

# CLIMATE STRATEGIES

## **Prospects of linking EU and US Emission Trading Schemes:** Comparing the Western Climate Initiative, the Waxman-Markey and the Lieberman-Warner Proposals

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**Abstract:**

A global carbon market is often advocated as the most cost-effective means to reach emission reduction targets. Given their status as the two largest integrated economies in the world, a transatlantic link between the EU ETS and a future federal US system would not only be a strong political signal for the creation of a global carbon market, but would eliminate competitive concerns between these two players caused by different carbon prices. If a combined EU-US market was established, this transatlantic market would provide the backbone for the overall international climate regime, with subsequent enlargements to other developed and developing countries. However, the environmental and economic benefits of emissions trading and by extension of linking crucially depend on the design of the trading systems. This paper therefore analyses the designs of the EU ETS, the US Waxman-Markey and Lieberman-Warner proposals for a federal US ETS, and the US Western Climate Initiative (WCI) to assess whether these (proposed) systems have design features that would lead to negative environmental or economic impacts in the case of linking. Particular areas of concern are the protection of the environmental integrity of the trading system as a whole, avoidance of negative economic or distributional impacts, and protection of design choices made in the establishment of an ETS. In addition to the discussion of design elements, the paper also examines possible mechanisms for linking the EU to an US ETS. There exist various possible forms of linking, such as direct and indirect, bilateral and unilateral links, as well as various possible legal mechanisms to implement the link, such as treaties or more informal agreements. It emerges that the recent Waxman-Markey discussion draft includes far fewer barriers to linking with the EU-ETS than earlier draft US legislation; still, certain differences are identified that will first need to be resolved. By contrast, the Lieberman-Warner scheme would be designed more differently from the EU ETS in crucial respects, such as the stringency of the cap and the inclusion of cost-containment measures. The WCI system would again be more compatible with the EU ETS, but here, as well there would be some possible concerns related to linking, in particular as regards the recognition of external units and the stringency of the targets. A full bilateral link between the EU and the USA is probably still some time away, although the new Waxman-Markey draft clearly improves the prospects for a transatlantic link.

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# 1 Introduction

Since the adoption of the Kyoto Protocol in 1997, the establishment of a harmonised international carbon market has been seen as one of the main strategies in international climate policy. So far, however, the market is far from being globally harmonised or systematically linked as, for example, optimistically suggested by Wicke (2005). Instead, a mosaic of national and sub-national markets has been under development, differing in timing, location, relationship to the Protocol and their levels of legal commitment. While the traded commodities, usually defined in terms of metric tonnes of CO<sub>2</sub> equivalent (CO<sub>2</sub>-eq.), may seem identical, many design features such as coverage of trading sectors or cost-containment provisions are quite different. While the EU has been among the frontrunners, with its emission trading system (EU-ETS) up and running since 2005, the debate on emissions trading has also intensified in the USA. At the federal level, various bills have been introduced both in the Senate and in the House of Representatives. The most significant initiative coming out of Congress since the 2008 elections is a discussion draft disseminated on 31 March 2009 in the House of Representatives by Henry Waxman and Edward Markey, titled the **American Clean Energy and Security Act of 2009 (ACES 2009)**. Given its influential sponsors – chairmen of the House committee and sub-committee with jurisdiction over climate change, respectively – this draft has a high likelihood of becoming the basis for future US climate legislation at the federal level.<sup>1</sup> Although the Senate has yet to see the introduction of a counterpart bill during the current legislative term, a prominent bill introduced during the previous Congress will likely continue to influence any major climate legislation emerging from the Senate: America's Climate Security Act (ACSA 2008), a proposal by Senators Joseph Lieberman and John Warner that was voted out of committee in 2008, but ultimately met defeat on the Senate floor. In addition to these developments in Washington, there have also been activities to develop sub-national trading systems in the absence of federal action. In 2003, nine north- and middle-eastern states of the USA set out to create the Regional Greenhouse Gas Initiative (RGGI), a mandatory multi-state cap-and-trade programme with absolute targets that started in 2009. Similar initiatives have been launched on the West Coast (Western Climate Initiative) and in the Midwest (Midwestern Regional Greenhouse Gas Reduction Accord). These sub-national activities have the stated goal of influencing national decision-making. If a national scheme is adopted, however, it will depend on its rules on federal pre-emption of state-based initiatives whether such sub-national systems will be allowed to continue operating, for instance if they are more stringent than the national system.<sup>2</sup>

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<sup>1</sup> Indeed, members of the US Senate have implied that they could see this discussion draft as the basis of the Senate legislative counterpart. Still, it can be expected that significant changes will still follow from the Subcommittee and Committee mark up process.

<sup>2</sup> For instance, the Waxman-Markey explicitly provides in Section 861 that “no State or political subdivision thereof shall implement or enforce a cap that covers any capped emissions emitted during the years 2012 through 2017”; the purpose of this provision is to ensure that, at least during the initial setup phase of the federal system, compliance obligations and administrative structures are uniform throughout the US.

Economic theory suggests that overall efficiency will increase if domestic trading systems are linked to each other. Linking means that one system's trading units can be used, directly or indirectly, by a participant in another system for compliance. 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; Edenhofer, Flachslan, Marschinski 2007).<sup>3</sup> As an additional benefit, linked trading schemes with harmonized prices eliminate any competitive distortions that might arise from different pre-link carbon prices between linking partners. Linking the emerging domestic systems could also be politically significant since they would serve to underpin the top-down approach of the international climate regime by a bottom-up process which might further strengthen the international regime via bi- and plurilateral agreements. Currently, international climate negotiations are almost exclusively being held under the umbrella of the UNFCCC. These negotiations are characterized by near universal participation and consensus-based decision making; parties bring a range of highly divergent national circumstances and priorities to the negotiations, however, raising the threat of diplomatic stalemate over future commitments. Bilateral talks between the EU, the US and others focusing on integrating national trading schemes may establish an additional and potentially synergistic arena for negotiations. This second arena could be gradually and purposefully expanded in order to include more actors, including developing countries.

The EU and USA combined account for about 60% of total current Annex I emissions. Among Annex I, outside the EU only the OECD countries, i.e. Australia, Canada, Iceland, Japan, New Zealand, Norway, Switzerland, the USA and Mexico have already introduced or are considering to establish emissions trading. Among these, the EU and USA combined account for almost 80% of current emissions (UNFCCC 2009). Correspondingly, the EU and USA are also set to account for the lion's share of demand for offset credits from developing countries in the post-2012 regime as Russia and the Ukraine will hardly become major buyers due to their massive bankable surplus of assigned amount units and substantial low-cost domestic reduction potential. Hence, if a combined EU-US market was established, the "global carbon market" would for all intents and purpose be synonymous with this transatlantic market and provide the backbone for the overall international climate regime, with subsequent enlargements to advanced developing countries, such as China and India. Creating a global carbon market is hence a key goal of EU climate policy and engagement with the US is seen as crucial. In its recent post-2012 communication, the European Commission proposed the establishment of an OECD-wide market by 2015 and suggests the creation of an EU-US working group on the design of carbon markets (European Commission 2009).

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<sup>3</sup> 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.

However, these possible advantages are based on a best-case scenario where countries establish environmentally effective emissions trading systems and then link them with each other. Real-life emissions trading systems will not necessarily be environmentally effective. The environmental benefits of emissions trading and, by extension, of linked trading schemes are highly dependent on the design of a trading system. Most importantly, the amount of emission reductions achieved by cap-and-trade stems not from the trading as such, but from the stringency of the cap. The environmental effectiveness of emissions trading is also determined by whether cost-containment features such as price caps are used. Through linking, such features would impact the combined trading scheme and thus impair rather than enhance its environmental effectiveness. It is therefore not advisable to link emissions trading systems without any regard to their design. To the contrary, key features that determine the environmental effectiveness of trading schemes, such as the cap and cost-containment features, should be harmonised prior to linking (see e.g. Sterk et al. 2006, Mace et al. 2008).

This paper therefore aims to assess the potential for linking a US scheme along the lines of the Waxman-Markey and Lieberman-Warner proposals or the WCI with the EU ETS.<sup>4</sup> The main research question is whether these three proposed US systems and the EU ETS have design features that would lead to negative environmental or economic impacts in the case of linking. In addition to the discussion of design elements, the paper will also examine possible mechanisms for linking the EU to a national or sub-national US ETS. Various possible forms of links exist, such as direct and indirect, bilateral and unilateral links; likewise, different legal mechanisms are available to implement the link, such as treaties or more informal agreements.

From the analysis below, it emerges that the proposed Waxman-Markey bill offers improved prospects for linking to the EU ETS compared to the earlier Lieberman-Warner proposal. The Lieberman-Warner bill was characterised by a less stringent cap than the EU ETS and far-reaching cost-containment measures. Linking the EU ETS to such a system probably would lead to significant net purchases by the EU and a net transfer of wealth, occurring not due to economic activity but solely as a result of US regulation. Most importantly, the various cost-containment measures of the Lieberman-Warner proposal aimed to keep allowance prices within a certain range. Through linking, the EU would have therefore effectively ceded control over its allowance price (and the effect of the price signal on emissions) to the USA, a prospect that would hardly have been palatable to the EU. By contrast, the new Waxman-Markey draft is more ambitious in its environmental objectives and provides for fewer price control measures. Although it will likely continue to be less stringent than the EU ETS in terms of the emissions reductions it mandates relative to the same base year, the differences across the Atlantic are now less pronounced, rendering it more difficult to categorically exclude linking as a realistic prospect in the

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<sup>4</sup> The prospects of linking the EU ETS to the RGGI scheme were discussed in a previous paper: Sterk, Wolfgang, Marcel Braun, Constanze Haug, Katarina Korytarova and Anja Scholten (2006): Ready to Link Up? Implications of Design Differences for Linking Domestic Emissions Trading Schemes. Wuppertal: Wuppertal Institute for Climate, Environment and Energy (JET-SET Working Paper I/06).

near- and mid-term future. Challenges remain in particular with regard to the use of offsets under Waxman-Markey.

At the regional level, the WCI system is also more compatible with the EU ETS than the Lieberman-Warner bill, yet it again raises concerns related to linking, in particular as regards the stringency of the targets and the recognition of external units.

The two most likely mechanisms to implement a link – the adoption and implementation of an international linking treaty or the mere amendment of domestic legislation – pose challenges of their own and entail a formal and usually time-consuming process. Finally, since the US is currently not a Party to the Kyoto Protocol, it cannot back its allowances with Kyoto compliance units; hence, any link where the EU turned out to be a net importer of US allowances would currently inflate emissions in the EU without a corresponding acquisition of Kyoto compliance units, and could thus bring the EU into non-compliance with the Protocol. If Washington joins a post-2012 climate regime the US will likely possess internationally recognised compliance units that can be used to back up allowances. In case the USA does not ratify a post-2012 agreement, linking to a US trading system could face additional challenges since international compliance units may only be transferable between countries that have ratified said agreement. Sub-national schemes such as WCI will probably not dispose of UNFCCC compliance units. Overall, while prospects for linking have improved with the latest Waxman-Markey bill, it can be concluded that a full bilateral link between the EU and the US is still several years away. Instead, coming years are more likely to be characterised by unilateral links, as for example foreseen in the RGGI system under certain conditions, and indirect links, for instance through common offset mechanisms such as the CDM or new crediting mechanisms in developing countries, yielding some of the economic benefits of a direct bilateral link.

The introduction of emissions trading in the US is still under debate and it is not clear what shape an US ETS will finally take. On the one hand, this provides an opportunity to inform the US discussion on the need to implement an ETS that is environmentally effective and hence also compatible with a view to international linkages. The US debate has so far been driven largely by domestic concerns and especially by a desire to contain participants' costs. At this point, decision makers and stakeholders in the US are more concerned with the immediate effects – and political feasibility – of different design options for the domestic market, and less concerned with future prospects for international linkages. Nevertheless, given the potential economic and large political benefits a linked trans-Atlantic emission trading system could provide, it might be advisable to broaden the scope of the US debate to take more account of international concerns. The EU has started to proactively engage with US actors to share its lessons learned and try to develop a harmonised approach to emissions trading. For example, the EU and some US states have already taken steps in this direction, by initiating the International Carbon Action Partnership (ICAP) in

2007.<sup>5</sup> Such initiatives should be further expanded and strengthened, and the proposal of the European Commission to create an EU-US working group on the design of carbon markets is a concrete step in that direction.

## **2 Comparative Analysis of the EU ETS, the WCI, the Lieberman-Warner and the Waxman-Markey proposals**

The EU emissions trading directive (“ET Directive”) was passed in 2003 and the EU system started its operation at the beginning of 2005. The ET Directive was recently thoroughly revised for the period after 2012. Given that the establishment of the WCI or a national US system is several years away, the following will focus on the post-2012 design of the EU ETS.

It has to be noted, though, that the present revision only relates to the unilateral target of reducing emissions 20% below 1990 levels by 2020 that the EU has committed to. If there is a new international climate agreement that commits the EU to a stronger target, the European Commission is mandated to submit a legislative proposal to further revise the EU ETS in order to enable the EU to meet this target. While the USA did not ratify the Kyoto Protocol, emissions trading has been discussed for several years now. In recent years, more than a dozen emission trading bills have been introduced in both houses of Congress. In 2008, one bill, the Lieberman-Warner proposal, even made it to the Senate floor, but in the end failed to be passed. Still, it remains a useful indicator of any future legislation out of the Senate. Meanwhile, the most important bill introduced in Congress since the elections of 2008, the Waxman-Markey draft, is set to become the focal point of discussions on emissions trading in the House of Representatives during the current legislative term. Given the stated commitment of President Barack Obama to strengthen climate policy in the US and establish a cap-and-trade system, the debate might evolve very quickly in 2009. As for the WCI, the US states and Canadian provinces that are partners in the WCI have agreed to reduce their greenhouse gas emissions by 15% below their 2005 levels by 2020. A recommended design for an emission trading scheme was released in September 2008. The scheme is supposed to be launched at the start of 2012. Substantively, this section is structured in accordance with central design choices for emissions trading. The basic choices that need to be made when establishing an ETS are:

- The GHG and industry sector coverage;
- The definition and recognition of trading units;
- The setting of targets and the distribution of trading units;
- The temporal flexibility;

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<sup>5</sup> ICAP was launched in October 2007 with the express aim of creating a “forum to discuss relevant questions on the design, compatibility and potential linkage of regional carbon markets”, see ICAP, Political Declaration, 29 October 2007, Lisbon, Portugal, available at [http://www.icapcarbonaction.com/docs/icap\\_declaration.pdf](http://www.icapcarbonaction.com/docs/icap_declaration.pdf).



- The compliance framework.

The provisions for monitoring, reporting and verification (MRV) of emissions are also crucial for achieving a credible ETS, since they are the key to determining whether each trading unit actually corresponds to one tonne of emissions. However, assessing their credibility would require a detailed study exceeding the scope of this paper.

The following will go through each of the items listed above in turn to examine in *how far the designs of the Waxman-Markey proposal, the Lieberman-Warner proposal, the WCI and the EU ETS would be compatible with each other and thus allow for linking without negative effects*. Particular areas of concern are:

- protection of the environmental integrity of the trading system as a whole, that is, making sure that linking does not lead to an increase of emissions compared to a situation without linking;
- avoidance of negative economic or distributional impacts, such as generation of profits that do not result from market fundamentals but from design choices such as allocation rules;
- protection of design choices made in the establishment of an ETS where the rationale for making these choices has not changed.

The results are summarised in Table 1 at the end of this section.

## 2.1 The GHG and Industry Sector Coverage

The EU ETS is a **downstream cap-and-trade system**. According to Annex I of the ET Directive, four main categories of activities – energy activities, production and processing of ferrous metals, mineral industry and the production of pulp, paper, and board with a specific production capacity – are regulated, mostly subject to a minimum threshold for output. In total, the currently about 10,500 installations covered across the 27 Member States account for about 41% of Community-wide GHG emissions (European Commission 2008b: 13). While the ET Directive lists all the six gases included in the Kyoto Protocol in its Annex, it has so far addressed only CO<sub>2</sub> emissions.

For the period post-2012, the EU ETS is going to be expanded to new gases and sectors. It will include CO<sub>2</sub> as well as N<sub>2</sub>O and PFCs from the chemical and aluminium sectors. In combination with a harmonised interpretation of combustion installation, coverage is expected to increase by 140-150 Mt CO<sub>2</sub>-eq (European Commission 2008a: 6). Moreover, Member States may unilaterally include additional activities and gases, subject to approval by the European Commission. In addition to the core EU ETS, Parliament and Council in 2008 also agreed on a separate directive providing for the inclusion of aviation in the EU ETS starting in 2012.

The WCI system will be a mixed upstream-downstream system covering the whole Kyoto basket of GHGs. Initially, the scheme will cover large downstream emitters in the industry and electricity sectors (including electricity generation that is outside but delivered inside

WCI jurisdictions). Beginning in 2015, coverage will be extended to residential, commercial and industrial as well as transport fuel combustion. Here, the point of regulation will be where the fuels enter commerce inside the WCI partners, for example the fuel distributors. The threshold for coverage for both the downstream and the upstream part is annual emissions of more than 25,000 t CO<sub>2</sub>-eq. It is estimated that the first period will cover about half of WCI emissions, rising to about 90% in the second period (WCI 2008: 2-3, 19).

The Waxman-Markey bill would capture approximately 85% of US GHG emissions. The Waxman-Markey bill also foresees a **mixed upstream-downstream system**, with downstream coverage of electricity generators and large industrial sources (emitting more than 25,000 tons CO<sub>2</sub>-eq. per year) and upstream coverage of refiners and other fossil-based liquid fuel producers and importers as well as producers and importers of fluorinated gases and other GHGs. Natural gas local distribution companies (LDCs) would turn in allowances for the emissions of their customers that are not regulated downstream. The EPA could reduce emission thresholds for certain stationary sources, thereby bringing smaller facilities under the cap over time. The Waxman-Markey bill covers the entire Kyoto basket of GHGs and additionally nitrogen trifluoride and any other anthropogenic gas designated as a greenhouse gas by the EPA.

The Lieberman-Warner Bill equally proposed a **mixed upstream-downstream system**, with downstream coverage of coal-based emissions and upstream coverage of emissions from fuel, natural gas and non-CO<sub>2</sub> GHGs. A separate trading system would be established for hydrofluorocarbons (Sections 1501-1503). The compliance obligation would apply to emissions of GHGs which were emitted through the use of coal, GHGs that will be emitted through the use of liquid or gaseous fuels or petroleum coke that was produced or imported into the USA in the preceding year, GHGs that will be emitted through the use of natural gas produced or imported into the USA, and GHGs that were produced or imported into the USA (Section 202). A separate trading system would be established for hydrofluorocarbons (Sections 1501-1503).

### **Analysis**

The EU ETS clearly differs in its coverage from the WCI, the Waxman-Markey and Lieberman-Warner proposals. In principle, 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 (Anger et al. 2006).

However, differences in scope result in different impacts of price adjustments caused by linking. Price adjustments in the EU ETS only affect prices of energy-intensive goods and electricity. By contrast, due to the comprehensive coverage envisioned by Lieberman-Warner, Waxman-Markey and the WCI, price adjustments in the USA would impact the entire economy, including the prices of gasoline and home heating. Links that would significantly increase prices might therefore not be politically acceptable, at least initially, even if the US economy as a whole would benefit (Jaffe and Stavins 2008: 25). As will be shown in the following, allowance prices in the Lieberman-Warner scheme would probably be significantly below EU prices. Comprehensive US coverage might then indeed be an obstacle to linking.

## 2.2 Definition and Recognition of Trading Units

### Description

According to Article 11 of the ET Directive, an EU Allowance (EUA) covers the emission of one metric tonne of carbon dioxide equivalent.

As for **external units**, the EU ETS allows operators to purchase and use **Certified Emission Reductions (CERs) and Emission Reduction Units (ERUs)** from the Kyoto Protocol's project-based mechanisms, the Clean Development Mechanism and Joint Implementation, subject to certain conditions.

First, there are a number of qualitative restrictions on the type of projects whose credits will be eligible in the EU ETS. Thus, in line with the Marrakesh Accords, credits from nuclear facilities are excluded. Moreover, credits from sink projects are not eligible due to concerns about the permanence of the achieved carbon sequestration. Finally, taking into account concerns about possible negative social and environmental consequences of large hydropower projects, credits from these are admitted only if they "respect" the criteria established by the World Commission on Dams (WCD).

Second, there are quantitative restrictions to ensure that the use of project-based credits remains "supplemental" to domestic action in accordance with the Kyoto Protocol. For post-2012, the revised ET Directive contains two scenarios for the use of CDM/JI (Articles 11a, 28):

- If there is no new international climate agreement, installation operators will be able to use either leftover CER and ERU entitlements from the period 2008 to 2012, or an amount corresponding to a certain percentage, which is to be set not below 11% of their cumulated allocation during the 2008-2012 period, whichever is higher. New entrants will be able to use CERs/ERUs up to a certain percentage, which is to be set not below 4.5% below their verified 2013-2020 emissions. Aviation operators will be able to use CERs/ERUs up to a certain percentage, which is to be set not below 1.5% below their verified 2013-2020 emissions. Measures will be adopted to determine the exact percentages. These measures shall also ensure that the total allowed use of credits does not exceed 50% of the mandated reductions.

- If there is a new international agreement which commits the EU to a target that is stricter than 20%, the allowed amount of CERs and ERUs will be increased to up to half the additional reduction in the further revision of the ET Directive. Only credits from countries that have ratified the new international agreement will be accepted.

In addition to the quantitative limits, the EU may also develop implementation measures that restrict the use of credits from certain project types.

In addition to the CDM and JI, the revised ETS directive states that “**Community-level projects**” (otherwise often referred to as Community Offset Projects) may be allowed in sectors not covered by the EU ETS.

The **WCI** will equally be based on metric tonnes of CO<sub>2</sub>-eq. and is also going to develop a domestic offset system. The suitability of the following project types will be investigated as a priority: soil sequestration and manure management in agriculture, afforestation/reforestation, forest management, forest preservation/conservation, forest products, landfill gas and wastewater management. In addition, the WCI partners may approve projects throughout the USA, Canada and Mexico where they are subject to comparable rules as within the WCI. The WCI system may accept allowances from other trading systems as well as CDM credits, but may potentially establish additional criteria for CDM credits to ensure comparable rigor to WCI credits. The WCI will not accept credits from developed countries that come from sources that within the WCI are covered by the cap-and-trade programme. That is, the WCI system will not accept ERUs from power plants, for example. To ensure that the majority of reductions occurs inside the WCI, the total use of external units is limited to 49% of the reduction effort (WCI 2008: 10f).

In the **Waxman-Markey** bill, the total quantity of offsets allowed in any year cannot exceed 2 billion tons. The percentage of offsets follows the following formula:

Percentage of offsets= 2 billion/(2 billion + number of allowances in the previous year)

For the year up to 2020, this means an offset limit of about 30% of the allocation, to be split evenly between domestic and international offset credits. These offsets may be utilized by the system only in case that the USA is party to a bilateral or multilateral agreement which includes the developing host country of the offset project. International offsets can be sourced from sector-based reductions, credits issued by an international body such as the UNFCCC, and from reduced deforestation in developing countries.

The draft bill states that 5 offsets equal 4 allowances, i.e. there is a discount factor of 0.8. This is to be valid for both international and domestic offsets. The bill gives little guidance as to what project types would be allowed in the domestic offset programme, but it sets general requirements for offset generation, such as additionality provisions, provisions for reversals of sequestered carbon in land-use projects, verification etc.

The Waxman-Markey bill allows the **use of international emission allowances** from a qualifying international programme if the programme is run by a national or supranational foreign government, and imposes a mandatory absolute tonnage limit on greenhouse gas emissions. Additionally, the foreign programme has to be at least as stringent as the US programme, including provisions to ensure comparable monitoring, compliance,

enforcement, quality of offsets, and restrictions on the use of offsets (Section 728). The owner or operator of an entity that holds an international emission allowance needs to then certify to the EPA that its international emission allowances have not previously been used to comply with any foreign, international, or domestic greenhouse gas programme. The bill does not limit the amount to which a covered entity can make use of international emission allowances, although the EPA may, by rule, modify the percentage of a covered entity's compliance obligation that may be met with international emission allowances.

The Waxman-Markey bill also makes provisions for early offset supply. The EPA is mandated with issuing an offset credit for each tonne of carbon dioxide equivalent of emissions reduced or avoided, or sequestered under an offset project that was started after 1 January 2001. This applies, however, only to reductions or avoidance of greenhouse gas emissions, or sequestration of greenhouse gases, that occur after 1 January 2009 and for which a credit was issued under any regulatory or voluntary greenhouse gas emission offset programme that the Administrator determines was established prior to 1 January 2009. The Waxman-Markey defines a number of preconditions for such an offset programme to be eligible, such as having publicly published standards, methodologies, and protocols that require that credited emission reductions or sequestration are permanent, additional, verifiable, and enforceable.

According to the **Lieberman-Warner proposal**, starting in 2012, covered entities would be required to submit one tradable allowance for every metric tonne of CO<sub>2</sub>-eq. they emit (Section 202).

In addition to allowances, the Lieberman-Warner bill would allow the use of various alternative national and international trading units:

- First, it would establish a **domestic offset programme**. Offsets would be awarded for agricultural and land-use, land-use change and forestry (LULUCF) activities. Section 303 lists the eligible activities, which range from agricultural land sequestration and management via reduction of nitrogen fertiliser use to manure management. Activities may also cover the reduction of fugitive GHG emissions not covered by the cap-and-trade scheme. It would also be possible to petition to the Administrator for the inclusion of additional project categories. Issuance of offset credits per year would not exceed 15% of the quantity of allowances established for that year (Section 302).
- Second, it would also be possible to use **offsets from other countries** up to 5% of the amount of US allowances established for that year. International offset credits would have to meet the requirements established by the act for US offsets and would not be allowed to come from facilities directly competing with US facilities. (Section 321).
- Third, the bill would allow the use of **international forest carbon credits** for up to 10% of US allowances. These credits would be awarded for national level reductions in deforestation and forest degradation in countries that have a national forestry baseline, that is, local forestry projects would not be able to generate these credits (Section 1314).

In total, the bill would therefore allow the use of external units to up to 30% of a year's cap. If the limit on a particular type of unit was not exhausted, it would be possible to use units from other categories:

- If the 15% limit on domestic offsets was not exhausted, it would be possible to use offsets from other countries as well as international forest carbon credits (Section 302).
- If the 5% limit on international offsets or the 10% limit on international forest carbon credits were not exhausted, it would be possible to use **allowances from other countries** if their systems are deemed to be of comparable stringency (Sections 321f and 1314).

Finally, any unused amounts could also be carried over to the next year and be added to that year's limit on external units.

### **Analysis**

All four systems would have the same quantitative unit of trading currently used in the international climate regime, namely metric tonnes of CO<sub>2</sub>-eq. In this regard, trading between the schemes would be straightforward and could be accommodated under a post-2012 climate agreement.

The recognition of external trading units is one of the crucial points when examining the potential for linking. For example, if a particular type of unit, such as credits from carbon sinks, is not recognised in one scheme, companies in another scheme accepting this unit could use them for domestic compliance purposes, thus freeing up 'regular' domestic allowances and selling them to companies in the first scheme. The political decision in the first scheme about which trading units are recognised would thus be bypassed.

This issue is relevant in particular with regard to the use of credits from carbon sinks and domestic offset projects, which the EU ETS excludes, but the WCI, the Waxman-Markey proposal and the Lieberman-Warner proposal would each include.

While a scheme with a more narrow recognition of units, here the EU ETS, 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.<sup>6</sup> 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.

In the case of the EU and the proposed US schemes, there is some convergence. The EU ETS may come to include "Community offsets", which are essentially domestic offsets but regulated at EU level. The EU has also been moving towards accepting sinks. During the

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<sup>6</sup> A possible means of accounting for units considered "undesirable" that are flowing into the other system would be to assess the share of such units in the total volume of allowances in the other system and discounting traded allowances from that system accordingly.

discussions on revising the ETS Directive, numerous member states as well as the European Parliament's environment committee were in favour of creating at least a limited access to sink credits (ENVI 2008).

While the prospect for linking the EU ETS to the latest version of the Lieberman-Warner proposal would be restricted from the outset, given that the Lieberman-Warner system would allow international allowances only if participants had not exhausted the 5% quota for "international offset allowances" or the 10% quota for "international forest carbon credits", the Waxman-Markey proposal currently places no restrictions on the use of international emission allowances from other ETS that are deemed sufficiently stringent.

However, regarding the use of international forest credits from deforestation and degradation, the Lieberman-Warner and the Waxman-Markey proposals contain significant differences to the EU-ETS, which recently decided not to include these credit types before 2020 (European Commission 2008c). At the same time, it is unclear whether the CDM – which is recognized by the EU ETS – would be considered eligible offset units under the Lieberman-Warner and Waxman-Markey proposals.

Likewise, linking between a scheme that applies a discount factor to (international) offsets and a scheme that does not can effectively undermine the decision to treat offsets as a less desirable compliance option in the scheme imposing the discount. Participants in the EU ETS importing CDM credits may free up EUAs within the quantitative limit imposed on CER use in the EU; such EUAs could then be sold to participants in the Waxman-Markey scheme, avoiding the discount factor.

Finally, access to offsets would be much more generous under both the Lieberman-Warner and Waxman-Markey proposals than under the EU ETS. Whereas the former cap use of offsets at about 30% of the allocation, the EU ETS (as well as WCI) limits use of offsets to 50% of the required reduction. In the case of Waxman-Markey, it has been calculated that in principle all of the required reduction could be covered by offsets well into the 2020s (PointCarbon 2009). On the other hand, the Waxman-Markey scheme would discount offsets, so depending on relative price levels of offsets and allowances the advantage may not be so large. All the foregoing aspects may constitute serious barriers for a EU-US link, although a more careful assessment may be needed to determine the scope and impact of these design differences on prices and allowance flows between schemes.

## 2.3 The Setting of Targets and the Distribution of Trading Units

### Description

The EU ETS is based on **absolute caps** on emissions. The ETS Directive currently does not establish an overall **cap** on emissions for the covered installations. Instead, Member States are responsible for elaborating National Allocation Plans (NAPs) determining the amount and method of allocation. However, the elaboration of NAPs has been a cumbersome, highly contentious procedure in many Member States. Post-2012, the system of NAPs will therefore be replaced by one **EU-wide cap**. The cap will mandate a reduction of 21% compared to 2005 by 2020, which would mean an average annual cap of 1,8 Gt for the

period 2013 to 2020 (Article 9). This value is based on the unilateral 20% target. If the international negotiations lead to a stricter target, the cap is to be adjusted in a further revision of the ET Directive. Article 10 lays out the rules for the distribution of allowances. Due to its ability to pass costs through to consumers, the power sector in most countries will be subject to 100% auctioning from 2013. A transitional free allocation is allowed for some Central and Eastern European economies in transition to facilitate modernisation of the electricity infrastructure. This free allocation shall not exceed 70% of the average 2005-2007 emissions of the respective participants and gradually decrease to zero by 2020. For the industry sector, the general rule for sectors not deemed to be exposed to serious risk of “carbon leakage”, i.e. relocation outside of the EU, is 20% auctioning from 2013, rising to 70% by 2020, with a view to rising to 100% by 2027. Sectors deemed at risk of carbon leakage will receive 100% free allocation based on a best available technology benchmark (average of 10% best EU performers). The list of sectors and sub-sectors exposed to carbon leakage is to be determined by the Commission after discussion at the level of Heads of State and Government at the latest by 31 December 2009 and every 5 years thereafter. Not later than 30 June 2010 the Commission is to submit a report to the Parliament and the Council that assesses the carbon leakage implications of the new international climate agreement (if there is one). At this point proposals can be made to adjust the levels of free allocation.

At the moment there is no good estimate of what share of allowances will be auctioned in total. According to the European Commission, its original proposal of 100% auctioning for the power sector and 80% free allocation for the other sectors in 2013 would have meant that overall 2/3 of allowances would have been auctioned in 2013 (European Commission 2008a: 8). Depending on what share of the total cap will be assigned to the power sector and how many industry sectors will be deemed to be exposed to carbon leakage, the final version of the directive may lead to about 50% auctioning. Finally, 5% of all allowances are to be set aside for new entrants, to be distributed according to the above rules.

The Waxman-Markey draft also adopts an approach based on **absolute targets**. Its ETS would start out in 2012 with a cap that would be at least 3% below the 2005 level of greenhouse gas emissions from covered sectors, equalling 4,770 Mt CO<sub>2</sub>-eq. (Section 721). The cap would then decline to at least 20% below 2005 emissions by 2020, 42% below 2005 emissions by 2030, and 83% below 2005 emissions by 2050 (Section 703). Unlike the EU ETS and other US climate bills, the Waxman-Markey draft does not specify the details of allocation. Rather, the initial draft merely mandates the EPA with allocating and auctioning as yet unspecified amounts of allowances (Section 782). Further details will be negotiated in the legislative process. While auction procedures are set out in greater detail, use of auctioning revenues is again not regulated (Section 791).

Under the current draft, a specified amount of allowances would be set aside each year for a “Strategic Reserve”, from which allowances would be auctioned on a quarterly basis subject to a specified minimum auction price and a quantitative limit on the amount of allowances to be auctioned (Section 726). The initial minimum price would be calculated on the basis of a model; after 2015, the minimum price would be set at “100 percent above a rolling 36-month average of the daily closing price for that year’s allowance vintage”.



Given these high minimum prices, such “Strategic Reserve” auctions are clearly intended to avoid significant near-term price increases, as allowances from these auctions would otherwise not find purchasers. Moreover, the quantitative limit is initially set at 5% and, after 2017, at 10% of the aggregate number of allowances for each year. Proceeds from the strategic reserve auction would be used to purchase international offset credits from reduced deforestation, which would then be made available – subject to a 20% discount factor – as allowances for subsequent strategic auctions. Although such “Strategic Reserve” auctions would be unlikely to attract buyers except in the unusual event of a dramatic short-term price increase, the inflow of international credits may, in theory, raise the overall cap of the scheme.

Like the Waxman-Markey bill, the Lieberman-Warner proposal adopts an approach based on **absolute targets**. The **cap** would initially be set at 2005 levels, equalling 5,775 Mt CO<sub>2</sub>-eq., and then be lowered by 2% each year through 2050 (Section 201). This would translate into a 19% reduction by 2020 and a 71% reduction by 2050. But as opposed to the Waxman-Markey draft, the Lieberman-Warner bill sets out a complex **distribution** system combining free allocation in the form of “transition assistance” for covered companies, which decreases over time, and an increasing share of auctioning. The auctioning revenues are earmarked. For example, in 2012 1% of allowances would be auctioned to provide funds for a “Climate Change Worker Training and Assistance Fund”, which would increase to 4% of allowances by 2031 (Section 531f). In total, 24% of allowances would be auctioned in 2012, increasing to about 60% in 2037. Nevertheless, only the minority of allowances would be allocated free of charge as “transition assistance”. In 2012, carbon-intensive manufacturers would receive 11%, fossil-fuel fired electricity generators 18%, refiners of petroleum-based fuel 2%, and natural gas processors 0.75% of all allowances established for that year free of charge (Sections 541-572). The remainder would be allocated as subsidies to specific programmes, e.g. for renewable energy or energy efficiency.

In addition, in December of each year until 2027 the scheme administrator would conduct a “cost-containment auction”. In these auctions, the administrator would offer allowances beginning at a minimum price. For 2012, the price would be established by the President based on economic computer modelling, but limited to the range between 22 and 30 US-\$. In each subsequent year, the price would be increased by 5% plus the rate of inflation. The pool for the cost-containment auctions would consist of 6,000,000,000 allowances taken from the period 2030 to 2050. In 2012, a maximum of 450,000,000 allowances would be auctioned. For the subsequent years, this limit would be decreased by 1% each year (Section 522-526). On the other hand, the bill also establishes a floor price for regular auctions. The price for 2012 would be 10 US-\$. It would subsequently be increased annually at the same rate as the cost-containment price (Sec. 524).

As noted above, the WCI partners have agreed to reduce their emissions by 15% from 2005 levels by 2020. The trading system will impose on **absolute cap** on participants and the 2020 cap will be set so that reductions from the trading programme plus reductions from other policies for uncapped sources will achieve this goal. The initial cap will be set at the best estimate of actual emissions in 2012 and 2015 respectively, and then be reduced

annually by a linear factor to 2020. Initially, at least 10% of the allowances will be auctioned, rising to a minimum of 25% by 2020. The WCI partners aspire to a higher percentage of auctioning in the long run, “possibly 100%”. The remainder is to be distributed by each partner jurisdiction as it sees fit, which may include further auctioning. If analysis indicates that allocations of free allowances to particular sectors should be treated uniformly to address competitiveness concerns, the distribution of allowances will be standardised as necessary. To guard against the risk of setting the cap too high, the first 5% of allowances auctioned by each partner will have a minimum price. If part of the allowances is not purchased at or above the minimum price, a fraction will be retired.

## **Analysis**

As for the **comparative stringency of targets**, a perfect balance of efforts is very unlikely to be achieved. However, while competitiveness issues resulting from differing levels of stringency 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.

A comparison of the systems renders the following results: In the EU ETS the unilateral EU target of 20% will be implemented by a 21% reduction in the ETS compared to 2005. If the EU internationally commits to a target that is stricter than 20%, the ETS cap will be adjusted accordingly. The Waxman-Markey draft proposes a reduction of 20% by 2020 compared to 2005. The Lieberman-Warner proposal envisages a reduction of 19% by 2020 compared to 2005. The WCI partners have committed to an overall reduction of 15% below 2005 levels by 2020, and since that ETS is going to cover about 90% of WCI emissions its cap will have to lie very close to this target. On the surface, the EU 20% case and the US targets are therefore similarly strict. A more detailed judgement would require an assessment of relative abatement costs in both systems, and also take into account reductions in other sectors not subject to emissions trading.

However, one also needs to take into account additional measures set out in the federal US bills. In the Waxman-Markey draft, the strategic reserve auctions might increase the overall cap by introducing credits issued for reduced deforestation activities. Still, given the high minimum auctioning price, auctioned allowances will only find buyers in the event of a sudden and dramatic price increase. Moreover, quantitative limits on auctioning as well as a 20% discount on the amount of international credits converted into auctioned allowances should prevent excessive inflation of the cap. Sudden and unexpected price increases would also be propagated through the link, and some linking partners might, in effect, favour other schemes that have implemented mechanisms to manage unexpected volatility and price developments (see generally Whitesell and Davis, 2008). Indeed, as described in Section 2.5 below, the EU has also included a mechanism to address prolonged price fluctuations in the revised EU ETS.

Price forecasts see the price of a US scheme following the Waxman-Markey draft at over 50 US-\$/tonne and the EU-ETS at about 63 US-\$/tonne (PointCarbon 2009) in 2020. This relatively similar carbon price implies that, in the case of a EU-US link, the CO<sub>2</sub> price in

the larger US system would only slightly rise. In a less stringent US scheme following for example the Lieberman-Warner proposal a EU-US link would lead to a stronger increase of the CO<sub>2</sub> price for the US system.

Furthermore, cost-containment auctions in the Lieberman-Warner proposal could have a serious effect on allowance prices and the overall cap because their likelihood of being triggered is much higher. Through this instrument, the US government would effectively borrow from future allowance budgets to increase the current cap. The 450 million allowances foreseen for the auction in 2012 therefore need to be added to the cap of 5,775 Mt, an effective increase of 7.8%. The US market could actually be oversupplied at the start (PointCarbon 2008). As a result, linking would have probably led to significant net purchases by the EU and a net transfer of wealth, occurring not due to economic activity but solely as a result of US regulation; that, in turn, could make an EU-US link politically unfeasible for European policy makers.

Finally, the 20% case is only the EU's fallback position. The EU is pushing for a comprehensive international agreement that would include a stricter EU commitment. In this case, the EU ETS cap would become even more stringent than the Waxman-Markey, Lieberman-Warner and WCI caps.

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. However, there may be distributional effects since free allocation is a transfer of wealth, effectively a lump-sum subsidy.

In the EU ETS, free allocation has led to undesirable distributional effects since many companies, especially electricity generators, were able to include the opportunity costs of allowances in their product prices and thus reap substantial windfall profits (European Commission 2008b: 90-93). This was one of the main reasons why the EU is shifting to more auctioning. Already in 2013 about 50% of allowances will be auctioned.

Allocation modalities in the Waxman-Markey proposal have yet to be specified; current language in the draft as well as the political debate leading up to the bill give reasonable grounds to expect that auctioning will play an important role in the allocation process.

Under the Lieberman-Warner proposal, 24% of allowances would be auctioned in 2012, 31.75% would be allocated free of charge and the remainder would be allocated to various environmental programmes. By 2020, the ratio of free allocation would decline to 27%.

In the WCI system, at least 10% of the allowances will be auctioned in 2013, rising to a minimum of 25% by 2020. Individual partner jurisdictions may decide to auction an even higher share.

The EU system and the Lieberman-Warner proposal thus envisage comparably low levels of free allocation. The level of auctioning in the Waxman-Markey and WCI systems may also be very high, depending on the future decisions of the partners.

## 2.4 Temporal Flexibility

### Description

The temporal flexibility built into an emissions trading regime relates to its compliance period, the validity of allowances, and banking and borrowing provisions. The compliance period is the period for which entities are held accountable for their emissions. The compliance period can differ from the trading period. During trading periods, installations can trade allowances within one domestic emissions trading scheme or between different trading regimes. Some allowances may be valid for part of or the whole trading period, whereas others may be valid for several trading periods.

For example, the next trading period in the EU ETS will run from 2013 to 2020, but compliance is determined annually. Until 30 April each operator of a covered installation has to deliver an amount of EUAs or other recognised units that covers the amount of CO<sub>2</sub> emission of the installation during the preceding year (Article 12). Since EUAs are valid for one trading period, **banking** within trading periods is possible. Furthermore, Article 13 of the ET Directive obliges Member States to replace leftover allowances from the previous in the next trading period.

Within trading periods, some sort of **borrowing** is effectively also possible at the moment: whereas operators are allocated the amount of EUAs assigned to them at the end of February of each calendar year, they have to surrender units to demonstrate compliance *ex post* only four months into the next year. Hence, at the time of determining compliance, they dispose of two annual sets of EUAs to cover their emissions – except for the final year of each trading period where only one set is available. While this feature will be progressively phased out as the EU shifts to 100% auctioning and hence less and less allowances will be allocated at the start of the year, after 2012 the EU ETS will include the possibility of moving forward the auctioning of allowances from future years if prices rise high, an example of intra-trading period borrowing.

The WCI system will have three-year compliance periods. Covered participants will need to surrender sufficient trading units only by 1 July of the year following the end of each three-year compliance period. The Western Climate Initiative will allow full banking without limitations but no borrowing. Due to the long compliance periods, operators would nevertheless have a high degree of temporal flexibility in managing their emissions and allowances. The design document refers in particular to being able to manage low water years that might affect the generation of hydropower as one reason for the three-year compliance periods (WCI 2008: 36f).

The Waxman-Markey draft permits unlimited banking of allowances for use during future compliance years. The draft also establishes a rolling two-year compliance period, effectively allowing covered entities to borrow from one year ahead without penalty. In addition, allowances from two to five years in the future can be borrowed for up to 15% of the compliance obligation. Borrowed allowances have to be repaid with interest.

The proposed Lieberman-Warner scheme would have one-year compliance periods. Covered entities would be required to submit one tradable allowance for every metric tonne of CO<sub>2</sub>-eq. they emit not later than 90 days after the end of the calendar year. The

scheme would accord considerable temporal flexibility to companies on how to comply with their targets. First, it would allow for unlimited banking of allowances (Section 501). Second, operators would be able to borrow up to 15% of their compliance obligation from up to 5 year in the future. The borrowed allowances would need to be repaid with interest equal to 1.1 raised by an exponent equal to the difference between the source year and the use year (Section 511-513).

## **Analysis**

Diverging compliance periods should not pose a problem for linking since financial markets make it possible to purchase diverse vintages from various programmes years in advance anyway (Haites/Mullins 2001: 52f). On the contrary, variations in this regard could prove beneficial to the liquidity of the combined emissions market: A temporary shortage of allowances in one country before the time of compliance determination could be satisfied by the purchase of foreign allowances from another part of the linked regime (Blyth/Bosi 2004: 27).

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. In practice, all four systems would allow banking. Borrowing 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).

As explained above, the EU has a form of borrowing within trading periods, but this feature will be progressively phased out as the EU shifts to 100% auctioning. Apart from the environmental risks, one could also imagine that European companies might complain about the additional flexibility granted to US companies. The Warner-Lieberman and Waxman-Markey borrowing provisions might therefore pose an obstacle to linking.

## 2.5 Compliance Framework and Intervention Mechanisms

### Description

In the EU ETS, non-compliant installation operators need to pay fines of EUR 100 per excess tonne of CO<sub>2</sub> emissions. Starting in 2013, this amount will be annually adjusted for inflation. In addition, operators are required to surrender a compensating amount of compliance units in the subsequent year. Additional civil and criminal penalties, for example for fraudulent reporting, are left to Member States, under the condition that the relevant legal provisions are notified to the European Commission and that they are effective, proportionate, and dissuasive. Finally, the obligation to publish the names of the offending entities adds a “name and shame” element to the compliance regime (Article 16). The revised ET Directive also foresees some limited **intervention mechanisms** in case of excessive price fluctuation. If for more than six consecutive months the allowance price is more than three times higher than the average price during the preceding two years, measures may be adopted to allow Member States to either bring forward the auctioning of a part of the quantity of allowances to be auctioned, or to auction up to 25% of remaining allowances in the new entrants reserve (Article 29a).

Somewhat less stringent penalties are applied under the Waxman-Markey bill. If they hold insufficient allowances to cover their emissions, operators are liable to pay an excess emissions penalty that is twice the fair market value of emission allowances during the calendar year for which the emission allowances were due (Section 723). Additionally, operators must still surrender allowances to cover their excess emissions, be it in the following calendar year or within a period agreed upon by the administrator.

Under the Waxman-Markey draft, the Federal Energy Regulatory Commission is charged with providing oversight of the carbon market by adopting regulations to preserve market integrity and facilitate compliance, for instance by preventing fraud, market manipulation, and excess speculation. Although the draft also mentions measures to limit unreasonable fluctuation in the prices of allowances (Section 761), it does not specify the nature and scope of such measures. No further interventions into allowance prices and amounts are referred to in the draft. Under the Lieberman-Warner proposal, failure to submit allowances would be punished by a penalty equal to the greater of either 200 US-\$ or three times the average market value for the year in which allowances were due. In addition, operators would need to submit the missing allowances in the following calendar year (Section 203).

The Lieberman-Warner proposal provides for various intervention mechanisms. It would establish a “Carbon Market Efficiency Board”, which would be charged with gathering information on the functioning and impacts of the ETS (Sections 421-423). In addition, the Board would be allowed to carry out one of the following cost relief measures (“emergency off-ramps”) if it deems it necessary “to avoid significant economic harm” (Section 521):

- Raise the limit on borrowing
- Expand the repayment period for borrowing

- Increase the limit on international allowances
- Increase the limit on offsets

The measures would be applicable for the ongoing year.

In the WCI system, participants that do not comply with their obligation will need to surrender three allowances for each tonne of emissions not covered. Further penalties may apply under individual state or provincial law (WCI 2008: 12).

### **Analysis**

From the environmental perspective, the financial penalties for non-compliance should be significantly higher than the cost of allowances. 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 undermine 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).

The EU ETS, WCI, Waxman-Markey and Lieberman-Warner schemes would all have stringent penalties that should be sufficiently dissuasive. The environmental integrity of all four schemes would be safeguarded by the requirement to make up for any shortfall of allowances in the following year. However, while not a safety valve in the strict sense, the Lieberman-Warner scheme would have a whole raft of mechanisms designed to control the market price. Through the cost containment auctions, the government would effectively loosen the cap by a significant amount. In addition, the Carbon Market Efficiency Board could take various emergency off-ramp measures to lower prices. While these are supposed to be taken “only as needed to avoid significant economic harm”, the Lieberman-Warner scheme would nevertheless be systematically less stringent than the EU ETS. Even more importantly, the various cost-containment measures of the Lieberman-Warner proposal aim to keep allowance prices within a certain range. Through linking, the EU would therefore effectively cede control over its allowance price and the emissions

implications to the US (Jaffe and Stavins 2008: 40f). It does not seem likely that the EU would be willing to do this. By contrast, the Waxman-Markey draft and the WCI design document explicitly reject price caps. Additionally, the WCI also precludes any intervention mechanisms, citing, inter alia, the risk of overshooting the 2020 emission goal. In addition, the document states that the WCI partners hope to link their system to similarly rigorous systems, possibly including the EU, which rejects linking the EU ETS to systems with price caps (WCI 2008: 43). The Waxman-Markey draft allows for strategic reserve auctions, and implementing regulations will probably provide additional means for intervention into allowance prices to prevent excessive price fluctuation. The criteria and details of such intervention have yet to be specified, and it will then need to be assessed whether their scope poses a serious obstacle to linking.



	European Union	Waxman-Markey	Lieberman-Warner	WCI	Linking Implications
<b>Coverage</b>	Downstream coverage of energy and industry sectors	Mixed upstream-downstream system, with downstream coverage of electricity generators and large industrial sources and upstream coverage of refiners and other fossil-based liquid fuel producers and importers as well as producers and importers of fluorinated gases and other GHGs.	Downstream coverage of coal-based emissions and upstream coverage of emissions from fuel, natural gas and non-CO2 GHGs, separate trading system for hydro fluorocarbons	Downstream coverage of electricity generation and industry, upstream coverage of residential, commercial and industrial fuel combustion as well as transportation	Price adjustments due to linking would impact whole US or WCI economy, including gas and heating prices for consumers
<b>Definition and recognition of trading units</b>	EU Allowances measured in metric tonnes of CO2-eq.; non-LULUCF CERs/ERUs up to  - 20% target: leftover amount from period 2008-2012 or minimum 11% of allocation in 2008-2012 period  - more stringent target: half of additional effort needed  Community offset projects	For the year up to 2020, offset limit of about 30% of the allocation, to be split evenly between domestic and international offset credits. Discount factor (0.8) applied to offset credits	Allowances measured in metric tonnes of CO2-eq.;  Domestic offsets credits up to 15% of cap, international offsets up to 5%, international forest carbon credits up to 10%  Leftover amounts may be substituted with other credit categories or be carried over to following year	Allowances measured in metric tonnes of CO2-eq.;  Domestic offset projects, may include CDM (potentially subject to additional criteria), may accept foreign allowances  Total of external units limited to 49% of reduction effort	Ex ante no full link possible with Lieberman-Warner since allowances from other countries are restricted  Linking would undermine EU decision to exclude sinks
<b>Stringency of targets</b>	Depending on international agreement, at least 21% below 2005 levels by 2020	Cap at least 3% below 2005 by 2012, 20% below 2005 by 2020, 42% below 2005 by 2030, and 83% below 2005 by 2050.	Nominal cap at 2005 levels, lowered 2% each year, 19% reduction by 2020, 71% reduction by 2050  Cap increased by cost-containment auctions	15% reduction from 2005 level by 2020	Lieberman-Warner probably less stringent than EU ETS; Waxman-Markey and WCI roughly comparable, unless EU cap tightened due to conclusion of international agreement
<b>Distribution methodology</b>	In total about 50% auctioning in 2013, increasing by 2020	A combination of free allocation and auctioning, with details still unspecified; free allocation likely to remain low	Combination of auctioning, starting at 24%, free allocation, starting at 31.75%, and allocation of remainder to environmental programmes  Slow increase of auctioning and decrease of free allocation	Minimum 10% auctioning, increasing to 25% by 2020  Rest distributed by each partner jurisdiction as sees fit, may include further auctioning	EU and Lieberman-Warner have comparably low levels of free allocation; Waxman-Markey also likely to have low free allocation
<b>Temporal flexibility</b>	1-year compliance periods  Banking possible  De facto borrowing possible within trading periods but phasing out	Banking possible  Rolling two-year compliance period, effectively allowing covered entities to borrow from one year ahead without penalty	1-year compliance periods  Banking possible  Borrowing possible	3-year compliance periods  Banking possible  No borrowing	Borrowing frowned on from environmental perspective, may raise concerns about unequal treatment
<b>Penalties</b>	EUR 100 per excess tonne plus surrendering of missing allowances	Penalty of twice the average market value in that year, plus surrender of excess allowances in	Greater of 200 US-\$ or 3 times average market value in that year plus surrendering of missing	3 allowances for each tonne not covered	Strict penalties in all systems

<b>Intervention mechanisms</b>	in the next calendar year	the next calendar year or an agreed timeframe	allowances in the next calendar year		
	Possibility to move forward auctions to address excessive price volatility	Possibility to intervene in the event of excessive price fluctuations; details to be specified later	Cost-containment auctions Possibility for emergency off-ramps	None	EU would cede control over carbon price and emission implications to Lieberman-Warner; Reserve price auctions in Waxman-Markey would increase the cap, additional intervention measures unclear

Table 1: **Prospects of Linking the EU Emissions Trading Scheme with US Emissions Trading Schemes along the Lines of the Waxman-Markey proposal, the Lieberman-Warner Proposal and the WCI Scheme**

### 3 Linking Options

“Two national emissions 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 emissions 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. In such a link, the registries would most likely be directly connected electronically.
- 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 mechanism to implement a direct link, 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, typically precluding treaties with sub-national trading schemes. Nevertheless, given the economic implications of a link and the high stakes involved, a formal treaty will probably be the option of choice. 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. This is likely to happen through the legislation ratifying and/or implementing the treaty.

- Alternatively, governments may come to an informal agreement to amend their respective emissions trading legislation. A more formal way of documenting such an understanding could for example be a joint political declaration or a memorandum of understanding, which, while not legally binding, creates a common frame of reference and certain reciprocal expectations. 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 an unilateral link.
- 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 market 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 example 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 CERs.

Linkages between domestic emission trading systems cannot be regarded in isolation from the international climate regime. Domestic emissions trading represents a key tool for countries to meet their emissions reduction objective they committed to in the Kyoto Protocol. Within the EU ETS, from 2008 onwards transfers of EU Allowances are in fact transfers of AAUs.<sup>7</sup> The same will probably be the case for the emerging ETS of other Annex B Parties. Thus, even if the EU would 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 of a Kyoto non-ratifier such as the USA.

It would generally be possible for entities from the US to purchase EUAs provided that they possess 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, but in principle any – legal or natural – person can open an account in an EU Member State registry, regardless of

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<sup>7</sup> 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*).

whether they have a physical presence in Europe. 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 means the unit would be counted twice. The AAU would thus have to be cancelled to ensure the system's environmental effectiveness. As to the transfer of allowances from the US into the EU ETS, difficulties would arise since the allowances from the US would not be backed up by AAUs as the US has not ratified the Kyoto Protocol. 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. However a EU-US link will not occur before 2013. In case the US don't ratify a Kyoto successor protocol there would be 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 USA could only purchase but not sell allowances into the EU ETS. Such a link could actually be implemented unilaterally if an US ETS allowed companies to cancel EUAs within the EU ETS and count this toward compliance in their own system. 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 and an US 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 (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 USA into the climate regime cannot take place through an immediate accession to the Kyoto Protocol or the international post-2012 agreement but rather through linking a domestic emission reduction system to the international system. Such an amendment would then need to stipulate that trading units can be transferred between the USA and the international system and that US allowances would be

eligible for international compliance. However, such an amendment could probably only be agreed as part of a comprehensive post-2012 agreement

## 4 Legal Considerations

The creation of a link between the EU ETS and a trading scheme in the USA would raise a number of **legal implications** affecting the legal admissibility of the link. A range of procedural and substantive considerations set out requirements and constraints which need to be taken into account for the link to become operational. Likewise, compliance with the overall regulatory framework determines whether the link **conflicts** with applicable rules and principles of law. Leaving international law aside, such considerations may originate in constitutional law (USA) or an establishing treaty (EU), statutory law (USA) or secondary legislation (EU), customary law, and judicial case law. The following section will briefly address these issues, starting out with an assessment of the mandates discernible in the legislation creating the EU ETS, the Waxman-Markey and Lieberman-Warner proposals, and the WCI rules, as well as relevant procedural requirements and other substantive norms which may affect a transatlantic link between the EU and the USA.

### 4.1 Linking Mandate

A concrete mandate to create a link between emissions trading markets in the EU and the US would have a strong determining effect on the nature and scope of the link. A mandate would already define linking as a desirable objective and thereby obviate the need to justify any related action. At the same time, the mandate may also define the **conditions for its exercise**, including material and formal restrictions to the scope and partners of the link. While the mandate may usually be amended, such an amendment will typically be subject to the same procedural requirements which governed the adoption of the mandate itself, and thus necessitate a protracted legislative or diplomatic effort that can be politically undesirable. For that reason alone, it is worth analysing to what extent the EU ETS, the Waxman-Markey and Lieberman-Warner bills, and the WCI rules already contain mandates that may affect the future implementation of a link.

As already mentioned earlier, the revised ET directive, in Article 25.1, specifies that “[a]greements may be made to provide for the recognition of allowances between the Community scheme and **compatible mandatory greenhouse gas emissions trading systems with absolute emissions caps established in any other country or in sub-federal or regional entities.**” Unlike the earlier wording of this provision in the previous version of the ET Directive, which ruled out links to countries that had not ratified the Kyoto Protocol, this mandate allows links to both federal and regional US schemes.

Unlike the EU ETS, the US schemes analysed in this paper do not contain an explicit mandate for bilateral links with other trading schemes. The Lieberman-Warner proposal does, however, contain an option for the **unilateral recognition of foreign allowances**,

including a mandate for the Environmental Protection Agency.<sup>8</sup> Under this mandate, the EPA should adopt rules “approving the use in the United States of emission allowances issued by nations other than the United States” within two years after enactment of the Lieberman-Warner bill (Section 322.a). To be **eligible**, such allowances would have to be issued by a foreign country “pursuant to a governmental program that imposes mandatory absolute tonnage limits” of “comparable stringency ... including comparable monitoring, compliance, and enforcement” (Section 322.b). For this option to become available, however, participants may not have exhausted the 5% **quota** for “international offset allowances” or the 10% quota for “international forest carbon credits”.

Likewise, the Waxman-Markey draft contains a provision empowering the EPA, in consultation with the Secretary of State, to designate an international trading scheme as a qualifying international programme if it is run by a national or supra-national foreign government, and imposes a mandatory absolute tonnage limit on greenhouse gas emissions from one or more foreign countries, or from one or more economic sectors in such a country or countries, and is at least as stringent as the US programme in terms of comparable monitoring, compliance, enforcement, quality of offsets, and restrictions on the use of offsets (Section 728). Covered entities may then satisfy their compliance obligations by holding international emission allowances in lieu of domestic emission allowances (Section 722). While these mandates do not encompass the adoption of agreements for bilateral linking, as the EU ET directive envisions, they allow the option of establishing **reciprocal unilateral links** with other jurisdictions, thereby facilitating trade between the participating schemes (Mehling/Haites 2009). In the EU, the EU emissions trading directive suggests its linking mandate will still be geared towards adoption of a formal agreement. The Waxman-Markey and Lieberman-Warner proposals do not contain a mandate for the adoption of such an agreement, but also do not preclude it.

## 4.2 Procedural Issues

Of the various linking options outlined earlier, the two most likely options presuppose either the adoption of an international treaty – followed by implementing legislation at the domestic level – or the amendment of domestic legislation. In both cases, the measures required to create the link will presuppose observance of **legislative procedures** and established doctrines on the **distribution of powers**.

Prior to its revision, article 25.1 of the ET directive expressly referred to article 300 of the Treaty establishing the European Community (EC Treaty). Article 300 stipulates the process for **adoption of international agreements** between the EC and third states or international organizations, and would still become most likely relevant if the EU and the US were to create a link by way of an international treaty. Essentially, article 300 of the EC Treaty grants the Commission a power to negotiate international agreements, subject to prior authorization by the Council of the European Union. Once the negotiations result in an agreement on the text of the agreement, the Commission submits the text to the Council

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<sup>8</sup> Pursuant to Section 4(2), “administrator” means the Administrator of the United States Environmental Protection Agency.

for approval. **Ratification** of the international agreement – a vital precondition of its entry into force – occurs through a Council decision. In the case of a linking agreement, the Council would have to decide by qualified majority and with the participation of the European Parliament. Due to shared competences between the EU and its Member States, the link would probably be adopted as a **mixed agreement** to which both the Community and the Member States are parties.

In the USA, the federal **Constitution** sets out rules outlining the power to adopt treaties. Its Article II, Section 2, Clause 2 states that the President “shall have Power, by and with the advice and consent of the Senate, to make treaties, provided two-thirds of the Senators present concur.” Again, international treaties do not usually become binding US law until Congress has enacted implementing legislation, and it is a longstanding practice of the executive branch not to bind the USA internationally until such legislation has been adopted; in certain cases, known as “executive agreements”, Congressional approval may even obviate the need for a supermajority in the Senate (Purvis 2008: 10). If a link between the EU ETS and a federal US trading scheme were to be implemented through a formal treaty, as envisaged in the ET Directive, it would require observance of the foregoing procedure. In the past, the steep requirement of a two-thirds majority in the Senate has prevented the ratification of a number of environmental treaties previously signed by the President, but a linking agreement would arguably enjoy support in the legislature due to the fact that the trading scheme itself would already have been previously approved.

If the trading link between the EU ETS and the scheme established under the Waxman-Markey or Lieberman-Warner bill were to be established **unilaterally or by way of mutually reciprocal domestic legislation**, the applicable legislative procedures would be the same governing the adoption of the original scheme. In the case of the **ET Directive**, the legislative basis was Article 175.1 of the EC Treaty, which sets out a general mandate for action on environmental protection. It calls upon the European Commission to submit a proposal to the European Parliament and the Council, which votes by qualified majority and in co-decision with the European Parliament. In the USA, a member of Congress will usually **introduce a bill** for consideration; following committee and subcommittee approval, the bill will be reported to the full legislature. Differences between bills in the House and the Senate have to first be reconciled in a conference committee and then approved by each chamber; only when both legislative bodies approve the bill in identical form, it becomes enrolled and sent to the President for signature into law. Congress may override a presidential veto through a two-thirds vote in Congress by a quorum of members in both the House and Senate.

A very different procedure applies if the link is to be created with the WCI. The sophisticated distribution of powers between the Union and individual states will raise a number of concerns with regard to the admissibility of a link to a regional – rather than federal – trading scheme. Altogether, the federal Constitution contains only four articles pertaining to treaty powers. Of these, Article I is the most relevant for a prospective market link to a regional scheme, given that its section 10 prohibits any state from entering into a “treaty, alliance, or confederation” or from entering “without the Consent of Congress (...) into any Agreement or Compact (...) with a foreign Power.” In essence, this provision

denies the individual states – including those forming the WCI – international legal personality, limiting their ability to participate in diplomatic relations and altogether barring them from the conclusion of an international treaty. Regarding international treaties, the scope of this restriction is wide, covering all binding international arrangements “regardless of title, designation, or form.”

While the states participating in the WCI may thus be precluded from entering into a formal linking treaty with other jurisdictions, they are empowered to adopt a binding “compact” or “agreement” with the consent of Congress. Article I, section 10 of the Constitution makes the conclusion of such a compact or agreement conditional on approval by Congress, something that, given the current majority situation, does not appear entirely unlikely. Still, even in the absence of Congressional endorsement, individual states may, under certain circumstances, enter into a compact or agreement with foreign powers. As the United States Supreme Court has declared, a compact with a foreign power requires Congressional approval only if it tends “to the increase of political power in the States which may encroach upon or interfere with the just supremacy of the United States.” Consent to an agreement is thus only required if the agreement tends to give the state elements of international sovereignty, interferes with the full and free exercise of federal authority, or deals locally with a matter on which there is or might be national policy. As the Restatement Third of the Foreign Relations Law of the United States comments, “agreements involving local transborder issues, such as agreements to curb a source of pollution (...), have been considered not to require Congressional consent.” Accordingly, it appears possible, albeit not certain, that a linking agreement could be adopted without federal endorsement by way of a state compact or agreement. Ultimately, however, Congress can always supersede such state arrangements by legislation. It bears noting, moreover, that a federal trading scheme, once implemented, may preempt regional and state initiatives to cap emissions. For instance, the Waxman-Markey explicitly provides that “no State or political subdivision thereof shall implement or enforce a cap that covers any capped emissions emitted during the years 2012 through 2017” (Section 861).

In all cases – the adoption and implementation of an international treaty or the mere amendment of federal or state legislation – the elaboration of a link will evidently be a lengthy process. To avoid further cumbersome negotiation and lawmaking procedures if the modalities of the trading link need to be altered or fine-tuned it could be advisable to incorporate a **simplified amendment process** in the treaty or legislative amendment. This way, required changes to the link will not necessitate full recourse to the formal procedures outlined above. Such a simplified process may also be extended to additional links with further partners, for instance through inclusion of all recognised unit types in a schedule contained in an annex or protocol (Mehling and Haites 2009).



## 5 Conclusions

A global carbon market is often advocated as the most cost-effective means to reach emission reduction targets. Currently a mosaic of national and sub-national emission trading systems is emerging. Economic theory would suggest that the efficiency of trading would increase if these systems were linked with each other. So far, the Lieberman-Warner bill has been the most prominent proposal for establishing an US ETS, although the discussion draft presented by Representatives Waxman and Markey in March 2009 is likely to be even more influential on climate lawmaking during the current legislative term. Finally, depending on how the discussion at the federal level develops, the sub-national schemes evolving in the USA such as the WCI may also be candidates for linking. A link between the EU-ETS and a federal US scheme would cover a major share of OECD emissions, and may become the nucleus of the future global carbon market.

This paper concludes that the recent Waxman-Markey discussion draft strongly improves the prospects for a near or medium term bilateral link to the EU ETS compared to earlier draft US legislation. The design of the WCI system is relatively compatible with the EU ETS, even if there are concerns: while at first sight, the 15% WCI target looks roughly similar to the 21% EU ETS target, it must be noted that this is only the EU's fallback position. The EU is striving for an international agreement that would entail a stronger target for itself. Furthermore, the WCI scheme will include sink credits, which the EU ETS presently excludes. The prospect for linking the EU ETS to the latest version of the Lieberman-Warner proposal would be restricted from the outset, since the Lieberman-Warner system would allow international allowances only if participants had not exhausted the 5% quota for "international offset allowances" or the 10% quota for "international forest carbon credits". In addition, the comparison reveals that the Lieberman-Warner scheme would be designed very differently from the EU ETS in crucial respects: The cap would probably be significantly weaker than the EU cap, US companies could borrow allowances from future years for up to 15% of their compliance obligation, the US scheme would include sink credits, which the EU ETS excludes, and the Lieberman-Warner scheme would include a whole raft of cost-containment measures. As a result, the Lieberman-Warner scheme would be systematically less stringent than the EU ETS. It can be expected that US prices would be consistently below EU prices. In the case of linking, this would probably lead to significant net purchases by the EU, i.e. significant transfers of wealth, occurring not due to economic activity but solely as a result of US regulation. It can be expected that this situation would not be palatable to the EU. Linking would also undermine the EU's decision of not allowing sink credits into the EU ETS. Most importantly, the various cost-containment measures of the Lieberman-Warner proposal, in particular cost-containment auctions that borrow from future allowance budgets to increase the current cap, aim to keep allowance prices within a certain range. Through linking, the EU would therefore effectively cede control over its allowance price and the emissions implications to the US. It does not seem likely that the EU would be willing to do so.

The Waxman Markey proposal, by contrast, creates far fewer barriers for a transatlantic link. By allowing international allowances from comparably stringent schemes without, in principle, any limitations, and by placing no restrictions on other schemes to purchase US allowances, the Waxman Markey proposal opens the door for a full bilateral link to the EU-ETS. The reduction target is in line with the EU's fallback option, and thus more ambitious than all other proposals for a federal US scheme so far. The reserve auction that may raise the scheme's cap and thus inflate the combined schemes' cap may pose a barrier. At the same time, it bears noting that such reserve auctions will only take place if the CO<sub>2</sub> price doubles relative to the long-term average. After having established a full bilateral link to the EU-ETS, drastic short-term price increases in the US scheme would be largely absorbed by the link, and the reserve auction floor price would most likely never be reached. A transatlantic link may even offer an alternative to such reserve auctions in the long term. The acceptance of international REDD credits may constitute a barrier as the EU does not plan to accept such credits in the EU ETS until at least 2020. In addition, linking a scheme with a discount factor on international offsets and a scheme that does not discount these can lead to arbitrage trading between schemes. However, the much more generous limit on offset use in Waxman-Markey would point to arbitrage in the opposite direction so that the two effects may cancel each other out. A common EU-US view about international crediting mechanisms within the post-2012 agreement would help to reduce barriers for a transatlantic link and would enable indirect links between these systems until a bilateral link is established. Moreover, while the Lieberman-Warner and the Waxman-Markey proposals include long-term emissions trajectories up to the year 2050, there is no explicit long-term trajectory for the EU ETS. Such a long-term mandate might be requested by the US as a condition for a link. Finally, for both of the two most likely linking mechanisms – the adoption and implementation of an international linking treaty or the mere amendment of domestic legislation – the elaboration of a link will be a lengthy process.

Even if the new Waxman-Markey draft clearly improves the prospects for transatlantic linking, any full bilateral link between the EU and the US is probably still some time away. The introduction of emissions trading in the US is still under debate, and it is not clear what shape an US ETS will finally take. Most likely, the coming years will be characterised by a number of unilateral links, such as those foreseen in the RGGI system subject to certain conditions, as well as indirect links to other trading systems through the CDM, both of which will yield some of the economic benefits of a direct bilateral link. On the one hand, this provides an opportunity to steer the US discussion into the direction of an ETS that would be more environmentally effective and hence also be more compatible for international linkages. On the other hand, the US debate has so far been driven largely by domestic concerns and especially by a desire to contain participant's costs. At this point, decision makers and stakeholders in the US are more concerned with the immediate effects – and political feasibility – of different design options for the domestic market, and less concerned with future prospects for linking with other systems. Nevertheless, given the potential economic and political benefits a linked trans-Atlantic emission trading

system could provide, it might be advisable to broaden the scope of the US debate to take more account of international concerns. The EU has started to pro-actively engage with US actors to share its lessons learned and try to develop a harmonised approach to emissions trading. The EU and US actors are already taking steps in this direction, for example through the International Carbon Action Partnership (ICAP), which does not, however, currently engage the federal legislature. These dialogue initiatives should therefore be expanded further and strengthened. The proposal of the European Commission on creating an EU-U.S. working group on the design of carbon markets is a concrete step in this direction.

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