments. First, it argues that RWE and E.ON "together hold a dominant position on the national electricity markets". For example, the two jointly produce more than 60 percent of the electricity generated and control up to 70 percent of the German electricity network.

Second, the Bundeskartellamt surveyed other industries subject to the EU ETS, and found that these industries did not pass through the full value of emissions allowances in product prices. It argues that the high level of pass-through in the German electricity market is unusual, and a sign of non-competitive behaviour.

Third, the Bundeskartellamt argues that there are theoretical reasons why the value of freely allocated allowances should not be reflected in electricity prices. The argument boils down to the claim that the allowances have no value unless they are used by

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the power companies, and therefore since they have been received for free, they do not represent a real cost that can be passed on to customers.

The Bundeskartellamt has not made public the detailed methodology of its assessment, but has concluded that pass-through of "more than 25 percent of the value" of allowances would not have occurred in an electricity market with "effective competition". It found that RWE's prices did exceed this threshold, and claims this constitutes an abuse of market dominance.

Evaluation of the Bundeskartellamt Analysis

The Bundeskartellamt's warning is based on what it claims would have happened in a competitive electricity market, so it is worth reviewing what economic theory says about pass-through of costs. In a competitive electricity market, short-term prices are determined by the production costs of the marginal generator—the most expensive production unit required to meet consumer demand at any given time. Under emissions trading, marginal production costs include the cost of emissions allowances—not just the average cost of meeting a *company's* shortfall in the free allocation, but the full "opportunity cost" of all allowances needed to cover the production of each additional *kilowatt-hour* (kWh) of electricity.

The *full* opportunity cost is relevant to pricing decisions because, when deciding whether or not to generate an additional kWh, power companies know they can either use allowances to generate electricity, or sell the "freed-up" allowances in the allowance market. This concept of opportunity cost is fundamental to economics and to analyses of markets.[1]

If the marginal generator needs to purchase all of the additional allowances needed to cover its production then it is clear that it will not supply the market unless it can fully recover the cost of allowances. But even in the case where the marginal generator has surplus allowances to spare, choosing to generate electricity incurs an opportunity cost, since these allowances could otherwise be sold. In a competitive market, if the marginal unit were not able to recover the full opportunity cost of CO_2 allowances required to cover its output, it would simply decide not to supply the electricity (in which case demand would not be met and prices would rise, or demand would need to be met in some other way with an even higher opportunity cost).

In the press release announcing its warning to RWE, the Bundeskartellamt accepts that prices in a competitive market will "in principle" reflect the opportunity cost of allowances. Since the advent of the EU ETS, energy market analysts have been watching indices and exchanges

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to see how much of the cost of CO_2 is reflected in electricity prices. In the UK—widely regarded as among the most competitive electricity prices in Europe—the full (opportunity) cost of CO_2 allowances at any time[2] appears to be reflected in the wholesale spot and forward prices at that time, even though electricity producers received the bulk of their allowances for free. Hence, even if Germany's power market is not competitive, full pass-through of CO_2 prices cannot be used as *prima facie* evidence of anti-competitive behaviour.

How does the Bundeskartellamt square its recognition of the importance "in principle" of opportunity cost with its finding that only 25 percent of the allowance value should be passed through? They rely on two lines of argument—one largely irrelevant, the other of dubious significance.

Their first argument is based on a comparison with other sectors covered by the EU ETS. The Bundeskartellamt asserts that these sectors have not raised prices to reflect the full opportunity cost of CO_2 emissions. The arguments here are weak. Unlike European steel or aluminum producers, electricity producers in Europe do not compete with *non*-European producers to supply their product. Producers in countries without CO_2 restrictions—including the United States, China, and India—do not face higher costs as a result of the EU ETS, unlike their European counterparts.

European steel producers face the opportunity costs of CO_2 emissions, but the price of steel depends not on *European* marginal costs, but also on the marginal costs of non-EU competitors within the wider global market—which have not increased (see Box 1). In electricity markets, by contrast, competition is confined to producers *within* the EU, all of whom are affected by the EU ETS. There is no meaningful "non-European" competition, so the entire supply to the market reflects the (full opportunity) cost of CO_2 emissions. This does not mean the markets are not competitive—only that all competitors within the EU are on a level playing field and face the same costs of CO_2 emissions.

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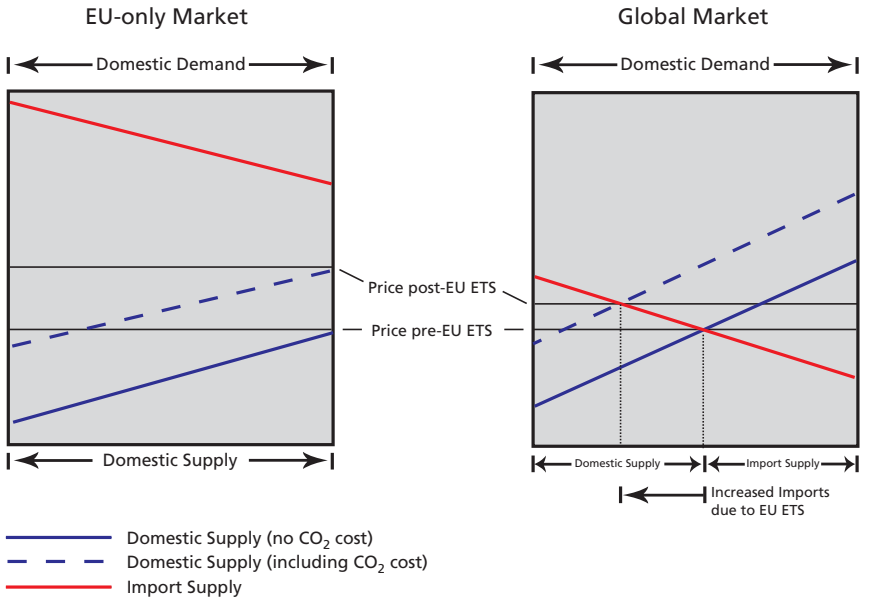
NERA is at the forefront of the continuing transformation of energy industries worldwide. Our experts have developed approaches for introducing competition in segments such as power generation and gas supply, where competition is workable, and for improving the regulation of sectors where it is not. We work with companies, governmental bodies, and regulators worldwide to design competitive gas and electricity markets and to develop tariffs and rules of access for regulated transmission and distribution systems for electricity and gas, and the transport of oil and oil products.

NERA helps companies develop strategies for exploring new opportunities and minimising new risks, including issues related to climate change and other environmental initiatives. We also help our clients to develop new regulatory strategies, and support them with analysis and testimony before regulatory commissions, antitrust and competition policy agencies, and domestic and international courts.

Our work includes designing and conducting energy auctions and providing strategy and valuation advice on mergers and acquisitions, the financing of energy companies, and the financial restructuring of distressed companies.

Box 1: EU and Global Markets



The left and right panels represent the markets for two goods, one supplied by EU producers only, the other by a global market. The width of the panels represents domestic demand for each good, which can be met by either "domestic supply" or imports. In the left panel, the market price is set where the domestic supply curve intersects the right-hand side of the box; in the right panel, the market price is set where the domestic and import supply curves intersect. Domestic supply increases from left to right. Import supply increases from right to left. In the left panel, imports are too expensive to compete with domestic supply—even when the increased costs of CO_2 are included. When the EU ETS raises the cost of domestic supply, prices rise by the same amount. (This example assumes no demand response from consumers.) In the right panel, global imports represent an important segment of the market, and their costs are unaffected by emissions trading. When the EU ETS raises the cost of domestic supply, demand switches to imports—so price impacts are much lower.

The Bundeskartellamt recognises the weakness of its appeal to markets facing external competition, and therefore tries to strengthen its argument by claiming that, even in other markets that are "Europe-only", producers have not passed through the full opportunity cost of CO_2. As examples, they cite petroleum, cement, lime, and sugar. The notion that the petroleum refining market is not global is arguable—consider the apparent response of global prices to Hurricane Katrina in 2005, as supplies were diverted to the US to make up for lost capacity there—and many European cement manufacturers complain about the potential competition they face from North Africa, for example. But even if these markets really were not exposed to competition from suppliers facing no CO_2 constraints, the Bundeskartellamt cannot claim that a lack of competition and abuse of dominance have led to the full pass-through in the German electricity market—when the same outcome has been observed in the UK. If producers pass through most of the cost of CO_2 emissions in fully competitive markets (as predicted by economic theory), how can the same behaviour by German companies imply abuse of a dominant position?

The Bundeskartellamt appears to recognise that it remains on shaky economic ground here, and therefore turns to a second, more complicated argument as the main basis for its findings. Although the Bundeskartellamt admits that "opportunity costs in principle influence business calculations", they question whether there are in fact opportunity costs facing the electricity sector—because any allowances "freed up" actually could not be sold. They note cryptically that they have "proved that for electricity supply reasons and according to emission law only a small number of the emission allowances allocated to the power plant operators could actually be put to other use".

The Bundeskartellamt gives no further explanation of this claim. It may relate to the high levels of output that German generators are required to produce from "must-run" plant, in order to meet demand for security of supply in electricity and heat. These obligations do not affect the pricing rule of the marginal production units which set competitive market prices, although the contracts under which they operate may affect the prices paid in individual circumstances. Alternatively, the claim may relate to a controversial provision in Germany's implementation of the EU ETS, which would allow the government to take back emissions allowances if a company's emissions fall sufficiently below the amount allocated. This provision (allowing for "ex-post adjustment" of allocations) has been rejected by the European Commission because of the serious inefficiencies it would create in the emissions market, but it has been the subject of an extended dispute before the European Court of Justice. Even in the unlikely event that this provision were allowed to stand, it would only reduce the opportunity cost of allowances if generating units significantly reduced their output.

Moreover, the German power sector is not an island; underpricing German electricity production by omitting the opportunity cost of the EU ETS would increase demand from foreign traders facing such costs in their own countries, thereby driving up German production to the point where its costs matched the other countries' marginal costs of production—including the opportunity cost of CO_2.

Even within the German electricity market, the marginal production unit may lie in another EU Member State, in which case marginal production costs and competitive market prices will be unaffected by German legal restrictions on the use of emissions allowances. Thus, the Bundeskartellamt's arguments either lack a proper rationale in economic theory, or rely on arguments that are inconsistent with the economic theory of competitive markets.

Implications for the Efficiency of Emissions Trading

The Bundeskartellamt argues that that pass-through of allowance values is the result of poorly functioning markets. However, this is a misunderstanding of the role of prices in ensuring an efficient outcome in an emissions trading programme. Far from a sign of inefficiency, electricity prices that reflect the cost of CO_2 emissions are a likely outcome of competitive markets, as well as an important pre-condition for achieving emissions reductions at least cost.

Emissions trading works by applying the same cost of carbon dioxide emissions to all of the covered activities. With perfect competition and a perfectly designed carbon market, the cost of carbon is automatically factored into the price of commodities in all relevant markets. This result helps consumers assign economic resources efficiently to the cheapest methods of cutting emissions.

The incentives provided by the EU ETS are directly relevant to electricity markets. When CO_2 emissions costs are reflected in electricity prices, consumers will have an incentive to reduce their consumption, either by reducing their demand or by

increasing their energy efficiency. Similarly, higher electricity prices will improve the prospect for the construction of less emissions-intensive generation plant.

If prices do not reflect the opportunity cost of CO_2 allowances, abatement opportunities from energy efficiency and low-emissions generation will not be encouraged. For a given level of required emissions reductions, abatement will therefore have to be sought from other, more expensive sources. This will push up the price of allowances, and thus increase the overall cost of the trading scheme. Indeed, if Germany were to prevent its electricity producers from reflecting the opportunity cost of carbon in electricity prices, it could do the whole of the EU a disservice by pushing up prices for CO_2 allowances and for electricity.

Concluding Remarks

If emissions trading is used as a scapegoat in a wider political debate about energy policy and the state of competition across European energy markets, there is a danger that neither market will be allowed to function properly. The Bundeskartellamt's analysis appears to confuse the workings of a new market—in this case, the market for CO_2 emissions—with the workings of the German electricity market. The Bundeskartellamt's analysis does more to confuse the issues than to clarify them. Tampering with the CO_2 emissions market will not correct whatever competitive issues may exist in the electricity market and, indeed, would undermine the cost-saving potential of the EU ETS.

Notes

1 This principle is accepted in other parts of the market. If a power company has acquired the right to coal, oil, or gas at some contract price, we nevertheless expect the current market price of fuels to dictate the price of electricity, if the company could otherwise sell the fuel to someone else. To give a different example, one expects a family-run hotel to charge the same rate for its rooms, whether the family acquired the hotel by buying it or by inheriting it from the previous generation (i.e. for free).

2 It is difficult to reach firm conclusions, since it is not always clear what generators are the marginal production units for a given contract, but in general electricity contract prices have moved up and down in line with the price of CO_2 emissions allowances. How much individual companies recover depends on when they sell electricity.

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