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Options and Implications of Linking the EU ETS with other Emissions Trading Schemes

Note

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Executive Summary

Since the EU has established a downstream cap-and-trade emissions trading scheme (ETS), the question of linking the EU ETS with other emerging domestic emissions trading schemes has come on the political agenda. In the present briefing note, different options of linking the EU ETS with other emissions trading schemes are quantitatively and qualitatively assessed, as well as the economic and environmental impacts and the design implications of these options.

Economic analysis shows the important role of cap-setting and global emissions constraints for the economic impacts of linking the EU ETS internationally. In order to be environmentally effective and economically attractive, a recommendable emissions trading scheme should either strictly cap the covered industries based on their relative marginal abatement costs compared to the non-trading sectors or be extended to all emitting sectors of the economy. In this case an international linkage of trading schemes induces substantial economic benefits in terms of lower compliance costs.

The institutional analysis shows that several design issues of emerging schemes have important implications for the equity, the economic and the environmental effectiveness in a combined scheme. Most importantly, price caps and safety valves as envisaged in Australia, Canada, and some US proposals are inflationary devices that put shielding the participants from costs ahead of the environmental objective. Through linking, the price caps or safety valves would effectively cap prices for the combined system and emissions would probably be higher than if the EU ETS continued to operate separately. In the case of Canada, the problem is further exacerbated by the envisaged relative targets. From the climate protection point of view it is therefore not advisable to link the EU ETS to these systems as long as these features are retained.

All of these problematic issues fundamentally flow from countries' level of ambition as regards climate protection. If environmental effectiveness is the main priority, the route leads clearly to stringent absolute targets with reliable monitoring, reporting and verification and strict penalties. Such a system will also be careful to allow only high-quality offsets to count towards compliance. By contrast, features such as relative targets, weak emission caps, price caps or safety valves and a generous recognition of offsets sacrifice environmental effectiveness for the sake of containing costs.

Through linking, these cost-containment measures will also impact all other linked systems and impair their environmental integrity and effectiveness. Linking should therefore only be sought between countries which have a comparably ambitious climate policy outlook. Given this state of affairs, the EU should pro-actively engage with the non-EU countries to try to harmonise their developing national emissions trading schemes with the EU ETS. It may also be advisable not to link to non-EU systems as soon as they become established but to first monitor their performance for a while.

The linking of the EU ETS to an US trading scheme might represent a vital component to re-engage the world's largest emitter in the international efforts to mitigate climate change. Additionally, early linkages between trading schemes will be crucial for the development of entity-based international emissions trading, which would provide an institutional substructure to the Party-based international emissions trading based on Article 17 of the Kyoto Protocol.

However, linking requires not only agreements on how the link will be designed but also how the environmental effectiveness of schemes to be linked can be sustained in the long term. This will likely require the establishment of an international institution such as a clearing house or regulatory board in order to avoid reductions in the environmental effectiveness of linked schemes and reassure all stakeholders that the schemes are and continue to be comparably stringent.

1 Introduction

Since the adoption of the Kyoto Protocol in 1997, the establishment of a harmonised international carbon market is seen as as one of the main strategies in international climate policy. So far, however, the state of the market is far from being globally harmonised or systematically linked as, for example, optimistically suggested e.g. by Wicke (2005). Instead, a mosaic of markets has been under development, differing in timing, location, relationship to the Protocol and their levels of legal commitment. While the traded commodities may seem identical (e.g. metric tonne of CO_2 equivalent), covered trading sectors and agents can be quite different (Bell and Drexhage 2005: 6).

With the introduction of domestic emission trading systems (ETS), countries are breaking the compliance mechanisms of the Kyoto Protocol down to the national level. Under the Kyoto Protocol, every Party listed in Annex B (mainly the traditional "industrialised countries") has taken on a quantified emissions target to limit greenhouse gas (GHG) emissions during the first commitment period from 2008-2012. The resulting emissions budget is referred to as the "assigned amount" of emissions and expressed in Assigned Amount Units (AAUs), measured in tonnes of CO_2 equivalent (CO_2e). According to Art. 17 of the Protocol, Annex B Parties whose emissions overshoot their assigned amount can acquire AAUs from other Annex B Parties whose emissions stay below their targets, add them to their assigned amount and thus bring their emissions account back into balance. They can do the same with the emission credits generated by the Kyoto Protocol's project-based mechanisms, namely Emission Reduction Units (ERUs) generated by Joint Implementation (JI) projects carried out in Annex B Parties, and Certified Emission Reductions (CERs) generated by Clean Development Mechanism (CDM) projects carried out in Non-Annex B Parties (developing countries).

Figure 1: Annex B Countries with (Emerging) Emission Trading Schemes

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Subsequently, the Marrakesh Accords from 2001 laid down the detailed procedures, modalities and rules governing the functioning of international emissions trading. Significantly, they provide that each Party may authorise legal entities for participation in emissions trading. However, the Party will remain responsible for meeting the national Kyoto cap.[1] Originally, the aim was to establish a global entity-level emissions trading system on the basis of Article 17 of the Kyoto Protocol, as also reflected in the European Commission's 1998 communication on a post-Kyoto EU strategy (European Commission 1998: 17). However, these discussions at the international level turned out to be very protracted and so the bottom-up initiatives to establish domestic trading schemes highlighted above have come to the fore.

Economic theory suggests that efficiency would increase if these trading systems were linked with each other. The inclusion of more participants entails a greater diversity of sources and more abatement options. This should in turn lead to improved market liquidity and result in a more efficient allocation of resources towards least-cost abatement measures and thus lead to lower overall compliance costs (Haites and Mullins 2001; Anger et al. 2006, Anger 2007).[2]

Moreover, while linking is generally considered environmentally neutral as it does not affect the aggregated emissions of both schemes, enhanced cost-effectiveness may render additional environmental efforts politically acceptable. Linking the emerging domestic systems would also be politically significant since thus the top-down approach of the Kyoto Protocol would be underpinned by a bottom-up process which might serve to further strengthen the Kyoto regime via bi- and plurilateral agreements. Accordingly, Article 25 of the EU emissions trading directive provides for agreements to be concluded with non-EU countries in this regard.

The European Parliament has invited the Wuppertal Institute to deliver a briefing note on the "Options and Implications of Linking the EU ETS with other Emission Trading Schemes" for the European Parliament - Temporary Committee on Climate Change. The present briefing has been requested in the context of its 6th Thematic Debate on "How to engage other main actors - climate change, adaptation in third countries and global security" (to be held in March 2008).

The briefing note covers the following aspects:

- the different options of linking the EU ETS with other emissions trading schemes
- the economic and environmental impacts of these options
- the design implications of these options in particular in light of the EU ETS revision
- the policy recommendations for engaging towards these options: institutional, legal and political dimensions

[1] Decision 18/CP.7. Modalities, rules and guidelines for emissions trading under Article 17 of the Kyoto Protocol, FCCC/CP/2001/13/Add.2, 21 January 2002, para. 5.

[2] However, despite these gains at the macro level, linking will inevitably create winners as well as losers at the micro level. While net sellers in a domestic emissions trading scheme with low permit prices will benefit from a linkage to a scheme where the allowance price for allowances is higher, the opposite is true for buyers in the first scheme. At the same time, net buyers in the high-price scheme win from linking, whereas sellers in this scheme lose.

2 Background: Current Status of Emissions Trading in Non-EU Countries

Apart from the EU, also several other industrialised countries or regions at the sub-national level have started political discussions and initiatives on the establishment of domestic emissions trading systems. A wide spectrum of designs and options will be, or has already been, established, reflecting country-specific interest structures, energy supply and emissions structures as well as country-specific paths and cultures of climate policy. Within Europe the emissions trading scheme in Norway has been designed very similarly to the EU ETS. From 2008, Norway has adopted the EU emissions trading directive in full and linked its ETS to the EU ETS.

Switzerland, has also introduced an ETS which rests on a CO_2 tax of currently 12 Franks (about 7.6 EUR), which can be tightened if emissions do not fall below certain tresholds in the next years. Companies (or groups of companies) are allowed to exclude themselves from the tax if they take part in a Swiss cap-and-trade emissions trading scheme instead. In this case, companies have to assume a legally binding target for reducing their energy-related CO_2 emissions for 2008–2012. If a company does not meet this target, it will have to pay the CO_2 tax instead, but not only for the compliance shortfall but for all of the CO_2 it emitted since exemption from the tax was granted.

Canada announced the implementation of a domestic emissions trading scheme already in its 2002 Climate Change Plan. After a long hiatus due to a government change in January 2006, in April 2007 the new government proposed a Regulatory Framework for Air Emissions that basically returned to the emission tradings plans of the previous government. The scheme to be launched will cover large final emitters (LFE) in the thermal electricity sector, the oil and gas sector as well as the mining and manufacturing sector. In difference to the cap-and-trade approach chosen in the EU ETS, however, the scheme in Canada will be a mandatory credit-and-baseline system with relative targets at the entity level.

In **Japan**, emissions trading faces massive opposition from industry and the economic ministry. The Ministry of the Environment therefore decided to launch a small voluntary pilot emissions trading scheme in 2006 combining emissions trading with subsidies.

While not having ratified the Protocol, the **United States** have already gained experience with a number of voluntary and mandatory non-GHG emissions trading systems. All initiatives to establish a mandatory cap-and-trade ETS for GHGs at the federal level have so far failed, though. At the state level, however, initiatives have been more successful, such as the schemes in Massachusetts (since 2002) or New Hampshire. In 2003, nine north- and middle-eastern states of the US set out to create the Regional Greenhouse Gas Initiative (RGGI), a mandatory multi-state cap-and-trade programme with absolute targets. A similar initative has started on the West Coast (Western Climate Initiative). In parallel to these sub-national activities, the emissions trading debate in the US Congress continues to intensify, with various bills having been proposed both in the Senate and in the House of Represenatives.

In **Australia**, the previous federal government refused to ratify the Kyoto Protocol and for a long time also rejected emissions trading. In reaction, state and territory governments established a National Emissions Trading Taskforce to investigate a national emissions trading scheme. In August 2006, the Taskforce issued a Discussion Paper outlining detailed plans for a state-level ETS to be introduced in 2010. The envisaged scheme would be based on the cap-and–trade model with absolute targets. Covered entities would also be able to use domestic offsets for their compliance.

In the meantime, the then Australian Prime Minister also established a Task Group on Emissions Trading, which delivered its report on 1 June 2007. The report recommended the introduction of an Australian ETS with "maximum practical coverage of all sources and sinks, and of all greenhouse gases" starting in 2011. In practice, this would mean downstream coverage of direct emissions from large facilities and upstream coverage of fuel suppliers for other energy emissions. The scheme is furthermore recommended to include domestic and international offsets as well as a 'safety valve' to limit costs. The recent change of the federal government, which was immediately followed by ratification of the Kyoto Protocol, can be expected to accelerate the establishment of an Australian ETS.

Discussion in New Zealand are very advanced. The "Climate Change (Emissions Trading and Renewable Preference) Bill" was introduced in Parliament in December 2007. The NZ ETS is supposed to progressively cover all economic sectors and gases regulated by the Kyoto Protocol through a mix of upstream and downstream coverage, starting with the forestry sector in 2008 already. Entities could use not only CDM and JI credits but also AAUs for compliance, except for sink credits. Entities failing to submit sufficient trading units would need to make up for the shortfall and pay a penalty of 30 NZ-$ (about 15.5 EUR).

3 Options of Linking the EU ETS with other Domestic Emission Trading Schemes

"Two national emission trading schemes are linked if one country's allowance can be used, directly or indirectly, by a participant in the other country's scheme for compliance purposes" (Haites 2003). As already indicated by the words "directly or indirectly", links between emission trading schemes may take a variety of forms, both regarding the nature of the link and its legal form.

As for the nature, there are two basic options: direct and indirect links. Each of these contains a number of sub-options.

Direct linking means to allow regulated entities to directly purchase and use allowances from another trading scheme for their domestic compliance obligations. Available sub-options are:

- A **full bilateral or multilateral link** where allowances may be freely traded between two or more systems and each system's allowances are equally valid for compliance in all other systems. An example for a full multilateral link of several national schemes is the EU ETS.
- A **bilateral or multilateral link channelled through an intermediary.** For example, markets may be linked via each country's governments under Art. 17 of the Kyoto Protocol. Under such an approach, an entity in scheme A wanting to sell allowances to scheme B would hand the respective amount of allowances to its government. The government would convert these allowances into assigned amount units (AAUs) and transfer them to the government of scheme B. Government B would then convert these AAUs into its national allowances and issue them to the buyer. Another example is to establish a link via a mechanism called a "gateway". Gateways might be established to serve a variety of purposes, as will be outlined in section 4.2.
- A **unilateral link** where entities in system A can purchase and use allowances from system B for compliance but not vice versa.

As to the legal form of direct linking, there are three distinct options (adapted from Mehling 2007):

- A link could be established through a **formal and binding international treaty** between the governments involved. This approach would require a lengthy negotiation and ratification process but provide a high degree of legal certainty and transparency. Also, treaties can only be concluded by formal subjects of international law, precluding treaties with sub-national trading schemes. Nevertheless, given the economic implications a formal treaty will probably be the option of choice and is in fact the approach foreseen in Article 25.1 of the EU emissions trading directive. After conclusion of the treaty, each partner's respective emissions trading legislation would need to be amended to allow their entities to purchase allowances from each other's system and use them for compliance.
- Alternatively, governments may come to an **informal agreement** to amend their respective emissions trading legislation. A formal way of documenting an agreement could be for example a joint political declaration or a memorandum of understanding. A country could also unilaterally decide to amend its legislation to allow the use of allowances from another system. This would be the approach to be taken for establishing a unilateral link. For example, the RGGI scheme foresees to allow the use of EU allowances under certain conditions.

- Finally, in the absence of a formal link private market participants could **use private law to bridge trading schemes** by creating a system for the conversion of units. This bridge would rest on the vital distinction between *trading*, in which basically anyone can participate, and *transfers*, which are usually only open to markt participants. In fact, history has already provided an example of a swap between two private companies bridging the trading schemes of Denmark and the UK in 2002.

Indirect links occur when two schemes A and B are linked to another system C but not to each other. If for examle the EU ETS was linked to a system in the USA and a system in Australia, developments in the USA and Australia would have an impact on each other even if they were not formally linked. In fact, most emerging emission trading systems will probably be indirectly linked through the Kyoto Protocol's CDM because most systems plan to allow regulated entities the use of the CERs.

4 Economic and Environmental Impacts of Linking

4.1 Economic Impacts

The economic impacts of the linking of the EU ETS with entity-based schemes in other Annex B countries have been assessed especially by Anger et al. 2008.

It bears noticing that the economic modelling in this context assumed a "standard" linking model where all countries' trading systems are designed similarly to the EU ETS and where full links between all participating countries are established. The subsequent sub-chapters will therefore discuss environmental and economic implications of cases where other systems are designed differently from the EU ETS or where other linking options are pursued.

Anger used a numerical multi-country equilibrium model of the world carbon market based on marginal abatement cost functions (SIMAC, see Anger 2007). The model was used to simulate economic and emission effects of alternative scenarios of linked emissions trading schemes. For an adequate reproduction of national schemes, the model divided the various national economies into the energy-intensive sectors covered by the EU emissions trading directive (in the following referred to as **DIR sectors**) and the remaining sectors not covered by the directive, such as the household or transport sectors (in the following referred to as **NDIR sectors**). The model thus assumes a similar sectoral coverage of the trading systems in other countries as in the EU ETS.[3]

The key parameters for the economic modelling were:

- The **stringency of the national emission reduction targets**. Here two cases were distinguished: First, relatively *weak targets* based on the assumption of low political ambition to combat climate change (here: an extrapolation of the national targets under the Kyoto Protocol), and second, *strong targets* in line with stabilising the atmospheric concentration of greenhouse gases (GHGs) at 450 ppm CO_2e. Stabilisation at 450 ppm is the minimum requirement for keeping global temperature change below 2°C, as aimed for by the EU.[4]
- The **distribution of the national emission reduction targets** between the trading (DIR) and the non-trading (NDIR) sectors. Here as well two cases were distinguished. The first case is a relatively weak cap for the emissions trading sector, lying in between the the caps in the first phase of the EU ETS from 2005-2007 and the second phase from 2008-2012 (scenario "NAP EUROPE"). This implies that most of the abatement effort required to reach a national Kyoto target will need to be undertaken by the remaining NDIR sectors. The second case is an economically optimal distribution of the necessary effort among sectors which ensures that marginal abatement costs are equalized across DIR and NDIR sectors ("NAP OPT EUROPE").

[3] Regional and sectoral marginal abatement cost functions were generated using data of marginal abatement costs and the associated emissions reductions as simulated by the energy system model POLES (Criqui et al. 1999). The coefficients for marginal abatement cost functions are estimated by employing an ordinary least squares (OLS) regression for the simulated data pairs of tax levels (marginal abatement costs) and respective abatement. The detailed least-square estimates of marginal abatement cost coefficients for various regions in 2010 and 2020 can be found in Anger et al. (2006).

[4] The detailed national emission reduction targets and regional ETS caps are presented in Anger et al. (2008).

- **Which countries** the EU ETS would link to. Here, three cases were distinguished: first, no linking at all, corresponding to the EU ETS itself (scenario "EUROPE"), secondly, progressive linking to all Annex B countries that had ratified the Kyoto Protocol by 2006, i.e. Annex B parties excluding Australia and the USA ("KYOTO"), and third, progressive linking to all Annex B countries ("ANNEX B").

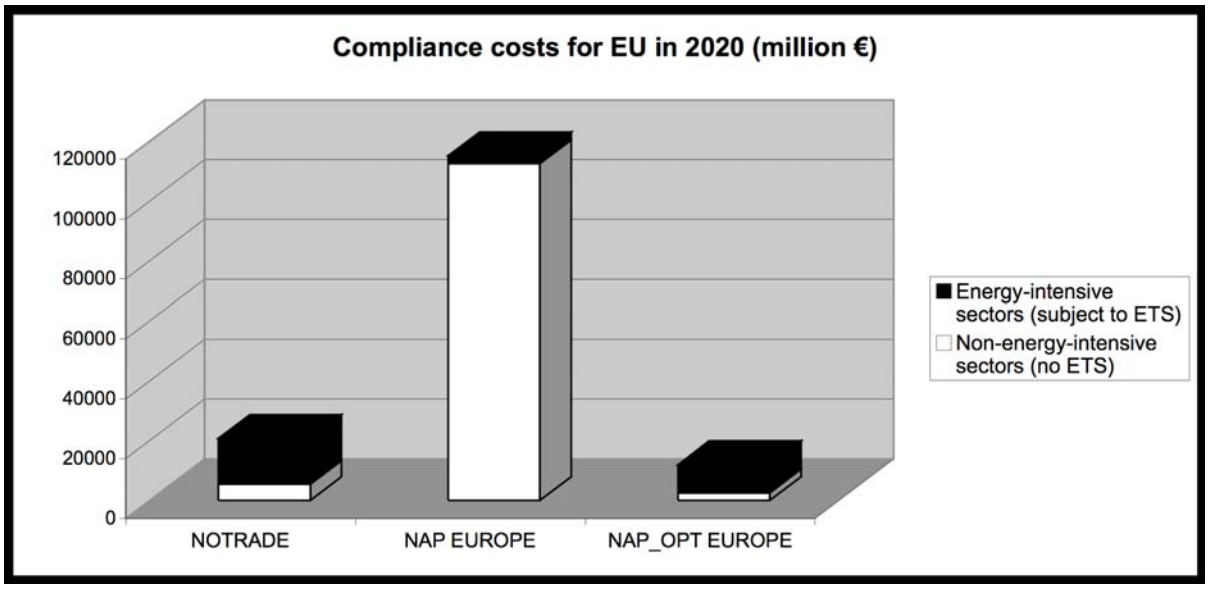
Out of the numerous scenarios that result from the different possible combinations of these variables, in the following we will focus only on the key results.

Scenario 1: Weak Cap and no Linking of the EU ETS to Other Countries

First of all, the modelling results show that with weak caps for the DIR sectors, total compliance costs *with* emissions trading would be higher for the EU than if the EU member states implemented efficient (i.e. sectoral uniform) national carbon taxes instead of emissions trading (NOTRADE). This is due to the relatively high marginal abatement costs of the non-trading NDIR sectors which would in the NAP EUROPE scenario have to account for almost the whole reduction requirement.

Figure 2: Total compliance costs for the EU in 2020 (without linking)

Source: Anger et. al. 2008 **Wuppertal Institute 2008**



In the case of optimal cap-setting (NAP OPT EUROPE), the DIR sectors would carry the major part of the compliance effort, in line with their relatively low marginal abatement costs when compared to the NDIR sectors. In this scenario, the efficiency advantages of trading would make themselves felt, leading to even lower overall compliance costs than in the NOTRADE scenario.

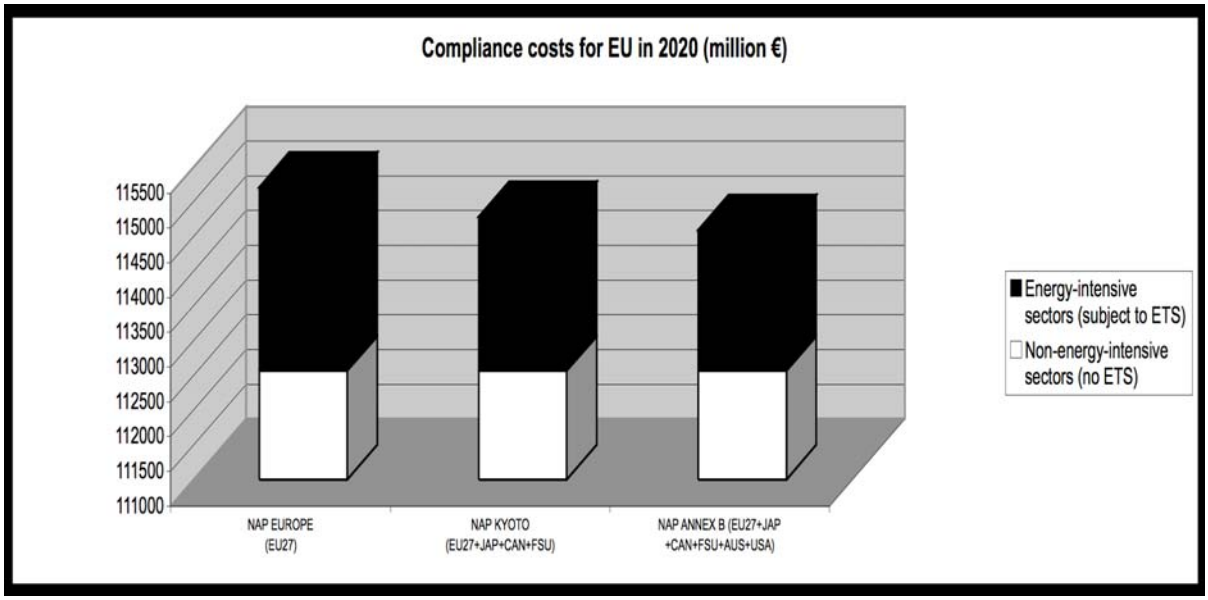
Scenario 2: Moderate Targets for 2020 and Linking to Annex B Countries

In the case of linking the current EU ETS with other emerging schemes in Annex B countries under moderate targets and economically inefficient (weak) cap-setting, compliance costs will be reduced only slightly through linking, as shown in Figure 3. **Error! Reference source not found.**Since with inefficient cap-setting the major part of the emission reduction effort is carried by the high-cost *non-trading* NDIR sectors, the efficiency benefits from linking all countries' DIR sectors only apply to a minor fraction of the total reduction requirement. Linking does reduce compliance costs, as seen when comparing the bars for the EUROPE, KYOTO and ANNEX B scenarios, but not significantly.

Given optimal cap-setting within the domestic emissions trading systems, however, linking ETS causes a much stronger fall in compliance costs for the EU. In such an economically efficient setting, the benefits from linking are greater since the major part of the emission reduction requirement is now carried by the trading DIR sectors, which have lower marginal abatement costs than the NDIR sectors and can mobilise the benefits of trading. The efficiency effect is the stronger the more countries participate in the joint trading scheme.

Figure 3: Compliance Costs for the EU in 2020 in Different Linking Scenarios

source: Anger et al. 2008 **Wuppertal Institute 2008**



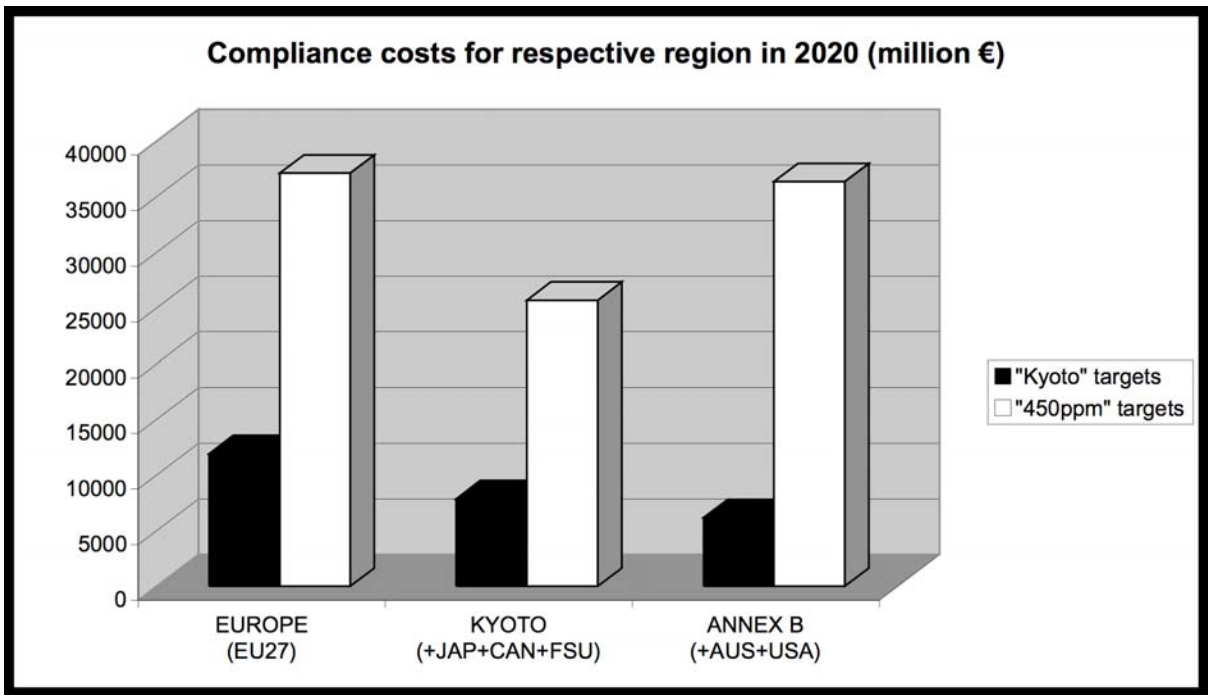
Scenario 3: Stringent 450 ppm targets by 2020 and Linking to other Annex B Countries

Finally, we analyze the linkage of emissions trading schemes in the context of reduction commitments that relate to a global 450 ppm CO_2 stabilization.

Figure 4 compares the simulation results for relatively weak "Kyoto" targets and stringent 450 ppm targets.

Figure 4:Total compliance costs for respective region from linking in 2020 (optimal cap-setting) for "Kyoto" and "450 ppm" targets

source: Anger et al. 2008 **Wuppertal Institute 2008**

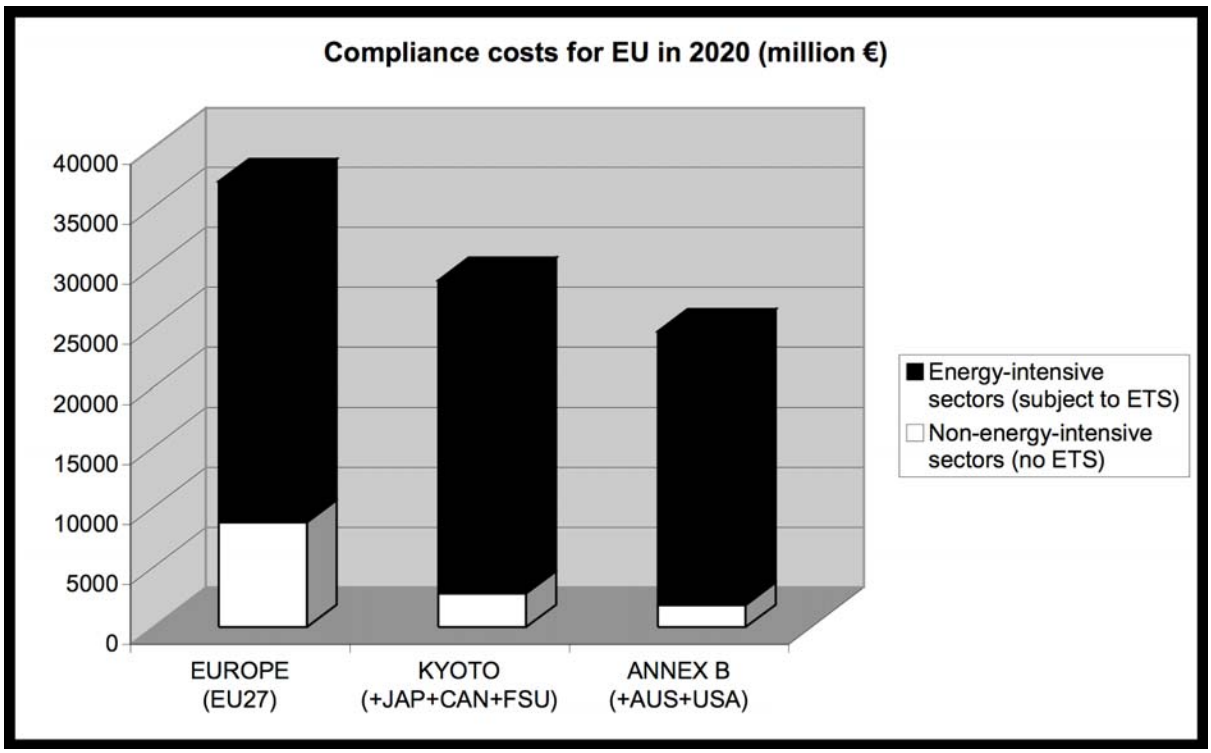


As expected, we find that committing to global reduction targets which are compatible with stabilizing CO_2 concentrations at 450 ppm in 2020 more than proportionally increases compliance costs compared to the scenario with weak targets. This effect is due to positively sloped marginal abatement cost functions: The higher the emissions abatement level, the more expensive abatement becomes at the margin. Comparing the compliance costs of the scenarios KYOTO and ANNEX B under the two target scenarios shows that while under weak "Kyoto" targets the costs for ANNEX B linking, i.e. including Australia and the USA, are lower than for KYOTO, compliance costs under "450 ppm" targets are higher for ANNEX B than for KYOTO. These reversed effects are due to the relatively heavy tightening of reduction commitments for the linking candidate USA implied by "450 ppm" targets as compared to "Kyoto" targets: since US emissions have risen considerably since 1990, achieving stabilisation at 450 ppm will require quite drastic emission reductions by 2020, leading to relatively high compliance costs for the USA, and by extension for ANNEX B as a whole.

However, focusing on the economic impacts on the EU, Figure 5 illustrates that the high compliance costs associated with an ambitious climate policy of stabilising CO_2 concentrations at 450 ppm can be alleviated by linking ETS: Given an efficient domestic cap-setting, adjustment costs for the EU are decreased considerably.

Figure 5: Compliance costs for the EU from linking in 2020 (optimal cap-setting) for "450 ppm" targets

source: Anger et al. 2008 **Wuppertal Institute 2008**



4.2 Economic and Environmental Impacts of Differing ETS Designs

As noted, the economic modelling assumed that all countries' trading systems are designed similarly to the EU ETS. In fact, however, some of the systems currently emerging feature some characteristics that are quite distinct from the EU ETS.

Linking the EU ETS to a system that is designed differently may in some cases impair rather than enhance its efficiency and environmental effectiveness. The following will therefore discuss the potential impacts of different designs (Sterk 2006, Sterk and Schüle 2008). Potential issues include:

- the GHG and industry sector coverage;
- the definition and recognition of trading units;
- the setting of targets and the allocation of trading units;
- rules for banking and borrowing;
- monitoring, reporting and verification provisions; and
- the compliance framework.

(1) The GHG and Industry Sector Coverage;

Differing sector or gas coverage is not a matter of institutional compatibility, nor does it affect the environmental effectiveness of a linked trading scheme. A constellation where one or more gases or categories of sources are included in one scheme but not in the other raises first and foremost questions regarding competitiveness and gaining the necessary political support for linking under these circumstances. However, competitive disadvantages and possible discrimination due to diverging treatment of sectors in two trading regimes are not caused by linking and would also occur in its absence.

Possible economic discrimination against certain sources can also be mitigated by economically efficient cap-setting: In the optimal case of sharing out reduction efforts according to each sector's abatement costs, which is admittedly difficult to do, the economic impact would be the same as in an economy-wide emission trading system covering all emitters. Thus, if opposition by stakeholders regarding competitiveness concerns due to unequal treatment of comparable emissions sources can be overcome, differences in the sources covered by two system's coverage should not impede linkages.

(2) Definition and Recognition of Trading Units

Trading systems should ideally have the same quantitative unit of trading based on the Kyoto Protocol, namely metric tonnes of CO_2e. Almost all systems currently emerging do in fact rely on this basis. The one exception is the RGGI system which would be based on short tons, which is less than a metric tonne (namely 907.18474 kg). Linking would therefore require an exchange rate.

The recognition of trading units is likely to be at the centre of linking negotiations. For example, if a particular type of unit, such as credits from carbon sinks, is not recognised in one scheme, companies in another scheme, which accepts this unit, could use them for domestic compliance purposes, thus free up 'regular' domestic allowances and sell them to companies in the first scheme. The political decision in the first scheme about which trading units are recognised would thus be bypassed (Blyth and Bosi 2004: 20).

This issue is salient in particular with regard to the use of credits from carbon sinks and domestic offset projects, which the EU ETS currently excludes but most other schemes plan to include. According to the Comission's ETS revision proposal, domestic offset projects may be included in the EU from 2013, but sinks would continue to be excluded (European Commission 2008).

Another problem would arise concerning the New Zealand ETS, which allows the use of AAUs, which the EU ETS does not. This needs to evaluated against the background of the very generous Kyoto targets for the Central and Eastern European Economies in Transition, often referred to as "hot air". Linking to the NZ ETS would allow hot air to enter the EU ETS.

While a scheme with a more narrow recognition of units may take adjustment measures such as the introduction of exchange rates, these would increase transaction costs while producing only limited effects: The scheme's administrators would never be able to tell whether an incoming allowance has maybe been freed up by use of an external trading unit which they themselves would not accept for compliance. The question would therefore probably rather be to which extent the negotiators from both countries would want to maintain their rules for the recognition of units instead of harmonising them for the purpose of linking. If the inclusion of certain units is considered to be intolerable by a scheme with a more narrow recognition of units, the only option to really keep them out would be not to link to schemes which include them.

(3) The Setting of Targets and the Allocation of Trading Units

The kind of target adopted by individual schemes also poses a problem. Two types of targets are conceivable: absolute caps as in the EU ETS, which limit the total emissions during a specified period; and relative targets, which are defined as emissions per unit of output or activity, such as gross domestic product (GDP) or energy consumption, or per unit of input. Thus, under a system with relative targets, GHG emissions may even increase as long as this is justified by an increase of production or GDP.

Linking two schemes that differ in the way the target is determined may actually impair rather than enhance the liquidity of the combined scheme. Relative targets require that allocation takes place in two steps, an initial allocation based on projected production levels and adjustment *ex post* when the actual production levels are known. This is likely to lead to spikes in liquidity at the moment of adjustment. In the case of linkage, these liquidity shocks will also affect the scheme with absolute targets (Choquette 2005: 6).

Linking a scheme with relative to a system with absolute targets also raises concerns of economic equity since companies under the system with relative targets in effect receive a subsidy for increasing their output. This incentive may also compromise the environmental effectiveness of a combined regime because output increases will inflate the number of trading units available (Haites and Mullins 2001: 48f).

In fact, linking as such will have an impact on emissions, the direction of which depends on the allowance prices in the two schemes: If the price in the system with relative targets is lowered by linking, production and energy use will be stimulated, which will lead to rising emissions. That is, the environmental effectiveness of emissions trading would be impaired. If the price is raised by linking, the reverse effect will take place.

To solve this problem, Fischer (2003) provides four possible policy solutions:

- Imposing a tax on trade between the two schemes
- Introducing an exchange rate to adjust for relative allowance values
- Adjusting allocation in the scheme with relative targets to account for changes in expectations of growth levels resulting from linkage of the schemes, and
- Tightening the allocation in the absolute scheme

Another possible solution is a gateway approach as used in the UK emissions trading scheme. Under such a mechanism, allowance transfers from a system with relative targets into the other scheme could occur only as long as the total emissions of the former did not exceed a certain ceiling. Yet this concept has its weaknesses, too: most importantly, it would increase the unpredictability of trading as it may be hard to foresee when the gateway will close and thus diminish the liquidity of the combined market (Butzengeiger et al. 2001: 17).

Even though these options would produce environmental benefits, implementing them would introduce additional complexity into the scheme and reduce the efficiency of the market.

While the EU ETS and most of the other planned schemes rely on absolute targets, Canada's plans envisage the use of relative targets. Given the problems outlined above, it could be concluded that linking in this case poses more problems than benefits.

As for the **stringency of targets**, a perfect balance of efforts is very unlikely to be achieved. However, while competitiveness issues would not arise as a result of linking – they would also arise if the two schemes operated separately – it is probably a political precondition for linking that all sides demonstrate efforts to establish comparable caps.

Importantly, though, here as well linking itself changes the rules of the game: Countries will have an incentive to relax their cap in order to become net sellers. To guard against this effect, countries should have a comparably ambitious climate policy strategy and a joint vision of where medium- and long-term emission trends should be headed. It would also be helpful to jointly agree on the caps in all linked systems in order to reassure all stakeholders that no country is trying to take advantage of the others. In the EU ETS, this role is played by the European Commission.

Differences in the **way allowances are distributed** to the companies covered by an ETS usually have no impact on the system's environmental effectiveness since this is solely determined by the overall cap. Moreover, after the initial distribution the carbon price will be independent of the method of distribution and be determined by market supply and demand. Beyond an initial transfer of wealth in the case of free allocation, the method of initial distribution should therefore not affect the competitiveness of the entities. Thus, linking schemes with different initial allocation methodologies should not introduce any additional economic distortion into the combined scheme (Blyth and Bosi 2004: 25).

Difficulties will arise though, if current emissions have an impact on future allocations, for example if allowances for a second trading period are allocated based on the emissions from a new, up-dated base year in the first period. In this scenario, if allowance prices are likely to rise in later periods, companies may choose to avoid emission reductions in the initial phase and instead comply with their targets by purchasing allowances from the market since they can expect that high emissions in the first period will result in a more generous allocation of allowances in the second phase. Linking two schemes where one uses updating and the other does not could result in emissions (and the attendant production) being shifted to the system with updating for the purpose of receiving a more generous allocation. Updating provisions should therefore be harmonised before the systems are linked (Choquette 2005: 9f).

The Swiss system actually provides that companies' emission targets will each year be adjusted to their production growth, with the final adjustment taking place in 2010. The European Commission has rejected such *ex-post* adjustments for the EU ETS. It could therefore hardly defend agreeing to similar provisions in non-EU countries.

(4) Rules for Banking and Borrowing

Banking allowances from one trading period to the next provides emitters with an incentive to overachieve their targets as they can use the resulting allowances at a later date and it gives them additional flexibility to deal with uncertainties such as future production levels. If a scheme which prohibits banking was linked to a scheme which allows banking, the latter would effectively provide a banking option for all the companies on the combined market. But since banking effectively means that more emissions have been reduced than required by the cap, this should not pose any environmental problems. In practice, all emerging schemes are set for allowing banking anyway.

Borrowing – that is to say, delaying reduction measures into future trading periods where they might be achieved more cost-effectively – is not seen favourably from an environmental perspective. First, borrowing entails the risk that mitigation measures may not be taken in future periods either, for example due to lack of enforcement or if a company goes bankrupt. Second, companies may have an incentive to rely heavily on borrowing to artificially raise their future compliance cost curve and then argue that they need softer targets because otherwise the costs would be prohibitive (Boemare and Quirion 2002: 223).

Thus, linking a system without borrowing to a regime that allows borrowing may require restrictive provisions to be taken so as to maintain the environmental effectiveness of the linked trading scheme. One option would be to allow purchases from the scheme with borrowing only after its compliance period has been completed and only from companies that did not borrow, i.e. to allow only ex-post purchases of surplus allowances (Haites/Mullins 2001: 62).

(5) Monitoring, Reporting and Verification and Compliance Framework

Monitoring, reporting and verification (MRV) provisions are crucial for achieving a credible ETS since they are the key to determining whether each trading unit actually corresponds to one tonne of emissions. Slight differences in MRV do not necessarily impact on the effectiveness of a combined trading scheme, but only as long as confidence in the trading units is not undermined by suspicions of under-reporting of emissions (Blyth and Bosi 2004: 28).

From the environmental perspective, the financial penalties for non-compliance should be significantly higher than the cost of allowances, as is the case in the EU ETS. A different philosophy is that of the 'price cap' where paying the penalty exempts companies from submitting allowances. Yet another option for regulators is to establish a 'safety valve'. With this mechanism, the regulator commits to selling allowances at a pre-determined price in whatever quantity is demanded once the market price for allowances rises above a certain level. This mechanism limits the cost of the market participants to the safety-valve level but at the cost of missing the environmental target. One of the main advantages of cap-and-trade emission trading is the ability to precisely define the environmental outcome. Price caps and safety valves crack the cap.

Moreover, if a system with strict penalties such as the EU ETS was linked to a system with a safety valve or where paying the penalty exempts companies from submitting allowances, the safety valve or penalty rate in this system would effectively act as a price cap for the combined system. As long as the market price was higher than the price cap or safety valve level, companies in the price cap/safety valve system would have an incentive to sell their allowances to companies in the other system until prices were equalised at the price cap/safety valve level. The environmental effectiveness of the combined scheme would thus suffer since total emissions would be higher than if the two schemes were kept separate (Blyth and Bosi 2002: 29f). Stakeholders in a scheme with strict non-compliance provisions might also object to linking to a scheme with less stringent provisions (Ellis and Tirpak 2006: 25).

If a link is to be established, there would need to be a limit on the exchange of trading units. The most feasible option would probably be to allow use of the safety valve or price cap only to entities covered by the system that has this feature and only up to the difference between the initial allocation and the actual emissions. This would not block the access to lower market rate allowances totally, but it would limit the amount of additional allowances being traded. However, apart from higher emissions the result of these measures would be a split market once the market price reached the safety valve/price cap level, with prices in the safety valve/price cap scheme staying at the safety valve/price cap level respectively and prices in the other scheme rising further, which would reduce the economic benefits of linking.

Finally, diverging compliance regimes in a combined trading scheme may entail the risk of a 'race to the bottom'. Also for this reason harmonisation of the respective features of two regimes should be sought before linking is considered (Peterson 2003: 10).

The Canadian system as well as several US proposals envisage the use of safety valves while the Australian scheme would include a price cap. However, the prospect of a scenario where the environmental effectiveness of the EU ETS has been compromised by linking it to these schemes – but with limited economic benefits – leads to the conclusion that it would be advisable to keep the systems separate

To conclude, the need for harmonisation varies widely with regard to different design elements. Some design options such as the systems' coverage may raise equity issues and stir opposition from concerned stakeholders. However, they are unlikely to adversely affect the overall effectiveness of the linked regimes. Other aspects have important implications for the equity, the economic and the environmental effectiveness in a combined scheme, namely the definition and recognition of trading units, the nature and the stringency of the targets, the provisions for banking and borrowing, monitoring, reporting and verification and the compliance regime.

It bears noting that all of these issues fundamentally flow from countries' level of ambition as regards climate protection. If environmental effectiveness is the main priority, the route leads clearly to stringent absolute targets with reliable MRV and strict penalties. Such a system will also be careful to allow only high-quality offsets to count towards compliance. By contrast, features such as relative targets, weak emission caps, price caps or safety valves and a generous recognition of offsets sacrifice environmental effectiveness for the sake of containing costs.

Through linking, these cost-containment measures will also impact all other linked systems. Linking should therefore only be sought between countries which have a comparably ambitious climate policy outlook.

4.3 Economic and Environmental Impacts of Different Linking Options

As noted, the economic modelling assumed that all countries' trading systems are fully linked with each other. There are also other options, however, namely links channelled through an intermediary and unilateral links.

Links channelled through an intermediary will inevitably make trading more cumbersome and raise transaction costs. The ability of the market to equalise marginal abatement costs would thus be impaired. However, installing an intermediary would allow a government not to completely give up control of its trading sectors. As noted above, this may be relevant for example when considering a link between the EU ETS and other schemes with relative targets or price caps in order to safeguard the environmental integrity of the EU ETS. There may also be other reasons, for instance where a small system links to a much larger system. The small system's impact on the overall market would be correspondingly small and it would inevitably be the "price taker", i.e. prices would mostly be determined by the developments in the larger scheme. This country's government may therefore wish to retain some control over the market flows through interposing an intermediary.

A gateway or similar mechanism will probably also be required for linking the EU ETS to systems in the USA as long as Washington does not ratify the Kyoto Protocol (see section 5).

The impacts of a **unilateral link** would depend on the allowance price levels in the two systems concerned. If scheme A establishes a unilateral link to scheme B and prices in scheme A are lower, its companies will have no incentive to purchase allowances from scheme B and there will be no trading. If prices in scheme A are higher, its companies will have an incentive to purchase allowances until the prices are equalised. This will have a differentiated impact on the companies in scheme B: net sellers will benefit from the rising allowance price whereas net buyers will suffer. However, this effect will also take place in the case of a full bilateral link. In any case, there is no way scheme B could stop scheme A from establishing a unilateral link. Scheme A can simply decide that acquisition and cancellation of allowances by its companies within scheme B will count towards compliance.

As to the **legal form of linking**, linking via a formal and binding international treaty would obviously be the economically most efficient option since it would provide the highest degree of transparency and certainty to the market participants. Nevertheless, a more informal arrangement to amend each country's national legislation to allow trading and use of each others allowances would, if carried out, also be backed by the force of law. While this approach would have the drawback of theoretically allowing for a sudden amendment or termination of the link by one of the countries, termination is also always an option when concluding a treaty. The actual difference between the two approaches might therefore not be too great.

As noted, even in the absence of a formal link private market participants could use private law to bridge trading schemes by creating a system for the conversion of units. However, this approach would be very cumbersome. It can therefore be expected that not many trades would take place in this way.

By contrast, significant arbitrage can be expected to take place if two schemes A and B are linked **indirectly** with each other via a third scheme C. If both links from A and B to C are bilateral and unlimited, allowances can be traded between A and B via C and prices will converge. The magnitude of the effect will be determined by the size of the allowance pool in system C, since this constitutes the maximum of what can be transferred between A and B, An indirect link will also entail some increase of transaction costs compared to a scenario where allowances can be traded directly between A and B. Even if trades are unidirectional as in the case of the CDM, where actors only sell but do not buy trading units, or if there are other limitations to trading such as gateways, the indirect link of A and B via C will result in some convergence of prices since entities from A and B will compete for units from system C. Some of the economic benefits of direct linking may therefore be realised via indirect linking as well.

5 The Special Case of Linking the EU ETS with Systems in the US

Making Trading Possible

Within the EU ETS, from 2008 onwards transfers of EU Allowances will be transfers of converted AAUs.[5] Probably, the same will be the case for the emerging trading systems of other Annex B Parties or another form of backing up allowances by AAUs will be used. Backing up allowances with AAUs is necessary to stay Kyoto-compliant: Since a net purchase of allowances means rising emissions, it has to be accompanied by a corresponding increase in the stock of Kyoto units. Thus, even if a country were to fulfil its Kyoto target only by purchasing allowances from abroad which are backed up by AAUs, it would still comply with its obligations under the Protocol. The situation would be different, however, with regard to a link between the EU ETS and a trading system in a country that has not ratified the Kyoto Protocol, namely the US

At this point it appears useful to differentiate between the terms "trade" and "transfer" of allowances in emissions trading. As de Witt Wijnen points out, "everyone can trade Kyoto units; but when trade leads to a transfer of allowances, the transfer can be made, as a general rule, only by Parties to the Kyoto Protocol" (de Witt Wijnen 2005: 412).

With regard to allowance transfers between the EU and non-ratifiers two kinds of transactions must be distinguished: transfers of EUAs into the scheme of the non-ratifier as opposed to transfers of allowances from the non-ratifier into the EU ETS.

In line with the difference between "trade" and "transfer" outlined above, it would generally be possible for entities from the non-ratifier to purchase EUAs, provided that they have been authorised for trading by an Annex B Party and dispose of an account in an EU Member State. This would apply, for example, to entities covered by the EU ETS that are subsidiaries of US companies (Fauteux 2002: 2). A crucial problem would, however, occur in the second step – the transfer of EUAs from the EU Member State registries into the registry of the non-ratifier. The Kyoto requirement that transfers of Kyoto units (and EUAs would have to be considered as such, given their equivalence to AAUs stipulated in the EU Registry Regulation) may only occur between Annex B Parties to the Kyoto Protocol would prevent this kind of transaction. It could only be completed if an EUA was stripped of its AAU property when exiting the Kyoto system. However, this would also be problematic since the transferring country would then dispose of a free AAU which it could use to cover emissions in the non-ETS sectors while the EUA could be used to cover emission in the non-Kyoto Party, that is the certificate would be counted twice. The AAU would thus have to be cancelled to ensure the system's environmental effectiveness.

As to the other direction of allowance transactions in a combined ratifer-non-ratifier scheme – the transfer of allowances from the non-ratifiers into the EU ETS – difficulties would arise since the allowances from the non-ratifier would not be backed up by AAUs. In this case, if the EU turned out to be a net importer of allowances, this would inflate emissions in the EU without a corresponding acquisition of AAUs and could thus bring the EU into non-compliance with the Protocol.

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[5] The EU Registry Regulation sets out the details in this regard: From 2008, EU allowances will be issued by converting the corresponding amount of AAUs through adding a specific EU allowance code to the AAU serial number. Subsequently, at the annual surrendering of allowances, EU allowances will be reconverted into AAUs and retired for the purpose of compliance with the Kyoto Protocol. (European Commission, *Commission Regulation for a standardised and secured system of registries pursuant to Directive 2003/87/EC of the European Parliament and of the Council and Decision No 280/2004/EC of the European Parliament and of the Council* (EU 'Registry Regulation'), 2216/2004/EC, 21 December 2004, Art. 45 and 59).

There are three options to circumventing these problems.

- The first option would be to establish only a semi-open link between the trading systems where entities from the non-ratifier countries could only purchase but not sell allowances into the EU ETS. Such a link could actually be implemented unilaterally if a non-ratifier's ETS allowed companies to cancel EUAs within the EU ETS and count this toward compliance in their own system. Norway in fact established such a mechanism pending the negotiation of a full link to the EU ETS and the RGGI scheme also envisages the unilateral use of EUAs. If allowances were to be actually transferred, a gateway mechanism would need to be set up by which outgoing EUAs would be stripped of their AAU property, which would then have to be cancelled to safeguard the system's environmental effectiveness.
- A full link between the EU's and a non-ratifier's ETS would require a similar gateway. Under such an approach, the AAUs stripped from the outgoing EUAs would be put into a specific account and used to back up incoming allowances. Thus, acquisitions from the non-ratifier's ETS could only be completed if there were sufficient AAUs available in the gateway and it would be ensured that the EU would remain a net seller (Wit et al. 2005: 82; Zhang 2003: 17). Such a gateway would certainly diminish the benefits from linking. Nevertheless, it is the only means to avoid that the EU's ability to comply with its Kyoto target is compromised by an inflation of its allowance pool not backed up by Kyoto units.
- The third option would be an amendment of the Kyoto rules. Such an amendment may indeed be necessary for the period post-2012 if the reintegration of the US into the climate regime cannot take place through an immediate accession to the Kyoto Protocol but rather through linking a domestic emission reduction system to the Kyoto system. Such an amendment would then need to stipulate that trading units can be transferred between the US and the Kyoto system and that US allowances would be eligible for Kyoto compliance. However, such an amendment could probably only be agreed as part of a comprehensive post-2012 agreement

Finally, the EU could also adopt a position insisting that ratification of the Kyoto Protocol is a precondition to any linkage. While such an attitude would be understandable given the added difficulties in linking in the absence of ratification, it probably underestimates the political importance such a move would have for the progress of the international climate regime as a whole (Zhang 2003: 16).

Agreeing on the Link

The US Congress has been debating several bills to establish a federal-level US emissions trading scheme for several years already. If these legislative initiatives are successful, a link with such an US ETS could be established via a treaty just as with any other country.

Linking the EU ETS to the RGGI or other subnational US schemes would prove more challenging, though. The US states are not formal subjects of international law and can thus not conclude treaties. Linking would in this case therefore need to take the route of a more informal agreement such as a memorandum of understanding. However, as pointed out above, the practical difference between a treaty and a more informal arrangement may not be too large. One may also wish to weigh the potential political benefit of supporting climate change initiatives in the US against the drawbacks of a merely informal arrangement.

6 Conclusions and Recommendations

Linked Markets Ahead?

A first observation is that implementation of emissions trading is still at a very early stage in most industrialised countries outside of the EU:

- The only other countries that have already implemented a large-scale ETS or are close to doing so are **Norway** and **Switzerland**.
- Discussions in **Russia** and the **Ukraine** are still at a very early stage.
- In **Japan**, emissions trading faces massive opposition from industry and the economic ministry. The environment ministry has therefore so far only been able to establish a voluntary pilot scheme.
- In **Canada**, planning has been severely delayed by the current government. Nevertheless, the establishment of an ETS now seems to be back on track.
- In **Australia**, the previous federal government used to oppose emissions trading but developments can be expected to accelerate under the new pro-Kyoto government.
- In the **US**, the discussion at the federal level is progressing rapidly but the final outcome cannot yet be determined. By contrast, the Regional Greenhouse Gas Initiative is very advanced and expects to launch in 2009.

Economic Implications

Economic analysis emphasizes the important role of cap-setting and global emissions constraints for the economic impacts of linking the EU ETS internationally. In order to be environmentally effective and economically attractive, a recommendable emissions trading scheme should allocate allowances to the covered industries more strictly than in the second trading phase of the EU ETS. The reason is that the covered energy-intensive industries feature lower marginal abatement costs than the non-trading sectors (such as households or transport) and are simulatenously able to benefit from international emissions trading. Alternatively, a recommendable emissions trading scheme should be extended to all possible emitting sectors of the economy. Only then the international linkage of trading schemes can induce substantial economic benefits in terms of lower compliance costs. From an economic perspective, an international ETS linkage is especially beneficial in the context of ambitious global carbon constraints: Given an efficient cap-setting, the high efficiency gains from linking trading schemes considerably decrease the otherwise high compliance costs due to an ambitious international climate policy.

Design Implications

However, several design issues of emerging schemes have important implications for the equity, the economic and the environmental effectiveness in a combined scheme. Most importantly, price caps and safety valves as envisaged in Australia, Canada, and some US proposals are inflationary devices that put shielding the participants from costs ahead of the environmental objective. Through linking, the price caps or safety valves would effectively cap prices for the combined system and emissions would probably be higher than if the EU ETS continued to operate separately. In the case of Canada, the problem is further exacerbated by the envisaged relative targets. From the climate protection point of view it is therefore not advisable to link the EU ETS to these systems as long as these features are retained.

A US scheme along the lines of the Warner-Lieberman proposal or the RGGI scheme would offer better prospects for linkage between the US and the EU. If implemented, both would be mandatory schemes based on absolute targets and with prohibitive penalties for non-compliance, which are among the most critical features to be compatible with the EU ETS. The offset component envisaged by these two systems, however, may give rise to complex negotiations, especially given their strong focus on carbon sequestration.

The Swiss system is also similar to the EU ETS in terms of absolute targets and prohibitive penalties. However, the Swiss system includes sink credits, which the EU ETS excludes, and until 2010 provides for ex-post adjustments of companies' targets, which the European Commission has ruled out for the EU ETS.

The system in New Zealand is also based on absolute targets. However, the non-compliance penalty of about 15.5 EUR is relatively low compared to the EU penalty, even when considering that in addition to the penalty entities will also have to make good the shortfall in allowances. Further issues are the inclusion of the forestry sector in the ETS, which poses considerable methodological challenges as regards quantification, and the recognition of AAUs, which the EU ETS excludes.

As far as the need for a common unit of trading is concerned, almost all systems considered rely on the same quantitative basis, metric tonnes of CO_2e. The one exception is the RGGI system which would be based on short tons. Linking would therefore require an exchange rate.

Apart from the contentious issue of credits from sink projects, allowance trading between the countries that have ratified the Kyoto Protocol would pose little difficulty as transfers of domestic units could be backed up by the Kyoto Protocol's AAUs. By contrast, a link to the US would require gateway mechanisms to avoid that the EU's ability to meet its Kyoto target is compromised by a net inflow of allowances which are not backed up by Kyoto units. While the challenges arising from this are considerable, the political importance of linking to a US system could be tremendous.

It bears noting that most of these problematic issues fundamentally flow from countries' level of ambition as regards climate protection. If environmental effectiveness is the main priority, the route leads clearly to stringent absolute targets with reliable MRV and strict penalties. Such a system will also be careful to allow only high-quality offsets to count towards compliance. By contrast, features such as relative targets, weak emission caps, price caps or safety valves and a generous recognition of offsets sacrifice environmental effectiveness for the sake of containing costs.

Through linking, these cost-containment measures will also impact all other linked systems and impair their environmental integrity and effectiveness. Linking should therefore only be sought between countries which have a comparably ambitious climate policy outlook.

Given this state of affairs, the EU should pro-actively engage with the non-EU countries to try to harmonise their developing national emissions trading schemes with the EU ETS. The EU is already taking steps in this direction, for example through the International Carbon Action Partnership (ICAP). These initiatives should be further pursued and strengthened.

It may also be advisable not to link to non-EU systems as soon as they become established but to first monitor their performance for a while. The EU ETS's own test phase from 2005-2007 highlighted significant potential for improvement, for example as regards the stringency of the caps.

Sustaining the Environmental Effectiveness after Linking

Designing links between trading systems requires not only agreements on how the link will be designed but also how the environmental effectiveness of schemes to be linked can be sustained in the long term (Haites and Wang 2008). This is due to the fact that domestic schemes are not static but will need to revise their regulations periodically in response to technological, economic and other developments.

If schemes are linked, such changes may apply either to all concerned systems or they will apply only for individual schemes. Significant changes to the population of affected sources in one scheme, for example, will be relevant also for all linked schemes. Most importantly, linking itself may lead to changes in the linked systems. For example, linking gives countries an incentive to relax their ETS cap in order to become a net seller.

In order to avoid reductions in the environmental effectiveness of two linked schemes, at least three components appear as desirable (ibid.)

- A process for agreeing on revisions to the regulations of the linked schemes (e.g. by regular meetings or in response to changes within one scheme)
- A mechanism to provide assurance of the environmental effectiveness of each of the linked schemes (e.g. by mutual external verification)
- A procedure for terminating the linking agreement

In terms of the institutional design of such components, Edenhofer et al. (2007: 16f) propose the establishment of an international clearing house to maintain a joint registry and facilitate the harmonization and coordination process. The clearing house (or a board similar to the executive board overseeing the CDM) could serve as forum for regular consultation, periodic review of the linkage and joint publication of sensitive market data such as verified emissions.

Strategic Prospects

Apart from the palpable economic benefits that linking may entail, its importance for the evolution of the international climate regime must not be underestimated.

First of all, linking to an US trading scheme might represent a vital component to re-engage the world's largest emitter in the international efforts to mitigate climate change. It may happen that the US approach to international emissions trading will be to first develop a national programme and then negotiate links with other countries, rather than to first adopt the Kyoto Protocol and then establish and ETS (Kruger and Pizer 2004: 4). Even if a linkage could not be conceived with a federal US scheme, linking to a regional trading scheme would equally be of great significance. A link of the EU ETS to the RGGI scheme would be a crucial sign of political support and might help to boost further state-level activity in the US in this field. The RGGI proposal recognises this potential since already at this early implementation stage it explicitly states that EUAs will be eligible for compliance purposes under the scheme if the price of RGGI allowances reaches a predefined level. Hopefully, this impetus from the regional level will in the longer term also contribute to the urgently required shift in Washington's climate strategy.

Second, early linkages between trading schemes will be crucial for the development of entity-based international emissions trading, which would provide an institutional substructure to the Party-based international emissions trading based on Article 17 of the Kyoto Protocol. As Egenhofer and Fujiwara point out, "if IET materialises only slowly or not at all [...], linking would be a substitute – at least to some extent – for a top-down emissions trading scheme established by international negotiation" (Egenhofer and Fujiwara 2004: 10-11).

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