Deutsche Bank Research

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Current Issues

EU trade in CO_2 emissions: 2005 launch deadline at risk

- In July 2003, the EU adopted a directive on trading in greenhouse gas emissions. Its essential goals are to gain experience of this still-new environmental policy instrument, and to keep down the cost of achieving emission reduction targets set under the Kyoto Protocol. Trading is to begin in 2005.
- Individual member states are currently in the process of transposing the EU emissions directive into national law. By the end of March 2004, each country is to submit its national allocation plan (NAP) to the EU. The NAP indicates the initial level of emission credits provided to those installations taking part in trading. All NAPs must then be harmonised at EU level. In parallel to this, the organisational and institutional framework conditions of the trading system must be established.
- In our view, the timetable for the lead-up to emissions trading is extremely ambitious. This view stems largely from the many grey areas and unanswered questions that remain, as well as the limited time available for solving massive problems in the initial allocation of credits.
- The still-unanswered questions include the following: how many emission credits will be issued? How can emissions from each installation be measured in a reliable, comparable and transparent way? Which base year is relevant for which installation? Which criteria can be used as reliable proof of emission reductions in years gone by (early actions)? How is emissions trading to be harmonised with other environmentally-motivated policy measures in individual member states?
- We see harmonising the NAPs of the EU member states as the greatest of the upcoming challenges. This is because of the relatively high degree of freedom in allocating emission credits, and the differing degrees to which EU countries have achieved their individual emission reduction targets.
- It will become clear in the near future that when it comes to implementing the (theoretically very convincing) instrument of emissions trading in practice, the devil is in the detail. It is to be hoped that politicians and industry can work together to create suitable framework conditions for its successful launch. The timetable for introduction can hardly be achieved. While this is regrettable, it should not call into question the entire concept of emissions trading.

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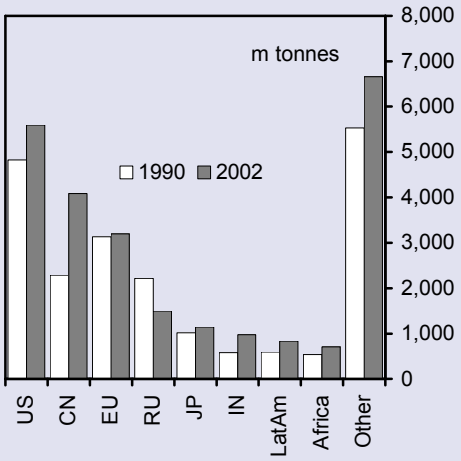
1. Introduction

Worldwide output of carbon dioxide (CO_2), by far the most important greenhouse gas, increased by around 4% in 2002, a recent report by the German Institute for Economic Research (DIW) found. The slow pace of overall world economic growth, relatively high energy prices, and the fiscal burden on energy consumption in some countries barely checked the hunger for energy. Recently, EU emissions of the six most important greenhouse gases were more than 2% below 1990 levels, but under the Kyoto Protocol this region is obliged to make an 8% cut by the period 2008/12. So in a period of over ten years, the EU has only covered one quarter of the distance required under the terms of Kyoto. One obvious reason is that the environmental policy instruments used so far were not sufficient to halt the rise in greenhouse gas emissions. For some time now, hopes have rested on trade in greenhouse gas emission rights.

The basic mechanism behind emissions trading is well-known. Economic agents are allocated greenhouse gas emission credits. These limit the aggregate volume of greenhouse gases emitted. Market participants left with unused emission credits can sell this surplus on to economic agents emitting more greenhouse gases than their allocations allow. The price of emission credits is thus established by the market mechanism. In theory this cap-and-trade system, as it is called, leads to emissions being reduced in areas where that is the cheaper course of action. The EU wants to introduce a similar system of emission trading from 2005. This would be the first multinational trading system of its kind.

Energy-related CO_2 emissions



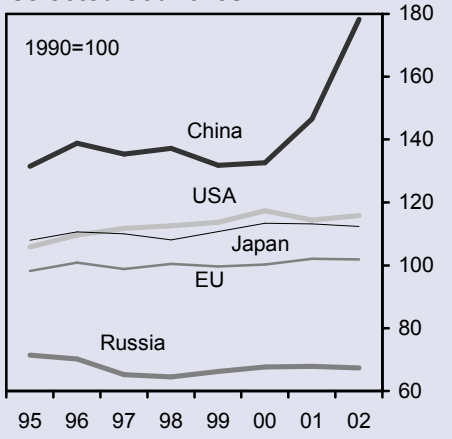
Source: DIW Berlin

2. Basic elements of EU emissions trading

At the end of July 2003, the EU adopted a directive on trading in greenhouse gas emission permits. Its essential goals are to gain experience of using this new brand of environmental policy instrument, and to keep down the cost of achieving emission reduction targets. According to EU estimates, introducing this market-based instrument could cut the annual total cost of achieving the Kyoto Protocol's reduction targets (EUR 3.7 bn) by around 35%. The basic elements of the planned system can be outlined as follows:

- Trading takes place over two periods. The first lasts from 2005 to 2008, the second from 2008 to 2012. This second phase coincides with the Kyoto Protocol's commitment period.
- Trading is based on the installation, not the entire company. It affects installations (depending on capacity) in the highly energy-intensive sectors of power generation (power stations, mineral oil refineries, coke ovens), ferrous metal production and processing, building materials (cement, lime, glass, ceramics), as well as paper and pulp. The chemical industry will also be included in trading, on the basis of its power station capacities.
- In Europe around 12,000 installations will come under the trade regime, about 4,500 in Germany alone. The regime covers some 46% of all CO_2 emissions in the EU.
- With the eastward enlargement of the EU scheduled for May 2004, trading will extend to the ten new member states, bringing it to a total of 25 countries.
- To avoid complications, trading will initially be restricted solely to CO_2, the most important greenhouse gas. The five other "Kyoto gases" will be excluded for the time being.
- Member states have the opportunity to exempt individual installations from the first trading period (opt-out clause). However,

Energy-related CO_2 emissions in selected countries



Source: DIW Berlin

Trade initially restricted to CO_2

they must then find some other way to prove that emissions have been reduced. The exclusion of entire sectors, as demanded by Germany, is not possible.

Pooling solely on a voluntary basis

- Pooling is envisaged solely on a voluntary, not an obligatory, basis. Individual installation operators may therefore voluntarily form a pool in order to participate together in trading. However, in practice this option should not play any significant role. Companies that are likely to be on the sellers' side have no incentive to take part in such voluntary pooling.
- In the second trading period, the "opt-in clause" allows member states to broaden trading to other sectors (e.g. the chemical and aluminium industries), and to other greenhouse gases. The EU wants to test whether and how trading can be extended to other energy-intensive sectors.

Sanctions planned for breaches of output limits

- An EU-wide monitoring and reporting system is envisaged. Sanctions are planned for installations that breach output limits. Fines will come to EUR 40 per tonne of CO_2 in the first trading phase, and EUR 100 per tonne in the second. Furthermore, offenders must make up the shortfall in CO_2 credits by buying them up in the ensuing period.

Initial allocation of emission credits must be set out in national allocation plan (NAP)

- The member states have a considerable degree of freedom in the initial allocation of emission credits. In principle, credits are to be allocated free of charge (grandfathering). However, each country is free to auction 5% of the credits in the first trading period and 10% in the second. Furthermore, emission reductions from earlier periods (early actions) can be taken into account when allocating credits. Both courses of action are optional. The initial allocation of emission credits must be set out in the National Allocation Plan (NAP).
- Emission credits may in principle be saved up, i.e. carried over into later periods. Rules need to be drawn up for the transition from the first to the second trading period.
- A supplementary draft directive of summer 2003 (referred to as the "linking directive") plans to allow emission credits generated by the project-related flexible mechanisms of the Kyoto Protocol (JI and CDM) to be traded in the EU emissions market. However, this will only be possible from 2008, assuming that the Kyoto Protocol is ratified by then. All in all, this sets the scene for linking EU emission trading with trading under the Kyoto regime, which is scheduled to start in 2008.

The Kyoto Protocol provides for flexible mechanisms aimed at supporting the achievement of emission reduction targets. Apart from trade in emission credits, these include the **clean development mechanism (CDM) and joint implementation (JI)**. In both cases, by investing in emission-reduction projects in another country, an industrialised country can generate emission credits and sell them on. If the focus of this project-related investment is another industrialised country, this action is referred to as JI. If the investment takes place in a developing country, it is CDM.

NAPs must be submitted by end of March 2004

Emission trading should begin in about 13 months' time. A certain number of milestones have to be reached by then. At the moment, individual member states are in the process of transposing the EU emissions directive into national law. By the end of March 2004, these countries are to submit their NAPs to the EU. The NAPs must then be harmonised at EU level, with adjustments being made where necessary. In parallel to this, the organisational and institutional framework conditions of the trading system must be established.

3. Extremely ambitious launch timetable

In our view, the timetable outlined above for the lead-up to emissions trading is extremely ambitious. This view stems largely from the many grey areas and unanswered questions that still remain, as well as the limited time available for solving massive allocation problems.

Clearly, the main source of uncertainty is the structuring of the NAP. The EU puts forward a range of basic requirements for this. For

instance, the NAP must include the number of emission credits for each individual installation participating in trading, as well as the planned allocations for each period. The emission reduction targets laid out in the NAP must tally with national targets set under EU burden sharing (varying reduction targets among EU countries, as set under the Kyoto Protocol). Moreover, the differing emission reduction potential of individual installations can and should be taken into account when issuing credits. As is well-known, this can vary greatly depending on the nature of the production process. The majority of CO_2 emissions in the cement industry, for instance, are due to the production process. This is an important reason why specific CO_2 emissions in the German cement industry will fall barely 17% between 1990 and 2012, while the chemical and paper industries will achieve cuts of over 55%, according to forecasts by the RWI economic research institute. Furthermore, the NAP must be structured in such a way that certain installations, companies or industries are neither favoured nor put at a disadvantage. A reserve of emission credits must also be maintained for new entrants to the market. As previously mentioned, member countries can take into account "early actions" undertaken from 1990 onwards.

NAPs and must be compatible with national reduction targets of EU member states

Uncertainty hinders NAP formulation

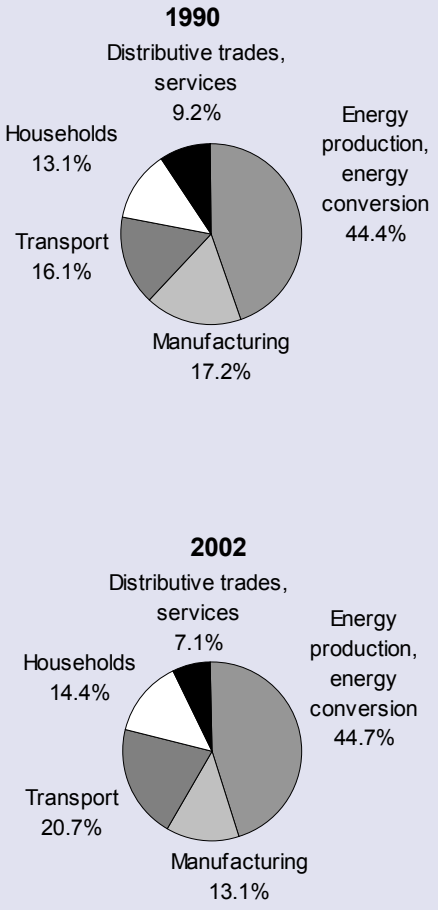
The practical application of these requirements in the NAP is seriously hindered by a whole range of questions that have, as yet, largely gone unanswered. How many emission credits will be issued? How will emissions from each installation be measured in a reliable, comparable and transparent way? Which base year is relevant for which installation? What criteria can be used as reliable proof of early actions, and which early actions will be taken into account? Which installations will be exempted from the first phase of emissions trading? How is emissions trading to be harmonised with other environmentally-motivated policy measures in individual member states, such as Germany's Combined Heat and Power Act, Renewable Energy Act or eco-tax? How will Germany's future phasing-out of nuclear power, a CO_2-free source of energy, be taken into consideration? What will happen to the emission credits of installations that are later taken out of operation? How can competitive distortions be avoided at the initial allocation stage? What sort of institutional framework is necessary? The list of questions could undoubtedly go on.

Allocations: heavy conflict in store

These questions, among others, illustrate the great challenges facing decision-makers involved in producing each participating country's NAP. The NAP is such a sensitive issue because the allocation of emissions credits free of charge is essentially equivalent to a monetary gift. Emissions credits will have a monetary value and can be freely traded. The Institute for Applied Ecology in Freiburg estimates the value of German credits at some EUR 4 to 5 bn per year. Furthermore, once the EU has approved an NAP, it cannot be changed. This makes pitched battles over allocation of the limited number of emission credits a virtual certainty.

A distinction between several allocation levels has to be made here. Each member country must establish the total number of emission credits to be made available; this figure is to be based on the objectives of the Kyoto Protocol. Of course, the national emission reduction goals of each of the countries party to the Kyoto Protocol cannot be fulfilled solely by the installations participating in emissions trading. Absolute emissions targets thus automatically need to be established for other sectors, too (transport, households, services). Other allocation levels include that of sectors participating in trading (plus

Share of CO_2 emissions in Germany by sector

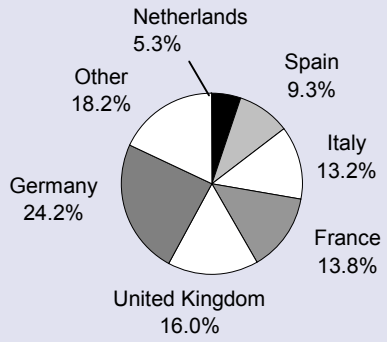


Source: DIW Berlin

reserve credits), and that of individual installations within each sector.

Each sector and each installation is striving to get the biggest possible slice of the emission-credits pie. Trade associations and companies have already started lobbying with the aim of strengthening their own positions in the allocations battle and forestalling any competitive disadvantage. In such cases reference is often made to emissions reductions achieved in earlier periods. Many installation operators cite reasons – in many cases well-justified ones – why their early actions should be taken into account. For instance, producers of brown-coal-based electricity upgraded ailing power stations in east Germany after reunification. The building materials industry has cut back both its specific and its absolute energy consumption since 1990. Moreover, through investment in modernisation the energy industry as a whole has significantly increased energy efficiency in using fossil fuels.

EU greenhouse gas emissions: 2001 shares



Source: DIW Berlin

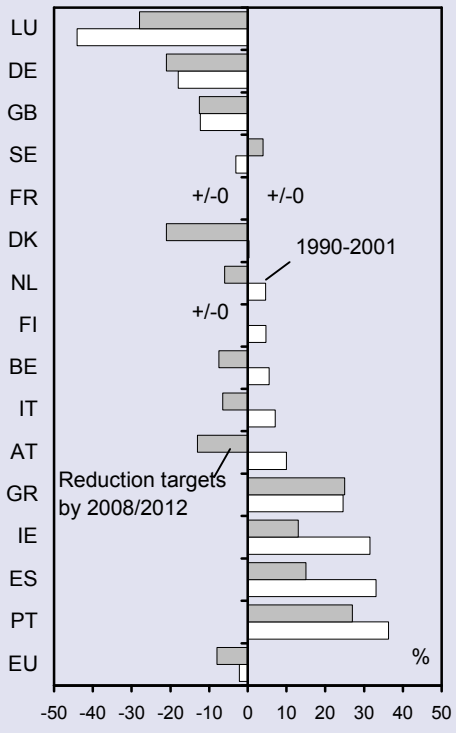
Early actions cannot carry too many hopes

However, it should be kept in mind that by no means all early actions can be taken into consideration. Every early action for which additional emission credits are allocated reduces the amount of credits for other market participants. If, for example, all emission reductions since 1990 were taken into consideration, the resultant allocation of certificates would be irreconcilable with Germany's national emission reduction target. Most credits are therefore likely to be allocated on the basis of recent actual levels. Besides, in many cases it is scarcely possible to provide proof of emission reductions in the early 1990s because of the lack of documentation. Finally, the allocation of credits for early actions must not contradict the terms of the European single market.

It is clear that producing the NAP, with its potentially distortive effect on the market, presents a difficult task even just for Germany alone. However, the problem for the Germans is relatively minor as they, in contrast to other EU countries, have already largely fulfilled their emission reduction targets under the Kyoto Protocol. According to a current opinion paper by the RWI, even assuming annual GDP growth of 2%, the emission reduction target of 21% on 1990 levels can be achieved.

However, the allocation problem is more serious in most other EU countries, as they are much further away from achieving the emissions targets set under EU burden sharing. The question (as yet unanswered) is this: what happens in the case of installations in countries that have fallen far short of achieving their emission reduction targets to date? These installations would in fact have to be allocated significantly fewer emission credits than they currently require. If they were to receive credits based on their most recent level of energy consumption, this would disadvantage companies from elsewhere, whose installations would be supplied with credits based on the targets already achieved by their particular country. However, it seems more than questionable whether dramatically reducing the allocation to countries lagging well behind reduction targets is politically feasible. Those countries' governments would actually have to buy the required credits, passing the burden on to consumers, perhaps in the form of higher energy taxes. It is doubtful whether this would be in line with EU competition law.

EU greenhouse gas emissions



Source: DIW Berlin

EU emissions trading: doomed to succeed?

In our view, the greatest challenge ahead is harmonising the member countries' NAPs at EU level. This is due to the relatively high degree of freedom in allocating emission credits, and the differing degrees to which EU countries have achieved their targets under EU burden sharing. We do not see it as fundamentally negative that all of the details have not been clarified as yet. The practical implementation of emission credits trading, a highly complex instrument, presents a significantly greater intellectual challenge than the introduction of orders, prohibitions or taxes, which are comparatively crude in both nature and effect. It seems that all of the problems listed above have solutions. However, we fear that the time available is too short to establish a truly reliable trading system. The fact remains that far more trivial tasks have taken the EU significantly longer to deal with than the just over 13 months remaining until the envisaged launch date.

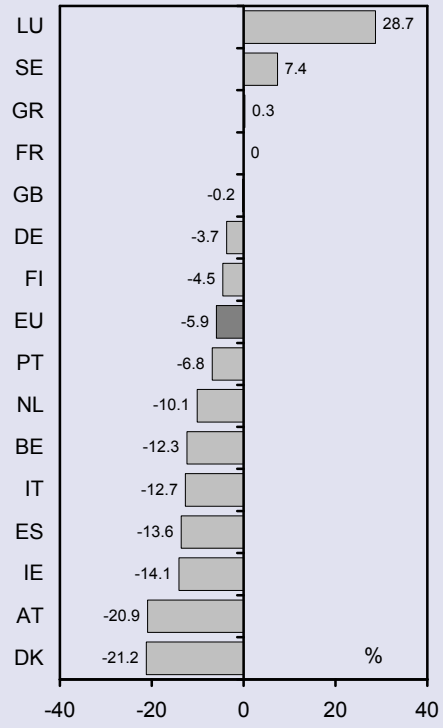
As the emergence process of the emission trading system is extremely complex, and as it is unlikely that everything will go without a hitch, the primary policy objective should be to gain initial experience of this new instrument. The failure of emissions trading due to allocation wars or bureaucratic barriers must be avoided at all costs, as this would be grist to the mill of long-standing critics of the instrument.

4. Outlook

In the following we offer our views on some selected details of the envisaged EU emissions trading system, and comment on a range of unanswered questions. Among the most important questions surrounding emissions trading – particularly in Germany – are these: who the winners and losers will be, and whether Germany as a whole can benefit from this instrument. The first question is hard to answer from today's vantage point, as it will depend greatly on the structuring of the NAP. In the energy sector, emissions trading favours shifts within the energy mix away from coal towards modern and more energy-efficient gas and steam power stations. With the step-by-step renewal of the power station network over the coming years, energy companies can generate more emission credits by modernising or changing over to lower-emission fossil fuels (gas instead of coal). Whether this yields a return, though, naturally depends upon the costs of the changeover, the prices of emission credits, and the prices of the various energy sources.

The question of whether Germany can benefit from emissions trading has already been the subject of earlier investigations. The conclusion drawn, particularly in view of domestic emission reductions already achieved, was that Germany would be a net seller. However, these studies assumed different trading regimes. The key to answering this question in the case of EU emissions trading is the harmonisation of the individual NAPs at national level. In our view, Germany should count among the nations with a surplus of emission credits, if initial allocation to installations is based on equivalent standards throughout the EU. The lower levels of emission reduction achieved by installations in other countries would therefore have to be taken into account in the issuing criteria. It is essential to stick to this demand in the upcoming negotiations.

Emission reductions required in the EU by 2008/2012 versus 2001



Source: DIW Berlin

Development of prices, market liquidity and trade volume

The price of an EU emission credit, based on estimates from and previous experience of other trading systems, is likely to fall between EUR 5 and EUR 15 per tonne of CO_2. This range is so wide because the price will depend mainly on the NAPs and their harmonisation. In our view, prices are unlikely to go significantly higher than EUR 15 because, at these cost levels, sufficient emission-reduction measures would become available. In addition, Eastern Europe will probably have plenty of sellers because of its over-achievement of targets and its associated generous initial allocation of emission credits.

In the second trading period, starting in 2008, the admission of credits from JI and CDM projects is likely to dampen prices. Thanks to the previously-mentioned linking directive, integrating these project-related flexible mechanisms could cut the price of credits in half. Russia is particularly likely to show great interest in selling emission credits from JI projects – assuming it has ratified the Kyoto Protocol by then. At present the Russians seem to be playing for time.

However, things will look different after 2012, if reduction targets become significantly stricter in a second phase of Kyoto. If much stricter reduction targets are agreed in a subsequent protocol, emission credit prices could rise significantly. It remains to be seen, however, whether a political majority in support of a tightening of reduction targets beyond 2012 can be found.

If installations are too generously provided with credits at national level, this could present problems for market liquidity. Sellers would then dominate the market. In that case, though, climate targets would be put at great risk. If allocation of emission credits is harmonised with climate protection targets, there should be sufficient buyer and seller positions to ensure adequate market liquidity. Estimated trade volumes amount to anything from barely EUR 2 bn in the second trading period up to EUR 5 bn annually. Because of the many unknown factors, these estimates probably harbour a high degree of uncertainty.

Greenhouse gas emissions in selected countries*), %

	1990-2000	Reduction targets 2008/12
Latvia	-65.6	-8
Estonia	-54.6	-8
Lithuania	-53.7	-8
Ukraine	-50.5	+/-0
Bulgaria	-50.5	-8
Romania	-38.1	-8
Russia	-35.4	+/-0
Slovakia	-33.3	-8
Poland	-31.6	-6
Croatia	-30.3	-5
Czech Republic	-23.6	-8
Hungary	-17.0	-6

*) Countries in transition toward a market economy (transition countries).

Source: DIW Berlin

Plea for greater role for JI and CDM projects

Plans to apply project-related flexible mechanisms of Kyoto Protocol (JI and CDM) ...

The proposed linking directive connects EU emissions trading to the Kyoto Protocol. The directive allows companies to buy emission credits via the project-related flexible instruments of the Kyoto Protocol, and to sell them (after legal conversion) within the framework of EU emissions trading. This brings down the cost of the entire system. Furthermore, it provides a stronger incentive for Russia to ratify the Kyoto Protocol. Emission credits from JI and CDM projects may be used only after 2008. There are qualitative restrictions: installations that fall under the EU trading regime are not allowable as JI projects, as this would result in double counting. This is particularly relevant for power stations in the EU accession countries. Moreover, nuclear plants and (for the moment) carbon sinks (woodland and fields) are ruled out as JI or CDM projects. Credits from hydropower stations are allowed in principle, but they must not be associated with negative social and ecological effects. This makes credits from major projects like reservoir dams generally inadmissible.

... but with a significant quantitative restriction

Apart from these temporal and qualitative restrictions, the linking directive also has a quantitative one: project-related credits are in principle limited to a share of 6% of total authorised emission credits

(the purely “complementary” role of JI and CDM). The reasons for the limited application of the flexible mechanisms are contained in the linking directive. For example, incentives to reduce emissions within the EU would be lost. Furthermore, shifting emission reductions beyond EU borders would not exploit the potential for reducing other greenhouse gases. Lower credit prices could lead to a postponement of technological measures aimed at reducing EU greenhouse gases, even though these measures will be necessary for climate protection in the medium term. Finally, developing countries would insist that industrialised countries – as the main culprits of climate change – take countermeasures at home.

Increased use of JI and CDM makes ecological and economic sense

In our opinion, only this final argument is valid. The others are unconvincing both from an economic and an ecological point of view, and are evidently more concerned with salving the conscience of certain EU policymakers in the short term. One thing is certain: it makes no difference to the climate which regions of the earth reduce greenhouse gas emissions. Boosting the importance of JI and CDM would increase acceptance of reductions in both industrial and developing countries, and reduce the cost of climate protection. This should have a leading position in the hierarchy of objectives. Of course, one important condition is that strict, reliable, transparent and thus verifiable standards are used as the basis for recognition of emission credits (certification) from the project-related instruments. If suspicions arose that the generation of emission credits was open to abuse, the credibility of the entire system would suffer. This is obviously no trivial task. All in all, the importance of achieving domestic emission reductions should not become a sticking point. After all, the industrial countries will also encounter incentives to reduce domestic emissions in the future.

Linking up with other instruments

Double burdens and double claims to be avoided when linking emissions trading with other environmental policy instruments

Linking emissions trading with other environmental policy instruments previously in existence should be based on one fundamental principle: to generally avoid both double burdens and double claims. In the case of the eco-tax, this would mean that those sectors participating in EU emissions trading could experience a corresponding level of relief from this tax in the very long run. However, calculating this kind of competitively neutral balance is bound to be fraught with difficulty. In addition, the public purse cannot afford to exempt large sections of industry from the eco-tax in the short to medium term. In the areas where, for reasons of efficiency, emissions trading is not (yet) worthwhile (private households, the transport sector), existing incentives should continue to be used to encourage energy conservation (taxes, levies, orders and prohibitions).

Phasing-out of nuclear power

Extra emission credits needed for phasing-out of nuclear power in Germany

The German government’s planned phasing-out of nuclear power will lead to an increase in CO_2 output, depending on the need for replacement and the type of energy used in its place. This is because the loss can only be realistically compensated in the medium to long term by building or extending fossil-fuel-based power stations (or by importing power, if the required capacities are available). The individual installation operator should not have to carry the cost of the additional CO_2 output. A compensatory model could look like this: the state buys enough CO_2 emission credits to cover extra emissions and distributes these among the installations, these costs then being added as a surcharge to the power bill. Installation operators that change over to low-emission fuels reap the benefits, as they do not use up all of their allocated emission credits.

5. Conclusion

If serious difficulties arise, timetable is scarcely achievable

The discussion about the upcoming EU emissions trade yet again shows that when it comes to implementing this (theoretically very convincing) instrument in practice, the devil is in the detail. It is to be hoped that politicians and industry can work together to create suitable framework conditions for the further advancement of emissions trading. However, if serious difficulties arise in the short time available, the timetable should be adjusted. While this would be regrettable, it is nevertheless preferable to the alternative of complete rejection of emissions trading.

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