Ways to improve the design of the EU emissions trading scheme: key issues and answers

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1. Introduction

The Europe Union is about to lunch the world's first greenhouse gas emissions trading scheme in history. This represents an enormous challenge because there is no previous experience with such an unprecedented scheme, and because its final outcome might shape the design of future environmental market-based policies as well as the political viability of future efforts towards emissions reductions. There are five basic issues that not only will shape the final design of the scheme but also might hinder the performance of such a scheme, if not effectively addressed. They include universal vs. reduced scope, member country vs. European-wide sector objectives and allocations, allocation methodology and base year choice, energy mix and national security, and incentives for technological innovation. This paper aims to address these key issues to help to shape the final design of the scheme in a positive manner.

2. Universal vs reduced scope

Given great differences in abatement costs among emissions sources and cross countries, it is desirable to broaden an international emissions trading (ET) scheme to include every country and emissions source. However, some countries like the U.S. and Australia have decided to at least initially stay outside the Kyoto Protocol. Thus, the EU ETS is at least initially unable to reach a global scope, although the underlying Directive explicitly allows its linking with other national domestic greenhouse gas ET schemes that are being developed. This partial system of reduced scope could lead to an increase in the cost of production in the EU relative to those competitors outside the EU. However, what needs to be stressed is that increases in the cost of production will not be a consequence of the EU ETS, but of the implementation of the Kyoto Protocol. Implemented effectively, the ET is the least cost means of meeting the Kyoto targets. This means that any cost increases will be the lowest necessary. Consequently, the effects on the competitiveness of the European economy will be the lowest necessary.

Moreover, in assessing any potential competitiveness effects of the EU ETS, the references to competitors outside the EU should not be made solely on the basis of whether or not these competitors have committed to quantified emissions targets and have ratified the Kyoto Protocol. Account should be taken of any relevant measures that these competitors are subject to. For example, following the U.S. rejection of the Kyoto Protocol, the six New England Governors and the five Eastern Canadian Premiers in August 2001 issued a Climate Change Action Plan aimed at the reduction of greenhouse gases to 10% below 1990 levels by 2020. In September 2003, the Western Governor's Association announced the formation of the West Coast Global Warming Initiative. Many U.S. large corporations are also moving ahead on their own to deal with global warming. These companies expect that despite the Bush administration's stance, it is only a matter of time before they will be required to cut their greenhouse gas emissions on their home turf. Given the long-lived nature of many energy-sector investments and great desirability of low-carbon economy, energy-sector investors would anticipate mandatory tighter future constraints, and thus factor this consideration into their near-term decision-making, even if no mandatory constraints are in place for them at the moment. Consequently, in adapting to tighter future constraints, energy-sector investors are making more costly investments than would be made in the absence of concerns about future carbon constraints. Thus, the U.S. also incurs GDP losses in 2010 even if it faces no mandatory constraints in that year (Manne and Richels, 2004; Zhang, 2004).

In the mean time, developing countries get involved in abatement projects through the CDM. The EU Linking Directive allows the unrestricted import of CDM credits into the EU allowance market.[1] This provides significant flexibility in assisting EU producers to meet their obligations under the EU ETS in a cost-effective manner.

Thus, viewed from these angles and taken the aforementioned factors together, in the short-term the obligations under the EU ETS may add a cost to EU producers. However, given the expected, low price of carbon credits as a result of the U.S. withdrawal from the Kyoto Protocol,[2] the carbon factor alone will not undermine the competitiveness of the European economy. The EU own estimate[3] for trade impacts of the EU ETS confirms this judgment.

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[1] The Linking Directive in its initial form sets a complicated 6% trigger mechanism whereby the Commission would monitor the quantity of JI/CDM credits that are imported into the EU ETS. However, the EU Parliament's Committee on the Environment, in its first reading on 16 March 2004, rejected this trigger mechanism, as indicated in the rapporteur's report.

[2] Whether and when the aforementioned New England states and the West Coast states in the U.S. will mandate state-wide emissions reductions and adopt a regional cap-and-trade system remain unknown at the time being. Assuming that these U.S. states adopt mandatory state-wide emissions limits and decide to recognize Kyoto permits/credits for purpose of compliance with the state's emissions limits, this will increase overall demand for Kyoto credits and push up the price of credits somewhat. The reason for limited impact on the price of credits is that these states have relatively low marginal cost of carbon mitigation because these states are neither major hosts to fossil fuel extraction nor dependent on fossil fuel-fired power generation capacity.

[3] This estimate only represents the work of the single modeling team and is subject to a number of assumptions about technology and behavioral response and external

On the other hand, the combined factors might not level the playing field completely. For those activities that are expected to experience severe effects from competition from outside the EU, they might be allocated more allowances relative to their historical shares in the total emissions. Moreover, regardless to their ownerships and extent of being affected, all the covered installations carrying out the same activity in each member state should be treated equally to avoid transgressing the WTO rules. To the extent that is compatible with the ET Directive, EU member states would further mitigate competitiveness concerns by shielding those sectors more vulnerable to global competition and/or invoking trade measures against non-Kyoto parties, although they need to ensure WTO consistency (Zhang, 2004).

3. Country vs European-wide sector objectives and allocations

At Kyoto, the EU took on the common 8% reduction commitment. Based on the EU burden-sharing agreement, the differentiated targets have then been assigned to each member state. In meeting the emissions targets, the EU needs to strengthen the "Cardiff process" and further increases the opportunities for sectoral integration of climate change. However, establishing the ETS based on EU-wide sector objectives may conflict with the goal of each individual country minimizing the total compliance cost. This approach would not be more efficient than the currently proposed EU ETS, as long as the covered installations are all price-takers, transaction costs are low, and the allowances are fully tradable. If adopted, the approach will also limit the flexibility of a member state in determining how much the capped sectors will contribute to meeting its national target, because a member state who is applying effective policies and measures to sources outside the trading scheme is likely to allocate more allowances to those covered installations that have limited technological abatement options. Member states could acquire JI/CDM credits through national carbon purchase funds such as the Dutch ERUPT/CERUPT programs and to the extent that this is compatible with state aid rules and the criteria of Annex III of the ET Directive, issue additional allowances *ex-ante* to all the covered installations in the same severely affected activity. Moreover, these installations should take full advantage of the opportunities offered by the Linking Directive and purchases/generates JI/CDM credits to further lower the compliance cost and alleviate competitiveness effects.

Some member states, e.g., the Netherlands, have used benchmarks in allocating allowances to a specific trading sector. To a large extent, competitiveness distortions in the EU internal market could be avoided with the use of common benchmarks among member states, at least for sufficiently homogenous products. To further avoid competitiveness distortions among the covered installations and ensure a level playing field within the EU, clear definitions of installations need to be established. This issue is closely related to the next question, and will be addressed in discussing allocations.

4. Allocation methodology and base year choice

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events. Nevertheless, the estimate falls within the range of cost estimates for the EU produced from a dozen global models examined by Stanford University's Energy Modeling Forum (Weyant, 1999).

Unlike the U.S., the EU is not yet a true federation and thus its centralized authority is limited. Thus, it is no surprise that the ET Directive adopts the principle of subsidiarity. This is consistent with the European Community tradition and probably is a practically workable solution to increase the scheme's political acceptance.

On the other hand, allocations matter lot. Although the ET Directive provides member states with general criteria for allocation, including ensuring that the allocation is consistent with achieving the overall Kyoto target, it is lack of sufficient clarity about definitions of installations. This has led to different interpretation of criteria under the Directive. From the National Allocation Plans (NAPs) submitted to the European Commission, we observe that, in Germany, combustion installations do not cover steam crackers and melting furnaces, because the definition of combustion installations covers only activities that transform energy carriers into secondary energy carriers such as electricity or heat. An even narrower interpretation is adopted in France, where combustion installations cover only those from the energy sector and combustion installations from the industrial sector are entirely left out. The treatment also differs among member states in the accumulation rule that governs which of the installations whose capacities are below the 20 MW threshold or other production thresholds have to be accumulated and to be included in the EU ETS. As a result of these different treatments of otherwise equal installations, the entire chemical sector falls under the Directive in the Dutch NAP, whereas France leaves out its entire chemical industry in its NAP, with Germany and the UK covering a part of the chemical sector. These different allocations not based on an EU-wide consistent rule are troublesome particularly in the first trading phase 2005-2007 in which member states do not have quantitative emissions targets, because the installations covered in the NAPs face mandated emissions caps whereas emissions sources outside the trading scheme are not capped. For sectors like the chemical sector whose competition is severe among EU member states, an inconsistent implementation of the ET Directive would create damaging competitiveness distortions in the EU internal market. To avoid severe competitiveness distortions, an EU-wide allocation procedure with clear definitions of installations needs to be established.

5. Energy mix and national security

Some member states have decided to gradually phase-out nuclear power without climate concerns. These countries have to find ways to fill the demand gap left over by the nuclear phase-out. Depending on the replacement options, a nuclear phase-out might lead to an increase in greenhouse gas emissions and thus creates an additional difficulty for these countries to meet their emissions targets. Given this, these countries might need to re-consider their phase-out plan and reverse their decision to phase-out nuclear power. If not possible, the replacement of nuclear power with gas-fired power is one option in the short and medium-term. This will increase demand for natural gas and its share in the energy mix. However, the EU Directives for Electricity and Gas, among others, prescribe the rules for market opening and third party access to have fully opened energy market. This liberalization within the EU, combined with gradual reduction in subsidies for the domestic supply in the Russia (the large gas supplier to the EU market) and the expected, low prices of allowances, will put a downward pressure on the natural gas price and thus helps to reduce its price volatility.

From the perspective of reducing greenhouse gas emissions, the replacement of nuclear power with renewable-based power is preferable to its replacement with gas-

fired power. Although the current ET Directive does not specifically address renewable energy, renewable energy benefits from the fact that no allowances need to be obtained and surrendered for producing renewable-based power. By contrast, such allowances imply increased opportunity costs for those producers using fossil fuels. These increased opportunity costs will be reflected in market prices to the advantage of renewable-based power producers. In the mean time, the EU needs to further strengthen public service obligations on companies operating in the EU market regarding minimum shares of renewable energy or electricity and the share of combined heat and power production under the EU Directives for Electricity and Gas and the fixed feed-in tariff system to stimulate renewable electricity production. Needless to say, some renewable-based power production systems are more vulnerable to weather conditions. Severe weather conditions might lead to the interruption of their operations. However, it should be stressed that this risk is not a consequence of the EU ETS per se, but of the production systems themselves. Renewable-based power producers need to seek every means against various risks including this weather-related risk. Interconnecting with big grids connecting many countries is certainly one way to insure the risk.

In allocating the total amount of emissions allowances to the covered installations, it is important to make an appropriate reference to historical emissions. Using an average value of emissions over several years and eliminating extreme years as a reference will smooth out the effects of short-term events such as fluctuations in economic performance and/or certain extreme weather conditions, and thus is better representative of normal operations. Turning into future, the Linking Directive allows the use of CDM credits from 2005 onwards. This will help the covered installations to alleviate the problem in facing extreme weather conditions. In case natural disasters arise from extreme weather conditions, certain remedy measures could be taken. As specified under the ET Directive, Article 29 allows the issuance of additional non-transferable allowances in exceptional and unforeseeable circumstances in the first trading phase. But to avoid a stalemate in which every country claims its unique circumstances, avoid uncertainty in the allowance market and potential effects of any applications of such allowances, the circumstances under which *force majeure* are demonstrated need to be carefully determined at installation level and the corresponding decision needs to be made on a case-by-case basis.

The practice of linking natural disasters with energy security is not without the precedent. According to the CNN Money on 23 September 2004, the U.S. plans to loan out a limited amount of crude oil from the nation's strategic reserve in response to the physical disruption of offshore oil production and imports in the Gulf Region caused by Hurricane Ivan's destruction. The strategic reserve sited in underground salt caverns in Texas and Louisiana was created by the U.S. Congress in 1975 after the Middle East oil embargo, in a bid to protect American consumers against supply disruptions, including natural disasters. The last time U.S. loaned oil from the reserve was in late 2002, when Hurricane Lili disrupted shipments into the Gulf Coast distribution hubs. The U.S. Department of Energy said that the oil to be loaned would be returned after supply conditions return to normal. From these two examples, it can be suggested that in case the covered installations face extreme weather conditions, which need to be carefully determined as discussed above, they could loan a certain amount of allowances from the national authority. They are required to return these loaned allowances in the subsequent years. Implementing this kind of borrowing in exceptional and unforeseeable circumstances requires an amendment to Article 29 of the ET Directive. But in my view, this option is superior to just issuing additional

allowances, because it provides some disincentives for the installations affected to request the issue of additional allowances. If adopted, the option can maintain the environmental integrity of the EU ETS and in the mean time, helps to alleviate the short-term difficulty of the covered installations.

6. Incentives for technological innovation

It has been widely recognized that a ETS can act as a continuous incentive to search for a cleaner technology, while for the command-and-control regulations, there is no incentive for the polluters to go beyond the standards, unless the standards are continually revised and set slightly above the best available technologies. Thus, a ETS has a *technology-forcing characteristic.* By attaching a price to carbon allowances, the EU ETS will provide a continuous incentive for technological innovation. Indeed, the ETS is very much designed as a technological driver for long-term emissions abatement improvements from energy and industrial sources. As such, no recognition is given to CDM/JI credits from sinks projects in the EU ETS, partly because such projects that don't achieve permanent emissions reductions from sources do not bring technological transfer or development, and partly because the recognition of such credits would reduce overall, domestic abatement efforts of energy and industrial emitters, which would in turn lead to less incentives for these emitters to undertake technical innovation. Moreover, in order to ensure the supplementarity under the Kyoto Protocol, member states would be required to meet half of their commitments through domestic abatement actions. This requirement would constrain the quantity of CDM/JI credits to be imported into the ETS. This constraint may help the market price for EU allowances not to fall below the price of CERs, thus providing some incentives for domestic actions and innovation efforts in new energy technologies within member states.

However, actual implementation has put a downward pressure on the market price of allowances and thus limits its role in promoting technological innovation. Some member states have allowed generous allocations. As a consequence of rather lenient caps on the covered installations, they reduce the scarcity in the market and thus lower the market price for EU allowances, which has dropped from above €13/tCO2 in mid-February 2004 (when the UK issued its draft NAP that was perceived as rather tight) to below € 7/tCO2 in the course of May 2004 following the submission of the German draft NAP. As a consequence, little incentives are created within the EU for technological innovation, which is considered a key to fighting against climate change over the medium to long term. Moreover, such incentives are further undermined by uncertainties over the structure of a future international climate regime and the form and level of commitments beyond 2012 in that regime. These uncertainties will constrain EU member states in planning for the next phase of the EU ETS. They also undermine the incentives for European industries to make technological innovation and invest in the most promising emissions abatement technologies.

7. Concluding remarks

The EU ETS will be the first transnational CO2 emissions trading scheme in the world. By setting uniform, mandatory excess emissions penalties well above the prevailing price of allowances, and imposing mandatory emissions monitoring requirements, this scheme clearly builds on many of the lessons learned from earlier experience with

emissions trading programs. It covers more industrial sectors and has more regulated sources than existing U.S. SO2 trading program. Its structure is also more decentralized than that of U.S. SO2 trading program. Moreover, the scheme incorporates a variety of new features to further lower the overall compliance costs, e.g. allowing CDM credits to be converted into EU allowances and providing the possibility for member states to undertake a modest experiment with auctions. In my view, the EU ETS is well designed with respect to efficiency.

That said, my biggest concern is about implementation. On timing, the ET Directive has set very tight timeframe to put the ETS into operation. As a crucial step, each member state is required to submit its NAP by 31 March 2004 for the fifteen "old" member states and 1 May 2004 for the ten "new" member states. Given the number of the covered installations involved and extensive domestic consultation procedures, almost all member states had difficulties in meeting these deadlines, and some even failed to meet these deadlines. This delay in the submissions of the NAPs raises the question of whether the ETS will be able to go ahead as scheduled.

On allocations and enforcement, the two crucial elements for the overall scheme, the ET Directive gives considerable flexibility to member states to develop specific allocation and monitoring procedures. The Directive also delegates emissions verification to the member states but without imposing uniform, mandatory standards. All this decentralized design could lead to an inconsistent and uneven approach to allocating allowances and enforcing compliance among member states, thus creating damaging competitiveness distortions in the EU internal market.

In addition, there are numerous uncertainties and other external events beyond the EU control that will further complicate the implementation of the EU ETS. Perhaps the most significant uncertainties are about the structure of a future international climate regime and the form and level of commitments beyond 2012 in that regime. These uncertainties will constrain EU member states in planning for the next phase of the EU ETS. The lead times required for CDM projects and the current highly debatable process to review and approve CDM by the CDM Executive Board also raise the uncertainty over whether there will be sufficient amount of credits available for meeting the EU demand.

In summary, implementing any new, major initiatives is not an easy matter. There is no exception for the EU ETS. It is expected that there is significant leaning-by-doing in the initial years of implementing the scheme. Further fine tuning of certain elements in the scheme is thus expected to enhance its effectiveness. Whatever happens, the stakes are certainly high for the EU, because it carries out the world's unprecedented, grand policy experiment aimed to find ways to substantially reduce greenhouse gas emissions at the lowest cost. But the stakes are high for the rest of the world as well, because the outcomes of this experiment might affect its decision on whether to follow suit to set up similar programs.

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