Linking Different Emissions Trading Systems

Current State and Future Perspectives

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Abbreviations

AAU	Assigned amount units
ARB	Air Resources Board, California
CDM	Clean Development Mechanism
CER	Certified Emission Reductions
CFI	Carbon Farming Initiative
CO_2	Carbon dioxide
COP17	Conference of the Parties of UNFCCC, Durban, 2011
DEHSt	German Emissions Trading Authority at the Federal Environment Agency
EA	Emission Allowance
ERU	Emission Reduction Units
EUA	EU-Allowances
EU-ETS	EU Emissions Trading System
FVA	Framework of Various Approaches
GWP	Global Warming Potential
HFC 23	Trifluoromethane
ICAP	International Carbon Action Partnership
IET	International Emissions Trading
JI	Joint Implementation
KP	Kyoto Protocol
LDC	Least developed countries
MRV	Monitoring, Reporting and Verification
N_2O	Nitrogen oxide
NMM	New Market Mechanism
NZU	New Zealand Units
PCR	Allowance Price Containment Reserve
PMR	Partnership for Market Readiness
RGGI	Regional Greenhouse Gas Initiative
TEHG	Greenhouse Gas Emissions Trading Act
UNFCCC	United Nations Framework Convention on Climate Change
WCI	Western Climate Initiative

1 Introduction

In addition to the EU Emissions Trading Scheme (EU ETS), more emissions trading systems are currently emerging worldwide. A linking of these emissions trading systems can gradually lead to a global carbon market, the most cost-effective solution to the global challenge of climate change. With the change of the Australian government in September 2013 the intended linking of the Australian and European Emissions Trading systems from 2018 on is uncertain. But other countries are developing and implementing emissions trading systems. So linking of different carbon markets is an important topic now and in the future.

In the following text, linking means the linking of several compatible emissions trading systems. The link can be direct, indirect or unilateral:

- In the case of a direct link between at least two emissions trading systems, the emission allowances are mutually accepted to fulfil allowance surrender obligations.
- An indirect link of several emission trading systems can work, for example, by an accounting system such as the Clean Development Mechanism (CDM) in which states accept carbon credits (offsets) generated elsewhere in their emissions trading schemes.[1]
- A unilateral linking describes the acceptance of emission allowances of one system in another.

The purpose of linking emissions trading schemes is the idea of a global carbon market with uniform control of emissions and a uniform global price for emissions.

Any linking of emissions trading systems means a step towards a global carbon market. In addition to the politically difficult international climate negotiations, the emissions trading systems emerging outside the UNFCCC process worldwide can be used for decisive steps towards a global reduction of greenhouse gas emissions.

The benefits of a larger carbon market are obvious: the participants have access to other emission abatement potentials so that the most cost-effective ones can be used. Greater market liquidity reduces price volatility when linking and potentially the market power of individual participants. In addition, the creation of a single carbon price will reduce competitive distortions in the linked systems. This results in economic benefits for all participating systems.

In the case of direct linking, participating systems are either net buyers or net sellers of emission allowances. If a system is a net buyer of emission allowances due to higher abatement costs, its operators benefit from lower abatement costs in the other system or rather from a lower emission price. This, however, will reduce the incentives for investment in low-carbon technologies in their own country. In contrast, the system which is net seller may be exposed to rising prices. In return, financial funds will flow into this system by foreign buyers that, for example, can be used to finance low-carbon technologies.

Through the common emission price, the linking partners are subject to the influence of political decisions and economic developments in the other system. If an economic downturn reduces demand for emission allowances in one partner system, emissions in the other system can be higher than politically desirable. Also, tax or subsidy policies can influence the demand for emission allowances.

1 Links of this type are, however, only a theme of this paper, as the different offset solutions of the emissions trading systems need to be considered by a linking agreement. According to the linking definition used throughout this paper, the recognition of project credits from the Clean Development Mechanism (CDM) and Joint Implementation (JI) in the EU ETS („Linking Directive“) isn't an indirect linking. But the Emissions trading systems of Kazakhstan, New Zealand and the EU are linked indirectly, because they allow the use of the same type of Offsets (CER/ERU).

The greater the system is in comparison to other linking partners, the greater is its influence.

However, a linking also faces challenges, particularly in terms of compliance with the environmental integrity of the overall system and the creation of common ambitious standards.

In the following, the different approaches to linking emissions trading systems as well as the latest developments in the emergence of emission trading systems will be described. Subsequently, system characteristics will be analysed which may have a potential effect on achieving the targets of the linked systems.

2 Linking in an international context

Approaches for a global carbon market

Top Down: UNFCCC mechanisms	Bottom-up: Linking of Emissions Trading Systems
Interstate trade (Kyoto)	Regional systems (EU)
Sectoral emissions trading (New market mechanisms)	National systems (AUS, KOR, NZ)
Project-based approaches (Offsets)	Subnational systems (California, Quebec, WCI)

Source: Illustration by DEHSt

Top down: UNFCCC and interstate emissions trading

The Framework Convention on Climate Change (UNFCCC) launched at the United Nations Conference on Environment and Development in Rio de Janeiro in 1992 and the Kyoto Protocol (KP) adopted as the Additional Protocol to the UNFCCC in 1997 represent the basis for international greenhouse gas emissions reductions.

The UNFCCC is an international, multilateral climate agreement, committing the 195 contracting states to the goal of reducing anthropogenic influences on the climate as well as slowing down global warming. The goal of limiting of greenhouse gas emissions to the 1990 levels is on a non-obligatory basis. In the Kyoto Protocol, which entered into force in 2005, internationally binding reduction and stabilisation obligations were declared initially for 39 developed countries.

As suitable instruments for reaching the obligations beyond national mitigation efforts, the Kyoto Protocol specifies three flexible mechanisms that can be used by the contracting states.

These are

- international emissions trading between countries (IET)
- Clean Development Mechanism (CDM),
- Joint Implementation (JI).

International emissions trading under the KP refers to the state level. For the first commitment period 2008-2012, the KP specified the amount of allocated emission allowances (Assigned Amount Units, AAUs) for industrialised countries, which entitles them to emit greenhouse gases. If this limit – the so-called cap – is exceeded, either country-specific programmes to reduce greenhouse gases must be implemented or additional certificates must be acquired from other industrialised countries. These free allowances (AAUs) arise when the emissions of a state remain below its emissions budget. Trading in surplus allowances creates an intergovernmental market at the international level.

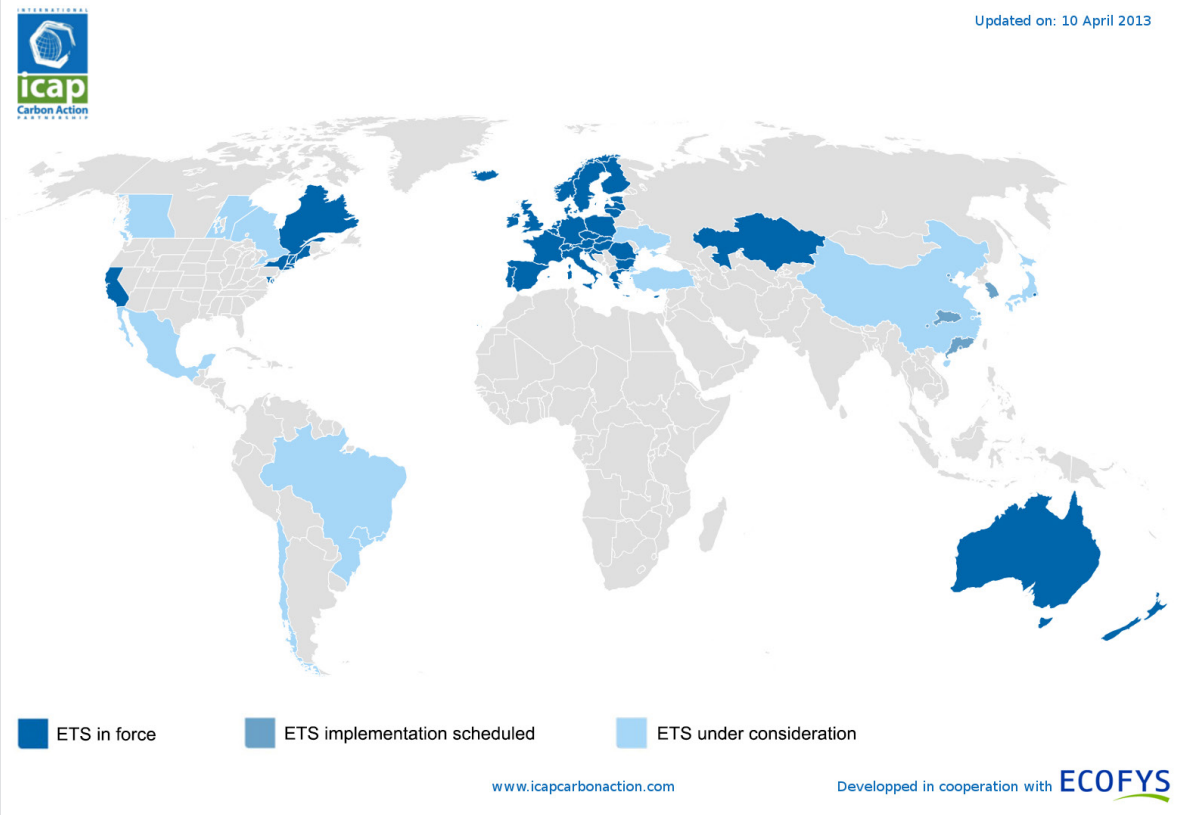
In addition to AAU, contracting states may also use carbon credits of the other two flexible, project-based mechanisms CDM (Certified Emission Reductions, CERs) and JI (Emission Reduction Units, ERUs) to meet their emission reduction obligations. CDM and JI are international climate protection projects in which the initiators receive carbon credits from a project for their activity to reduce emissions.

Bottom up: (Sub)national emissions trading systems (trading between companies)

By introducing international emissions trading under the Kyoto Protocol, the emissions trading instrument used to reduce greenhouse gas emissions also regained attention at the national and regional level: companies are committed to emission reductions below national or regional caps which they can also meet using emission allowances. The EU made Greenhouse Gas Emissions Trading through the Emissions Trading Directive of 2003 the most important instrument to fulfill common emission reduction obligations. Currently, national or sub-national emissions trading schemes exist in different territories such as in the city of Tokyo, some U.S. and Canadian states (California and Quebec in the West plus nine federal states of the US forming the Regional Greenhouse Gas Initiative RGGI in the Northeast), New Zealand, Kazakhstan and in a few provinces of China. In Australia, the former government had planned to transform the "Carbon Pricing Mechanism" (CPM), existing since July 2012 into a regular emissions trading system in July 2015. The current government tries to abolish the CPM including the emissions trading system. Instead, they want to implement an Emissions Reduction Fund from 2014 on. The final decision will probably be taken in summer 2014 only.

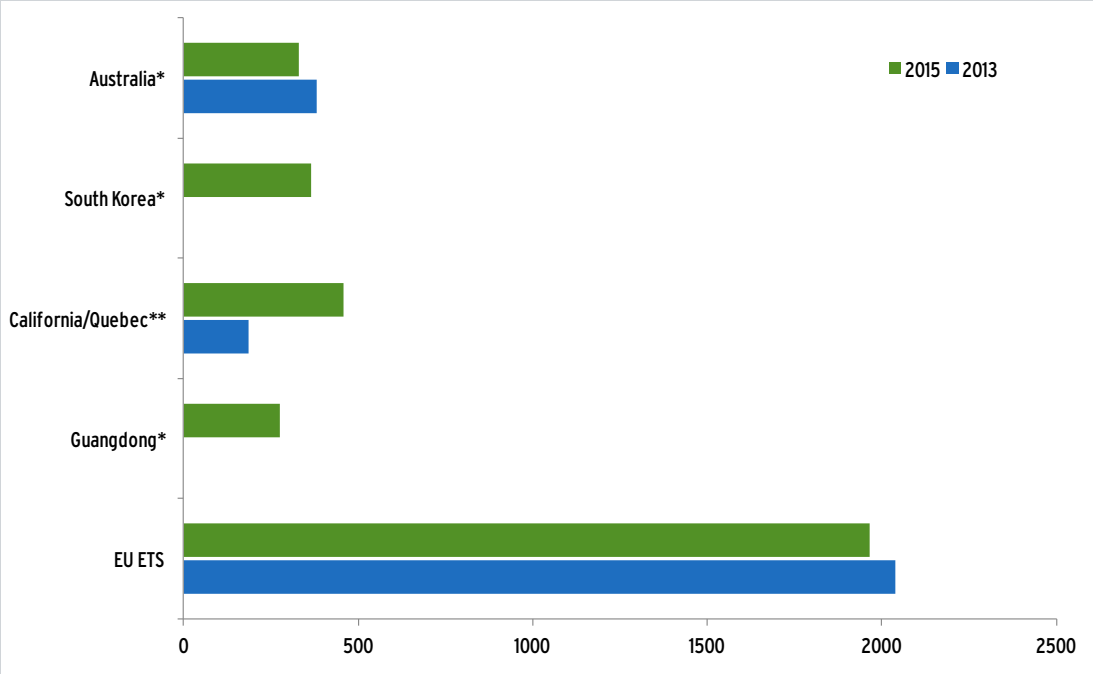
Apart from the existing emissions trading systems more and more emerging or fast growing developing countries – in part with financial support from the Partnership for Market Readiness (PMR) of the World Bank –

Overview about Emissions Trading Systems



Source: ICAP/Ecofys April 2013 (www.icapcarbonaction.com)

Size of the emissions trading systems (cap in millions of tonnes of carbon dioxide)



* Estimate, cap has not yet been published
** The cap's growth in 2015 compared to 2013 in WCI (California/Quebec) is due to the fact that, in the second trading period, fuel distributors will be included in the emissions trading via an upstream system from 2015 on.

Source: State and Trends of the Carbon Market, Weltbank 2012, Point Carbon

try market-based emission reduction instruments. Some, e.g. South Korea or China, have already decided to introduce an emissions trading system or pilot systems. The first regional pilot systems in China started in 2013, South Korea plans to begin with emissions trading in 2015.

Considerations for further emissions trading systems are ongoing e.g. in Brazil (especially Rio de Janeiro), Chile, Mexico, Ukraine and Turkey. Some of these countries take part in the International Carbon Action Partnership (ICAP) as observers or use the summer schools of ICAP for capacity building in emissions trading.

In terms of the amount of emissions under the cap, the EU ETS is currently the largest trading system. Among the Chinese systems, Guangdong particularly stands out.

Already implemented or planned approaches to linking

The first example of a direct linking of emissions trading systems is the Western Climate Initiative (WCI), within which the first two emissions trading systems in California and Quebec should be linked from 2014. The linking agreement was signed in summer 2013. British Columbia, Manitoba and Ontario are also members of WCI and have a basically positive attitude towards the accession to a common cap-and-trade system.

An indirect linking of different emissions trading schemes has already been agreed by the mutual recognition of credits from emission reduction projects (CDM, JI). Since 2004, the so-called Linking Directive has been in force, which allows operators of installations subject to emissions trading

in Europe to purchase additional carbon credits from CDM and JI projects and fulfill part of their national climate protection obligation. Thus this change in the Emissions Trading Directive links

the instruments of EU ETS, CDM and JI, and allows the trading of emission credits between EU ETS and other trading systems that also allow their use. An indirect linking promises the future recognition and use of emission credits from the New Market Mechanism (NMM) introduced at COP17 in Durban whose exact form has yet to be seen[2].

The EU takes a positive stance towards linking with other systems and has been active in negotiations. The most advanced are the negotiations with Switzerland so that the Swiss market can expect to be linked with the EU ETS in 2016. In 2013, the EU Commission - with the mandate from the member states - has started negotiations with Australia on a mutual linking of their emissions trading systems from 2018 on. Australia had even planned to open its market for European emission allowances from mid of 2015. After the change of the Australian government in September 2013, it has become questionable if the linking project can be realized as the new government wants to abolish emissions trading and the Carbon Pricing Mechanism from mid of 2014. If this is going to materialize depends on the approval of the Australian parliament.

2 "The development of the Framework for Various Approaches (FVA) that will combine different national and regional approaches proceeds on a parallel track, though it is not as far advanced as NMM. Such a framework mechanism may provide greater transparency, the EU also calls for a further unification of the standards and MRV systems."

3 System characteristics: relevant parameters for practical Linking in terms of climate policy

Basically, a linking of emissions trading schemes leads to a uniform price in the linked systems, increasing cost efficiency and thus economic benefits. But this should not be accompanied by a threat to the environmental effectiveness. This may be the case when two emissions trading systems with very different rules are connected. The following system characteristics are analysed in terms of their impact on the environmental effectiveness: integrity of the systems, stringency of reduction targets and the cap, market intervention, impacts on competitiveness, scope and coverage of the scheme and other technical details.

Integrity of the systems

Integrity, i.e. trustworthiness and reliability of the systems must be given and it is the most important criterion to guarantee the intended reduction effect. It must be ensured that one tonne of the monitored greenhouse gases in one system corresponds to one tonne in another system („a tonne is a tonne"). The systems must have monitoring systems of a similar quality, or the differences in monitoring standards must be at least known and mapped transparently. It must be clarified whether and how monitoring systems of different quality can be reconciled. In this respect, the regulations on monitoring, reporting and verification (MRV) are crucial. They must be credibly enforced.

Mutual trust must exist in the rules for penalising non-compliance: the sanctions must be devised effectively, e.g. in terms of the amount of fines and implemented credibly. If only moderate fines were to be paid and without any obligation to supply the missing allowances, there would be virtually no limitation to emissions.

If offsets are used, it should be ensured that the linked systems record the amounts reduced which result from offset use in a comparable manner. Therefore, emission calculation rules and monitoring should follow similar uniform standards in both systems. This can be ensured, for example, by the mutual recognition of international standards such as the Kyoto Protocol project mechanisms, JI and CDM. The linking partners may also recognise national offset standards, which use qualitatively comparable methodologies and inspection standards.

In terms of quality (i.e. the issue of useable offset types), different rules can be accepted within a given context. However, the creditable reduction amounts from offset activities must be determined using comparable standards. Too generous crediting rules in one system may result in distortion of competition or lead to a weakening of the cap in the other system. Thus: the greater the amount of approved offsets, the more important the comparable climate policy perspectives. For example, if sink projects are allowed in one of the systems, but not in another, a definite amount to be allowed should be agreed in the linking negotiations. However, a more extensive usability of such offset credits may indirectly lead to a weakening of restrictions within one of the systems. The approved amount must therefore be small enough not to cause avoidance manoeuvres.

In addition, there are restrictions of use for offset credits that cannot be politically accepted due to a lack of environmental integrity. For the EU, this applies to credits from nuclear projects as well as HFC23 and adipic acid projects. The partner system should also have taken a similar exclusion regulation.

To integrate offset projects into the emissions trading system, double accounting must be avoided, which can occur both at the installation level and at the emissions trading system level. For example, if a project activity in renewable energy projects (directly or indirectly) leads to emission reductions in an installation subject to emissions trading, credits must not be issued both for the implementation of the project and emission reductions in the installation.

Stringency of reduction targets and the cap

A stringent emission target is below the emissions that would have been emitted without mitigation measures. This means shortages in the market for emission allowances within an emissions trading system based on the cap. While the EU and Australia derive their cap from the respective Kyoto targets and international negotiation commitments (- 20 percent and - 0.5 percent compared to 1990), California has set the goal to achieve the 1990 emission level again by 2020.

Differences in stringency of environmental goals do not compromise the environmental effectiveness, because from a global perspective, it does not matter where emissions have been reduced. Ellerman (2012) argues that – as in the EU ETS and also in principle – burden sharing is likewise possible between the linking partners, i.e. one emissions trading system can increase its emissions up to a certain value, while the other system correspondingly reduces its emissions. For assessing whether the cap of a partner system is „reasonable“, several criteria must be used such as the level of development in general, economic development and population growth, market penetration of low-emission technologies (or methods), the available abatement potentials and their costs.

Apart from the question of a „fair“ sharing of burden, the issue of scarcity due to the cap is crucial from an emissions trading perspective: if there is no scarcity signal in one of the systems, then in the case of linking, the scarcity signal in the partner system reduces or disappears completely. The debate about „hot air“ – especially Russian and Ukrainian AAUs – of the first commitment period of the Kyoto Protocol and their threat to the system demonstrate the importance of seriously calculated shortage signals.

If the use of offsets has not been taken into account sufficiently in specifying the cap, in the case of low offset prices (as currently for CER/ERU) it can cause the cap to be substantially weakened for emissions trading.

Problems may arise when systems are linked where one of them has an absolute cap and another uses a relative cap (the latter adopting an emission target which is based on a certain emission intensity of production). The reason for the problem is that a relative emission target does not limit absolute emissions, and they can increase freely depending on the economic development. One possible solution would be an interface mechanism („gateway“), which limits the import of allowances from the system with the relative cap to the amount

exported from the system with the absolute cap (see Wartmann et al. 2008). The same applies to linking with a country that has not agreed to a reduction commitment under the Kyoto Protocol. Again, an interface mechanism would be possible, so the total amount of emission allowances within the Kyoto Protocol is not increased by allowances from outside. However, this is very complex and the European Commission stresses in its Impact Assessment for the revision of the Emissions Trading Directive (COM (2008) 16 final) that the EU ETS should only be linked to systems that have an absolute emissions target.

In connection with linking, the time dimension, in particular the length of the trading periods as well as banking and borrowing, must also be taken into account. In the EU, for example, the third trading period of the EU ETS consists of the eight-year period from 2013 to 2020. The cap was set in advance for each year of the period. The cap has now been shown to be too high, as large EUA surpluses have already accumulated from the second trading period. In Australia, however, a rolling cap is being planned. For each year, the cap is determined five years ahead. Thus it is possible to react to current developments. However, this also carries the danger that the cap is expanded because of political pressure and a challenging target fails. If the demand for allowances and therefore the common price increases in one of the systems due to an economic boom or production subsidies, this may, under certain circumstances, lead the government to adjusting the emission target upwards.

If banking (or borrowing) is allowed in one of the connected systems, but not in another, this will nevertheless affect both systems. When surpluses are available, allowances in the system that does not allow banking can be used for surrender obligations at the end of the trading period in the other system, so that certificates in this system can be transferred to the next period and thus increase the amount of emission allowances in the subsequent period. Thus there may be little incentive to invest in low-emission technologies in the follow-up period both in the system with and the system without banking. The same applies to borrowing. If one system does not allow borrowing, emission allowances can still be bought via the other system if borrowing within that system is financially viable for operators. Thus emissions of the next trading period will be brought forward.

Operators may be able to credibly argue that they can only reach a specific emissions target with a disproportionately high effort under certain circumstances by using both banking and borrowing. Thus both influence future targets indirectly in all linked systems by technological lock-in effects, regardless of whether this is permitted in all systems or only in one of the systems.

Market intervention

According to Ellis and Tirpak (2006) if a maximum price exists in only one of the linked systems, then this applies to both systems if market participants can trade with each other indefinitely. Depending on how a price ceiling is implemented, the environmental effectiveness may be compromised. This is the case where there is no absolute cap: the amount of emission allowances is increased without limit in the market once a certain price is reached in order to stabilise the price. The Australian provisions envisage for the first three years of emissions trading a maximum price of 20 AUS$ above the international CO2 price yet to be determined.

The Californian system (as well as Quebec) combines a price ceiling with strategic reserve, the so-called Allowance Price Containment Reserve (PCR): a certain percentage of the annual cap is transferred into the PCR. This reserve will be offered in addition to the auctions held and at three price levels. These were 40, 45 and 50 US$ in 2013 and they increase annually by 5% plus the inflation rate, and are expected to reach 65, 73 and 81 US$ by 2020. The cap remains untouched as the price ceiling affects only allowances kept in the PCR.

A minimum price in only one of the linked systems is ineffective because if the CO2 price is below the minimum price, the emission allowances will be bought in the system without a minimum price until the minimum price has

been reached. The allowances in the other system will only then be in demand again.

California and Quebec have therefore harmonized their provisions regarding minimum prices for auctions (auction reserve price) before they linked their markets and auctions will be commonly held from 2014 on.[3]

Impacts of allocation mechanisms and offset use on competitiveness

Fundamental differences between the observed systems exist in the proposed allocation mechanisms, although most systems, at least at the beginning, provide a large proportion of free allocation. If allowances are allocated free of charge in one of the systems, but auctioned in another system, it is not critical in achieving the reduction targets according to many authors (see Hausotter et al. (2011), Ellerman (2012), Wartmann et al. (2008), Baron and Bygrave (2002)). However, companies within a system that exclusively performs auctions have higher costs and possibly a competitive disadvantage. Different allocation mechanisms can therefore lead to discussions about fairness in distribution. However, this may even be the case without a linking of the two systems.

In addition, generous offset regulations can create price benefits in one of the systems. One system having more generous offset regulations than the other system leads to lower prices also for the other system, because of the common price in the linked market. But the price benefit for the market participants in the more generous system compared to market participants in the system with smaller offset quota would remain as offsets are usually cheaper than emission allowances. Distortions of competition, which existed due to different offset quotas already before the linking of two markets, can be mitigated by introducing similar offset quotas in both systems.

Scope, coverage of systems and other technical details

Most systems (apart from those purely based on the energy market such as RGGI[4]) include the energy industry and related sectors. In contrast to the EU ETS, other systems such as that in Australia do often not limit the application to specific industries, but include all installations that are above a certain emission threshold. In systems that also include indirect emissions (i.e. emissions from electricity consumption) such as in Beijing or South Korea, units of the service sector (retail industry/wholesale trade, medical installations, hotels, public buildings, financial services) are also included in this way.

For a linking to happen it does not matter which sectors the other system includes, provided confidence in the integrity and stringency of the cap setting is given. For example, cap specification should not be based on historical emissions if installations that produce HFC 23 and N_2O are covered by emission trading, rather they should be founded on reasonable benchmarks. This would otherwise undermine the desired scarcity in the system since a significant reduction potential can be achieved at very low cost within these sectors.

In principle, the linking of downstream systems with upstream or hybrid systems is feasible and straightforward if the two components are clearly separated from each other to avoid double accounting. The EU ETS is a pure downstream system while it includes the emitters (installation operators and aviation operators), other systems combine a downstream approach with an upstream one that applies to the supplier or seller of the fuel subject to emissions trading and not to the emitter. Thus, natural gas traders are subject to emissions trading in Australia, and oil and gas suppliers should also be included in California in 2015. In such hybrid systems, emission trading includes other sectors such as building and transport – depending on fuel types covered (natural gas, oil, coal). In hybrid systems, there are measures to avoid double accounting (e. g. abandoning the

3 In 2013, the minimum price for auctions was 10,71 US$ in California. It is adjusted annually by 5% plus the inflation rate.

4 The Regional Greenhouse Gas Initiative (RGGI) is a consortium of the northeastern U.S. states Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New York, Vermont and Rhode Island. Emissions from electricity generation are covered.

surrender obligation for fuels that are supplied to installations covered downstream), so that a linking between a downstream and an upstream system appears comparatively straightforward and should be solved using the evidence of the origin of fuel deliveries.

The linking of systems that address direct emissions, with systems that also capture indirect emissions, is more difficult. In systems that have an integrated market for direct and indirect emissions, double accounting can lead to an overestimation of the amount reduced in relation to the reduction of emissions and an underestimation of the amount emitted (Wartmann et al. (2008)). It makes more sense, therefore, to separate the markets into direct and indirect emissions. If an integrated market with a common cap for direct and indirect emissions exists, the allowances may be converted when used in the other system to map the different ranges. The conversion rate can then be gained from the share of direct emissions of the total cap.

If different allowance units or different Global Warming Potential (GWP) are used, according to Wartmann et al. (2008) a conversion must take place when allowances are transferred between two emissions trading systems. The allowances in one of the systems are replaced with newly generated converted emission allowances of the other system and then deleted. However, this can lead to rounding inaccuracies.

4 Conclusion

A way of linking the emissions trading systems must be devised so that the common reduction target will be achieved not only on paper but also in reality. Both systems must have the right incentives for the necessary transformation to a low carbon industry.

Therefore, stringent cap setting that leads to lower emissions than expected and creates the necessary scarcity in the system is a key requirement. Not all linking partners need to exert the same reduction effort, but an agreement on a common reduction target and a respective sharing of the burden by the linking partners are necessary.

Also important is the integrity of the systems involved. Linking partners must be able to trust that one tonne of CO_2 equivalent in one system corresponds to one tonne in another system. Strict rules for monitoring, reporting and verification, and their trustworthy application are equally crucial as effective sanction mechanisms in cases of non-compliance.

Credits from carbon offsetting projects (offsets) will also earn particular attention. If one system allows more offsets than another, this may weaken the cap in the other system if not adequately taken into account when setting the cap. Differences in the type and quality of offsets or the calculation of reduction amounts may hamper a linking. If there are doubts about the integrity of the other system or the stringency of emission targets, a quantitative restriction for the recognition of emission allowances from the other system may be helpful. While this impairs the anticipated efficiency gains due to the linking, it would guarantee a minimum of national or regional climate control ability. If there is mistrust about the effects of authorised offset usage in the partner system, a restriction for their use may also be agreed during the linking negotiations, so that only a limited number of offsets may enter the common market.

Two linked systems should pursue similar long-term climate policy objectives to avoid changes in cap setting, in economic or other external conditions which can cause an undesirably high price in one system or low price in another.

Therefore, an extensive negotiation process precedes a linking that should result in clear agreements on minimum criteria, potential extensions, and also on a possible withdrawal from the partnership. Perhaps, in some cases the emission allowances will not be able to be fully exchanged, but only in the context of fixed quotas.

As negotiations for an international trading system under the UNFCCC are difficult and many emissions trading systems arise worldwide, a linking of these systems through a bottom-up approach may also spur international climate negotiations (which are basically top-down oriented).

Motivated by climate policy cooperation with other countries and by the benefits derived from the linking of their systems, linking partners might agree on more ambitious climate targets internationally than they would have done without linking. In that case, the linking of emissions trading schemes will promote not only inexpensive, but also effective climate change mitigation.

However, this should not lead us to pursue this approach as the sole or preferred solution to achieve a global carbon market. The conclusion of a global agreement on climate change with mitigation commitments and uniform standards for all (top down) is preferred because it is a comprehensive solution. A successful linking can create positive stimuli for this.

5 For further reading

- For additional information on linking and other current topics, see the DEHSt website http://www.dehst.de/Perspectives
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Annex I: Selected emissions trading systems (existing or under preparation as of January 2013)

	EU	Australia	California	China (Guangdong)	South Korea
Million inhabitants	501.1 (2010 – EU 27)	22.5 (2010)	37 (2010) (Quebec: 7.9)	104 (2010)	50 (2010)
GDP (Bn USD)	17,570 (2011)	1,244 (2010); 1,487 (2011)	1,877 (2010)	838 (2011)	1,015 (2010); 1,116 (2011)
Start ETS	1st TP: 1.1.2005-31.12.2007 2nd TP: 1.1.2008-31.12.2012 3rd TP: 1.1.2013-31.12.2020	Fixed price: 1.7.2012 Flexible price: 1.7.2015 The current government plans to abolish the system from July 1, 2014 on.	1.1.2013 (first auction in Nov 2012)	Pilot phase: 2013-2015 (first auction in Sep 2012)	1.1.2015
Scope	▸ CO_2, also N_2O, PFCs from 3rd TP ▸ Installations with emissions › 25.000 t CO_2-e/a from defined activities ▸ Energy production and industry ▸ Approx. 46% of emissions	▸ CO_2, CH_4, N_2O, PFCs ▸ Installations with emissions › 25.000 t CO_2-e/a; also natural gas suppliers and landfills ▸ Fuel taxes are based on CO_2 price ▸ 60% of GHG emissions	▸ CO_2, CH_4, N_2O, NF_3, PFCs, HFCs, SF_6, ▸ Installations with emissions › 25.000 t CO_2-e/a ▸ Industry and energy production and energy consumption outside the country, but in 2015 also fuel and propellant traders ▸ 85% of GHG emissions (from 2015)	▸ CO_2 ▸ Direct and indirect emissions ▸ Units with emissions › 20.000 t CO_2, ▸ Energy production and 8 industry branches, ▸ From 2015 also buildings and transport ▸ 828 enterprises ▸ 42% of energy consumption, 63% of industrial emissions	▸ CO_2, CH_4, N_2O, PFCs, HFCs, SF_6 ▸ approx. 490 installations or corporations with emissions ▸ › 25.000 t CO_2-e/a Industry and energy sector, buildings and transport sector, landfills and agriculture ▸ 60% of GHG emissions
Cap setting	▸ Cap is set ex-ante for the relevant trading period ▸ Cap decreases annually 1.74% in the 3rd TP ▸ Cap 2013: 2.04 Bn t CO_2-e	▸ The cap will be set for the first five years by 31.05.2014 ▸ Afterwards, the emission cap will always be set annually for the fifth trading year in the future (rolling cap) ▸ Cap in 2015 (estimated): approx. 380 Mt	▸ Cap decreases annually 2% (2013-2014) or 3% (2015-2020) ▸ Cap in 2013: 162.8 Mt ▸ Cap in 2014: 160 Mt ▸ Cap in 2015: 394.5 Mt	▸ Derived from BIP expectation and emission intensity target ▸ Cap allows absolute emission growth ▸ Cap for 2015: 277 Mt (42% of emission target of province)	▸ Cap not yet set ▸ Derived from BIP expectation and reduction target of -30% vis-à-vis BAU by 2020 (corresponds to approx. 341 Mt $CO_{2\text{-}e}$ at 60% of national emissions in 2020)

	EU	Australia	California	China (Guangdong)	South Korea
Allocation	▸ Full auctioning for electricity production in 3rd TP ▸ 100% free allocation for carbon leakage exposed industries (energy and trade intensity), other industries will also receive free allocation, but with a decreasing percentage ▸ Allocation according to product benchmarks (emission rate of the top 10% of installations) ▸ Total share of free allocation may not exceed industry cap	▸ Basically auction (transitional free allocation for about 30% of emission allowances) ▸ For energy- and trade-intensive sectors, there is a transitional period with free allocation (between 66% and 95% of the industry average emissions of the previous year at decreasing percentages) based on benchmarks that are founded on the industry average (for both direct and indirect emissions), as well as for a limited number of energy producers	▸ Free allocation according to BM. The free allocation is about 90% of historical emissions. The remaining 10 % will be auctioned.	▸ 100% free allocation in the amount of expected emissions ▸ Partial auctioning for capacity extension/new entrants ▸ Details still to be clarified	▸ 95% free allocation between 2015 and 2020 (100% for energy- and trade-intensive industries) ▸ Early auctions possible

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Price regulation	If, for more than six consecutive months, the allowance price is more than three times the average price of allowances during the two preceding years and the price development is not a result of changing market fundamentals, there is the possibility of .bringing forward the auctioning of a part of the quantity to be auctioned or to auction a quantity up to 25 % of the remaining allowances in the new entrance reserve.	▸ Between 2015/16 and 2017/18 price ceiling is envisaged ▸ To connect the Australian emissions trading with the EU ETS, the minimum price planned for the years 2015/16 to 2017/18 has been abolished	▸ Allowance Price Containment Reserve (PCR): a defined percentage of the cap is transferred to reserve; reserve sales at set price levels are offered for sale in addition to the regular auctions; sales at three price levels ($40, $45, $50) and increase by annual 5% + inflation ▸ Only operators covered by the cap are licensed ▸ Auction Reserve Price (minimum price): $10 (for inflation annually plus 5% increase)	Unknown	Possibility to regulate prices if one of the following incidents occurs: ▸ The allowance price is more than three times the average price of allowances during the two preceding years for more than six consecutive months. ▸ The average auctioning volume and price doubles within one month. ▸ Drop of 60 % in allowance prices in comparison to the average price during the two preceding years Possible price regulations: ▸ Additional free allocation of up to 25 %. Of the reserve (3 % of the cap) ▸ Implementation of holding limits (Minimum quantity 70 % of free allocation, Maximum quantity 150 % of free allocation) ▸ Limitation or increase of Borrowing ▸ Limitation or increase of Offset quota ▸ Implementation of temporary floor or ceiling prices

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Offsets	▸ Kyoto offsets available according to the different national quotas for offset use (D: 22% of the individual allocation of 2nd TP) for the 2008-2012 period and max. 50% of the 2008-2020 reduction obligation ▸ Only remaining quantities of the respective quota may be used in the 3rd TP which were not used in the 2nd TP ▸ As of 2013, no ERUs and CERs from LDCs only (no HFC and adipic acid projects) ▸ New installations: up to 4.5% of their emission amount	▸ Credits of Australia's Carbon Farming Initiative up to an unlimited amount as soon as the flexible price is implemented ▸ Kyoto offsets (CER, ERU, RMU), up to 12.5% of the obligations of a year as soon as the flexible price is implemented	▸ 8% of annual obligation ▸ Only offsets of ARB or WCI	▸ Chinese offsets only (CCER) for 5-10% of emissions	▸ National offsets only, from national CDM projects if applicable
Special features	▸ First EH system with 30 participating States ▸ Comparatively long planning periods, in particular for cap setting (3rd TP includes 8 years)	▸ 2012/13 – 2014/15: Phase with a fixed CO_2 price ▸ Free trade from 2015	▸ Linking of various sub-national systems ▸ Largest scope	▸ Largest Chinese pilot system in a politically influential region ▸ Growing cap ▸ Full free allocation in the amount of expected emissions ▸ Direct and indirect emissions	▸ Borrowing allowed

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MRV	▸ Operators to monitor emissions according to monitoring plan ▸ Plan for monitoring and reporting via Form Management System ▸ Simplified calculation methods for small emitters ▸ Verification of emission reports by independent auditors	▸ Monitoring and reporting since 2008 on the basis of mandatory NGER Act ▸ Reporting to the CER via OSKAR system ▸ Checking of reports by CER ▸ External verification by registered auditors in suspect cases only	▸ Annual reporting by online tool ▸ Relief for small emitters ▸ Independent verification system	▸ Regulation in development ▸ CEMS being planned as a primary method ▸ Independent verification system being planned	▸ MRV using GHG/Energy Target Management System (TMS) ▸ Inspection of reports by different ministries depending on the sector ▸ Independent verification system

Sources: For population/GDP data: Wikipedia/national statistics for system characteristics: in particular State and Trends of the Carbon Market (World Bank 2012), ICAP/Ecofys (www.icapcarbonaction.org, December 2012), Point Carbon Reports, CDC Climate 2013

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