



Emissions trading outside the European Union

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Preface

This report explores the current state of the selected operational and planned greenhouse gas emissions trading schemes globally and evaluates the compatibility of these schemes with the European Union Emissions Trading Scheme (EU ETS). The underlying asset in these carbon markets are greenhouse gas emissions and consequently the trading schemes can be linked to each other. Linking the schemes has many benefits but can also be problematic. In this report conditions for linking is discussed and earlier studies on field are reviewed from the Nordic perspective. In addition the impact of the state level greenhouse gas emissions trading schemes in the USA to the international carbon markets is discussed.

The report was commissioned by the Climate Group of the Nordic Council of Ministers in December 2006 (climate project no. 123). The project leader in the Council was Mr. Bent Andersen from Danish National Environmental Research Institute, Aarhus University.

The report is based on a literature review and contacts to the relevant government officials and market experts. All the conclusions are however those of the authors (see below).

The report has been prepared by Mr. Juha Ruokonen, Mr. Juha Ollikainen, Mr. Kristian Gautesen and Mr. Tomas Otterström at GreenStream Network Ltd during December 2006 – May 2007.

The Climate Change Policy Working Group does not necessarily share the views and conclusions of the report, but looks at it as a contribution to our knowledge about an more globally emissions trading

June 2007

Jon Dahl Engebretsen

Chairman of the Climate Change Working Group

Abbreviations

AA	Assigned amount
AAU	Assigned Amount Unit
ACT	Australian Capital Territory
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
CO ₂	Carbon Dioxide
CO ₂ e	Carbon Dioxide equivalent
COP/MOP	Convention of Parties Serving as Meeting of Parties of the Kyoto Protocol
ERU	Emission Reduction Unit
ETS	Emissions Trading Scheme
EU ETS	European Union Emissions Trading Scheme
EU ETS	European Union Greenhouse Gas Emission Trading Scheme
GGAS	Greenhouse Gas Abatement Scheme
GHG	Greenhouse Gas
GIS	Green Investment Schemes
IET	International Emissions Trading
JI	Joint Implementation
JVES	Japan's Voluntary Emissions Trading Scheme
KVAP	Keidalen Voluntary Action Plan on Environment (Japan)
LFE	Canadian Large Final Emitters scheme
LULUCF	land use, land use change and forestry
MoU	Memorandum of Understanding
MtCO ₂ e	Million tonnes carbon dioxide equivalents
NAP	National Allocation Plan
NAP2	National Allocation Plan for the period 2008–2012
NETS	National Emissions Trading Scheme (Australia)
NGO	Non-Governmental Organisation
NSW	New South Wales
RES-E	Electricity from Renewable Energy Sources
RGGI	Regional Greenhouse Gas Initiative
tCO ₂ e	Tonnes of carbon dioxide equivalent
UNFCCC	United Nations Framework Convention on Climate Change
US ETS	The United States Emissions Trading Scheme

Summary

The global market for greenhouse gas emission allowances and emission reductions (“the carbon market”) has grown fast since the beginning of 2005. In the beginning of 2005 the European Union Emissions Trading Scheme (EU ETS) started, setting a GHG emission cap for installations in certain sectors, and allowing these companies to trade among themselves with emission allowances. Other countries are also implementing or planning to implement greenhouse gas emissions trading schemes. The most notable plans are currently in Canada, Japan, the RGGI initiative in the Northeast and Mid-Atlantic States of the USA and in the State of California together with four other western states.

The underlying asset in the carbon markets is greenhouse emissions and trading schemes can be linked directly or indirectly to each other. The linking of various emissions trading schemes together brings benefits, as the larger market is likely to have better liquidity and economic efficiency. However, the linking has also technical and political challenges that have an impact on how fast and which systems are likely to be linked to each other. There can be several types of links between different greenhouse gas emissions trading schemes.

- Two schemes can be fully linked to each other in a way that emission units (allowances, permits etc.) can be used in both schemes without any significant limitations (“bilateral direct link”).
- It is also possible that some trading schemes allow use of emission units of another trading scheme for compliance but not vice versa, i.e. the link is only one-way (“unilateral direct link”).
- Some trading systems may allow use of emissions reduction credits or emissions offsets from the project based mechanisms. This may allow various trading schemes to be linked via the emission reduction credit market. (“indirect link”).

There are currently various emissions trading schemes planned or operational that could be considered to be linked to the EU ETS. Below are listed some examples of such schemes and some main challenges in creating the links.

- The New South Wales Greenhouse Gas Abatement Scheme (GGAS) is the second biggest operational regional or state level trading scheme currently. The scheme is based on the baseline-and-credit approach and emission abatement projects play a key role in the scheme. The design of the GGAS is different to the EU ETS which creates

- challenges linking the schemes. Moreover, Australia has not ratified the Kyoto Protocol which creates additional difficulties for linking.
- The Canadian Large Final Emitters (LFE) scheme, due to start 2008, is based on the baseline-and-credit approach which is totally different from the cap-and-trade-based EU ETS. The LFE scheme has a price cap of 15 CAD/ ton CO₂e (9.7 €), whereas no such cap exists in the EU ETS. If the markets would be linked, the markets would be segmented. The numbers of units that can be used for compliance are higher in the LFE scheme. Whereas the EU ETS allows only EU emission allowances and emission reduction units from the CDM/JI projects, the LFE schemes also allows greened AAU (from the Green Investment Schemes or similar), emission reduction units from the carbon sinks (LULUCF) and CDM/JI emission reduction units from large hydropower projects.
 - The Regional Greenhouse Gas Initiative (RGGI) of the North-Eastern and Mid-Atlantic states of the USA resembles the EU ETS in many ways. However, as the USA has not ratified the Kyoto Protocol the ambition level of the RGGI is not as high as the level of the EU ETS. The RGGI caps emissions to 2000 levels for 2009–2015 and is then reduced by 10% by 2019. The EU, on the other hand, is aiming for 8% cut in the total greenhouse gas emissions from 1990 level in 2008–2012. The long term EU target is to reduce emissions by 20% by 2020 and if international climate agreement is accomplished by 30% by 2020.
 - The Norwegian emissions trading scheme is very identical the EU ETS and the Norwegian emission trading system is supposed to be linked to the EU ETS through a linking agreement according to Article 25 of the EU Emissions Trading Directive. The linking is expected to take place in 2008.

While the federal level climate policy in the USA has been lacking ambition, individual states and groups of states have established targets and programmes to reduce greenhouse gas emissions. The impact of the state level trading schemes and climate policies to the carbon markets can be seen twofold. Firstly the state level policies and schemes have an impact to the federal level policy. Secondly, the implemented trading schemes can be linked to the other regional emissions trading schemes such as the EU ETS or they could be linked indirectly through CDM/JI credit markets.

The states have legislative power but at the same time there are some constitutional constraints relevant to emissions trading. One of the most important one is the fact that states cannot enter into international agreements. However, in recent decades states policy diffusion has been common – the legislation of one state is adopted in a similar manner in another states. By and large, state's influence in the environmental policy of

the USA is significant and states can be seen as a "policy laboratories" for climate policy and putting pressure to the federal climate policies.

There are currently two regional emissions trading schemes planned in the USA. The RGGI is in the implementation phase and the rules of the Western Regional Climate Action Initiative have not been published. In general, as long as the USA has not committed to international climate agreement we expect that the emission reduction targets in the both regional schemes will remain in the moderate level in mid-term (~2012) and consequently the emission allowance prices will be low. As a result the demand of CDM/JI credits of the companies included in the US regional schemes is small and impact to the global carbon market will be modest.

The literature review on the linking various trading schemes seems to raise a question: is it reasonable to rush in linking with more or less incompatible schemes or patiently give them time to develop and try to push them in desired direction before linking? Would it be wise or even politically acceptable that Nordic companies or sectors would operate under ETS with different rules than similar companies or sectors in other regions linked to the same emission markets? It may be – the rules are not equal within EU ETS either, and linking the schemes will not, in cases of many divergences, cause competitive distortions, but they would exist if the schemes would not been linked. The Nordic countries should pay special attention to the impacts of the possible linkages on competitive situation of industries especially important in the Nordic countries, but not so significant in the EU level.

The carbon market is expected grow and negotiations on the post-Kyoto period (2013–2017) have started. The linking of various regional trading schemes is likely to increase in the future despite the challenges and difficulties. Functioning emissions trading markets are beneficial and improves efficiency of the climate change policies and therefore linking of schemes should be implemented if possible.

1. Introduction

1.1 Background

The global market for greenhouse gas emission allowances and emission reductions (“the carbon market”) has grown fast since the beginning of 2005. The Kyoto Protocol entered into force in February 2005 after it was ratified by Russia in late 2004. The Kyoto Protocol sets binding emission caps for the industrialised countries, meaning that many of them have to take considerable greenhouse gas emissions reduction measures in order to reach their targets. The entry into force of the Kyoto Protocol also convinced the market that the so-called project mechanisms of the Kyoto Protocol (Kyoto Project Mechanisms) – Joint Implementation (JI) and Clean Development Mechanism (CDM) – become operational and created a market for project-based greenhouse gas (GHG) emission reductions.

In the beginning of 2005 the European Union Emissions Trading Scheme (EU ETS) started, setting a GHG emission cap for installations in certain sectors, and allowing these companies to trade among themselves with emission allowances. Emission reduction credits from the CDM/JI projects can be used for compliance within the EU ETS, a fact which has consequently increased the interest of companies to participate in CDM/JI projects.

Other countries are also implementing or planning to implement greenhouse gas emissions trading schemes. The most notable plans are currently in Canada, Japan, the RGGI initiative in the Northeast and Mid-Atlantic States of the USA and in the State of California and four other western states.

The underlying asset in the carbon markets is greenhouse emissions and trading schemes can be linked directly or indirectly to each other. An example of an indirect link between the schemes is through CDM/JI markets.

The linking of various emissions trading schemes together brings benefits, as the larger market is likely to have better liquidity and economic efficiency. However, the linking has also technical and political challenges that have an impact on how fast and which systems are likely to be linked to each other.

1.2 Objective of the Report

The objective of this report is to explore the current state of selected operational and planned greenhouse gas emissions trading schemes globally, to evaluate the compatibility with the EU ETS, and to assess pre-conditions for linking the schemes. Previous studies on linking are reviewed from the Nordic perspective. In addition the impact of linking state level greenhouse gas emissions trading schemes in the USA on the international carbon markets is discussed.

1.3 Contents of the Report

This report will first introduce the background and basic setup for linking emissions trading schemes in Chapter 2. Chapter 3 introduces selected emissions trading schemes around the world and discusses the challenges and possibilities to link them with the EU ETS. The impact of the state level schemes in the USA to the global carbon market is covered in the Chapter 4.

Chapter 5 highlights the most important results of the previous studies in the field of linking emissions trading scheme with a special focus from the Nordic perspective. Chapter 6 concludes.

2. The EU Emissions Trading Scheme (EU ETS) and linking

2.1 The carbon markets

The international carbon market has developed rapidly in recent years. The developed countries and economies in transition that have ratified the Kyoto Protocol have binding commitments to reduce emissions in 2008–2012. Countries can use three different flexible mechanisms to supplement their domestic measures to achieve the commitments. Joint Implementation and Clean Development Mechanisms are project based emission trading systems that generate Emission Reduction Units (ERUs) and Certified Emission Reductions (CERs). The countries can also use International Emissions Trading (IET) with their Assigned Amount Units (AAUs). In order to achieve their Kyoto targets some countries have implemented or are planning to implement domestic emissions trading schemes. The most notable of such schemes is the EU Emissions Trading Scheme (EU ETS) that started in 2005 and covers the whole 27 member states of the European Union. The Figure 1 illustrates the global carbon market.

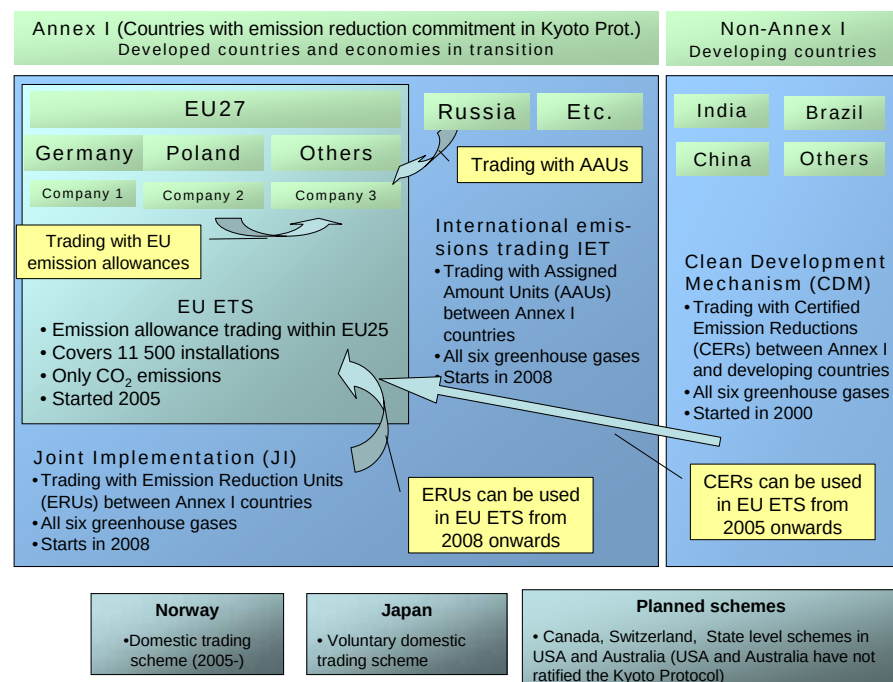


Figure 1. The overview of the carbon markets.

2.2 What is “linking”

There can be several types of links between different greenhouse gas emissions trading schemes.

- Two schemes can be fully linked to each other in a way that emission units (allowances, permits etc.) can be used in both schemes without any significant limitations (“bilateral direct link”).
- It is also possible that some trading schemes allow use of emission units of another trading scheme for compliance but not vice versa, i.e. the link is only one-way. For example Norway allows use of emission allowances of the EU ETS for compliance in its domestic scheme but Norwegian allowances are not eligible in the EU ETS (“unilateral direct link”).
- Some trading systems may allow use of emissions reduction credits or emissions offsets from the project based mechanisms. This may allow various trading schemes to be linked via the emission reduction credit market. For example EU ETS and Japan’s Voluntary Emissions Trading Scheme (JVETS) both allow use emissions reductions of Clean Development Mechanisms (CDM) projects, but EU ETS and JVETS are not linked to each other directly (“indirect link”).

2.3 The EU ETS

The European Union Emissions Trading Scheme (EU ETS) in a nutshell	
Status	Operational
Start	2005
Design	Cap-and-trade
Mandatory/Voluntary	Mandatory
Trading periods	2005–2007, 2008–2012 and continues in 5 year periods
Coverage	Combustion installations above 20 MW Mineral oil refineries Coce ovens Metal ore roistering and sintering installations Production of pig iron or steel Cement klinker and lime production Glass and glass fibre production Ceramic products manufacturing Pulp and paper industry (about 40% of the all EU’s greenhouse gas emissions)
Number of installations	app. 11 500 in 2005–2007
Included gases	CO ₂
Allocation methodology	Allocation is decided on the Member State level but it is subject to approval of the Commission (National Allocation Plans, NAPs). Mainly grandfathering. 5% can be auctioned in 2005–2007 and 10% in 2008–2012
Allocation	Some 1995 million allowances annually in 2005–2007

The European Union Emissions Trading Scheme (EU ETS) in a nutshell	
Monitoring	Emissions are reported annually by the end of March 30 th . The reports are verified by an independent verifier
Penalty and price cap	In 2005–2007, penalty is 40 €/missing allowance and the missing allowances has to surrender in the following year. In 2008–2012, penalty is 100 €/missing allowance and the missing allowances has to surrender in the following year. There is no price cap.
Linking to other schemes	Companies can use CERs from the CDM projects already in 2005–2007. ERUs from the JI projects can be used from 2008–2012 onwards. The maximum limit for using CERs/ERUs for a compliance is set in the NAPs
Banking Units	Allowed inside the periods with some exceptions in some countries. 1 metric ton

2.4 The use of CDM/JI credits in the EU ETS

So-called Linking Directive (2004/101/EC), which was adopted in 2004, amends the EU Emissions Trading Directive in a way that emission reduction units from the CDM and JI projects can be used for compliance in the EU ETS. All emission reduction credits are eligible with following exceptions:

- credits from nuclear projects
- credits from land use, land use change and forestry (LULUCF) activities
- credits from the large hydro power projects above 20 MW have to be in line with the criteria of World Commission on Dams.

The emission credits from the CDM projects can already be used in the Phase 1 on the EU ETS (2005–2007). Emissions credits from the JI projects can be used for compliance in the Phase 2 (2008–2008) of the EU ETS.

2.5. Linking the EU ETS and other trading schemes

Article 25 of the EU Emission Trading Directive (Directive 2003/87/EC) concerns linking the EU ETS with other greenhouse gas emissions trading schemes. The article states that the EU ETS could be linked to other countries listed in the Annex B¹ of the Kyoto Protocol and which have ratified the Protocol. The main approach would be the mutual recognition of the allowances.

In the recitals of the Linking Directive it is stated that the Commissions should examine

¹ Developed countries.

whether it could be possible to conclude agreements with countries listed in Annex B to the Kyoto Protocol which have yet to ratify the Protocol, to provide for the recognition of allowances between the Community scheme and mandatory greenhouse gas emissions trading schemes capping absolute emissions established within those countries.

This opens a door for linking the EU ETS also to the schemes in countries that have not ratified the Kyoto protocol.

In 13th November 2006 the Commission published a report “Building a global carbon market”. In the report the Commission has identified items that are examined in the review of the EU ETS. One of the main items is the link of the EU ETS to third countries. The working group conducting the review will consider the design of the trading schemes that are planned or operational and could be linked to the EU ETS. The group will also consider whether limiting the linking only to the countries that have ratified the Kyoto Protocol and are Annex B countries (developed countries and economies in transition) should be continued – e.g. the group will evaluate for example can the trading schemes in Australia or USA be linked to the EU ETS and under what conditions. The review is due by 30th June 2007. The European Council also stressed in late 2006 that it is committed to develop strong carbon market by linking the EU ETS to other emissions trading markets².

The representatives of the Commission’s marketbased instruments-unit, have lately discussed the linking in various seminars (May 29th 2006, September 27th 2006 and January 17th 2007). The representatives list following issues to be considered in the bilateral linking of other trading schemes to the EU ETS:³

- Currency used and its status
- Quality of monitoring and reporting provisions
- Registries conforming to Kyoto Protocol communication standards
- Level and types of sanctions
- Type and stringency of environmental target
- Private sector market without governmental intervention
- Direct vs. indirect emissions approach
- Banking and borrowing

Less important issues:

- Sector and gas coverage
- Trading periods
- Allocation method

² Council of the European Union, 18th December 2006.

³ Hartridge 2006, The EU emissions trading scheme: Perspectives for linking. Paris, September 27th 2006.

The political message of the EU has been quite clear – it is committed to combat climate change and sees emissions trading as a key tool to reduce emissions. The EU welcomes other countries to join the global carbon market and EU is willing to link other trading schemes to the EU ETS which is currently the most important carbon market.

3. Current status of operational and planned trading schemes

This chapter reviews the current status of the greenhouse gas trading schemes in Australia, Canada, Japan, Norway, Switzerland and the United States. Norway and Switzerland are covered in the same subchapter as they both are members of the European Economic Area (EFTA). The compatibility of the schemes with the EU ETS is evaluated and main requirements for linking are discussed.

3.1 Australia

The greenhouse gas emissions of Australia are projected to reach some 603 million tonnes CO₂e annually in 2008–2012. This is 109% of country's emissions in 1990 and slightly above Australia's Kyoto target 108%. Australia is committed to its Kyoto target despite the fact that it has not ratified the Kyoto Protocol. By 2020 country's greenhouse gas emissions are projected to increase by 27% from 1990 level.

Australia has implemented various policies and measures to reduce its greenhouse gas emissions and they are estimated to reduce emissions by 87 million tonnes in 2010. Some of the policies are:

- Greenhouse Gas Abatement Programme leverages private sector investment in activities or technologies that will result in substantial reductions of greenhouse gas emissions or sink enhancement, particularly in the period 2008–2012.
- Challenge Plus – Industry Partnerships, aiming to reduce emissions some 16 million tonnes in 2010. Programme promotes best practises in the power generation using fossil fuels and label greenhouse gas neutral products.
- Renewable energy sources are promoted with Mandatory Renewable Energy Target that will ensure that 9.5 TWh new renewable electricity enter into production in 2010. In addition there are other support programmes to promote renewable energy.
- New South Wales Greenhouse Gas Abatement Scheme (GGAS) is the second largest operational regional or state level in the world with 20 million tCO₂ traded in 2006.

New South Wales (NSW), Australian Capital Territory (ACT) – Greenhouse Gas Abatement Scheme (GGAS) in a nutshell

Status	Planned
Start	NSW 2003, ACT 2005
Design	Baseline-and-credit
Mandatory/Voluntary	Mandatory
Trading periods	Calendar year, the benchmark is set to 2012 but NWS government has committed to extend targets to 2020.
Coverage	Electricity sector; electricity retail licence holders ("Benchmark participants") electricity generators electricity sellers large consumer (<100 GWh/a) may voluntarily manage their own greenhouse gas benchmarks
Number of installations/companies	In 2005 there were 37 Benchmark participants of which 26 were mandatory and 11 voluntary participants.
Included gases	All 6 greenhouse gases
Allocation methodology	GGAS establishes an annual State-wide greenhouse gas benchmark for the electricity sector. Benchmark participants are allocated the mandatory greenhouse gas benchmark, based on their share of the NSW electricity demand. To be compliant Benchmark participants has surrender abatement certificates created from project-based emission reduction activities. The benchmark was set to 8.65 tCO ₂ e/per capita in 2003 and it decreased gradually to 7.27 tCO ₂ e/per capita by 2007 where it remains until 2020. The NSW Pool Coefficient is the average emissions intensity of electricity sourced from the electricity grid in NSW. This coefficient is used to determine the emissions of the Benchmark participant each year. The coefficient is announced in November the previous year and it is calculated from the emissions of five previous years. In 2006 the coefficient was 0.929 tCO ₂ e/MWh.
Allocation	Project-based emission reduction activities, from which abatement certificates can be created, include: Low-emission generation of electricity (including cogeneration) or improvements in emission intensity of existing generation activities (generation) Activities that result in reduced consumption of electricity (demand side abatement). Activities carried out by elective participants that reduce on-site emissions not directly related to electricity consumption (large user abatement). The capture of carbon from the atmosphere in forests (carbon Sequestration) Abatement certificate projects have to be accredited by the scheme administrator. The administrator assesses the application to validate that the project meets the eligibility requirements and that the project proponent can calculate abatement appropriately. Some 37 million abatement certificates have been issued to some 150 projects since 2003. There are some 100 organisations that have been accredited as abatement certificate providers.
Monitoring	Benchmark participants to submit their Annual Greenhouse Gas Benchmark Statements by April 18 th . The statements include electricity sales, greenhouse gas benchmark, and the number and details of abatement certificates surrendered. Voluntary participants have surrender certificates by June 20 th . The abatement certificates may come only from accredited abatement certificate providers.
Penalty and price cap	AUD 11.50 ~ EUR 6.7 in 2006

New South Wales (NSW), Australian Capital Territory (ACT) – Greenhouse Gas Abatement Scheme (GGAS) in a nutshell	
Linking to other schemes	Benchmark Participants can also claim the greenhouse gas emission reductions associated with the surrender of Renewable Energy Certificates (RECs) under the Commonwealth's Mandatory Renewable Energy Target (MRET). This is limited to RECs that has been surrendered in respect of electricity sales in NSW. The "value" of one REC in the GGAS is calculated annually and it is roughly same as the NSW Pool Coefficient (0.929 tCO ₂ e/MWh in 2006). Only abatement projects in NSW and ACT are eligible.
Banking	Allowed: abatement certificates are bankable. The benchmark participant can also carry forward 10% of their shortfall to the following year.
Units	1 metric ton CO ₂ e.
Compatibility with the EU ETS	Design of the GGAS scheme is not similar to the EU ETS. The main common features are that electricity production is important sector in both schemes and that participation to the schemes is mandatory.
	There are also some fundamental differences in the schemes such as: The EU ETS is cap-and-trade scheme, while GGAS is based on the baseline-and-credit approach. The abatement credits of the GGAS are issued to projects The penalty levels are far from each other: In the EU ETS 100 €/missing allowances + missing allowances have to be surrendered in the subsequent year. In the GGAS penalty € 6.7 € tCO₂e GGAS is based on various types of abatement projects that do not always have to be inline with the Kyoto Protocol rules. As the Australia has not ratified the Kyoto Protocol it does not have any AAUs, while the EU emission allowances include the AAU. Linking the GGAS scheme with the EU ETS would be very challenging. Due to fact that the design of the GGAS is fundamentally different to the EU ETS.

The NWS GGAS is the only greenhouse gas emissions trading scheme in place in Australia currently. The scheme is based on the baseline-and-credit approach and emission abatement projects play a key role in the scheme. These projects can be implemented also outside the installations included in the scheme. The design of the GGAS is different to the EU ETS which creates challenges linking the schemes. Moreover, Australia has not ratified the Kyoto protocol which creates additional difficulties for linking.

The EU emission allowances include the Assigned Amount Units (AAU) which are the trading units allocated to the countries in the Kyoto Protocol. In the EU ETS, when emissions allowances are sold to another country, the AAUs that are attached to the emission allowances are simultaneously transferred – this keeps the country level AAUs in balance. As Australia is not able to sell AAUs, purchasing emission credits/abatement certificates from GGAS would not include AAUs. The emission balance under the Kyoto Protocol in the EU member state where the credits would be used would not be in line with the balance under the EU ETS. However the EU Commission has said that this is not a major problem. Moreover, the penalty level and the price cap in the GGAS (6.7 €) is relatively low level compared to the EU ETS (100 €). Based on the

major differences in the design of the EU ETS and the GGAS we find it very unlikely that these two schemes would be directly linked. However, it could be possible that the GGAS would allow use of emissions reduction credits from the CDM projects for a compliance in the future, which would link the two schemes indirectly.

In addition to the GGAS, there have been high level discussions about possible domestic emissions trading scheme. In 2004 the Australian Government's Energy White Paper, "Securing Australia's Energy Future", identified emissions trading as potentially least-cost approach to reducing emissions subject to an effective global approach being in prospect. The Australian Prime Minister announced on December 10th 2006 the establishment of a joint government-business Task Group on Emissions Trading. The work plan of the group was published in the beginning of 2007 and its main objective is to "*advise on the nature and design of a workable global emissions trading system in which Australia would be able to participate.*" The group should also advise on the domestic action required that would be in line with the goal of establishing a workable global emissions trading system. Some of the key issues are to evaluate whether a domestic trading scheme would be inline with such a goal. Moreover, the group is expected to evaluate what are the pros and cons of Australia's adopting a domestic emissions trading scheme in the absence of a universal, fully-developed international scheme and how should the key design of such a scheme look like. The group will report to the Prime minister by May 31st 2007.

Earlier in 2006 State and Territory Governments in Australia raised a possible domestic trading scheme on the agenda. On August 2006 National Emissions Trading Taskforce (NETT), an organisation established by Australian State and Territory Governments, published a discussion paper on the possible design for a National Greenhouse Gas Emissions Trading Scheme (NETS).

At its second meeting on February 9th 2007 the Council for the Australian Federation (CAF), State Premiers and Territory Chief Ministers expressed their wish that the Prime Minister would make a commitment to introduce a national emissions trading scheme based on the Emissions Trading Task Group's report in May 2007. Interestingly, the Premiers and Chief Ministers stated that "*if the Commonwealth refused to commit at that time, the States and Territories would introduce an emissions trading scheme by the end of 2010.*" The design of a possible domestic trading scheme is not yet decided but here we evaluate the possibilities to link the trading scheme outlined by the NETT in its discussion paper published in 2006.

National Greenhouse Gas Emissions Trading Scheme (NETS) in a nutshell	
Status	Discussion paper
Start	2010
Design	Cap-and-trade
Mandatory/Voluntary	Mandatory
Trading periods	A firm cap would be set for 10 years. Every year the firm cap would be extended by another year. For future firm caps, upper and lower bounds would be set.
Coverage	Electricity generation over 30 MW ^{electricity} Later the scheme could also extended: Other stationary energy installations with emissions over 25 000 tonnes annually fugitive emissions from gas pipelines
Number of installations/companies	~100 installation with emissions of 190 million tonnes annually. After extension some 250 installations with emissions 275 million tonnes annually (45% of Australia's greenhouse gas emissions)
Included gases	All 6 greenhouse gases
Allocation methodology	Grandfathering and auctioning
Allocation	Some allowances would be allocated for free to those existing generators estimated to be significantly adversely affected by the scheme. New generators would not get free allowances. Some allowances would be allocated for free to firms in trade-exposed, energy-intensive industries (both existing and new). The remainder of allowances would be auctioned. Auction revenue would be divided among the States and Territories on a basis yet to be determined, but in a manner that recognises the differing impacts of the scheme. This revenue could be used to fund assistance measures for others, such as households, regions and small business.
Monitoring	Mandatory reporting and monitoring but no details available yet.
Penalty and price cap	Not decided. It is proposed that penalty would act as a price cap e.g. paying penalty would remove the obligation to surrender allowances.
Linking to other schemes	Use of CDM emission credits would be allowed (unilateral direct link). Also offset from domestic emission reduction projects would be included. It is proposed that bilateral linking with other trading schemes is explored later.
Banking	Indefinitely banking. Borrowing not allowed.
Units	1 metric ton CO ₂ e.
Compatibility with the EU ETS	Design of the NETS is still very vague but it has many similarities to the EU ETS. Both system are based on the cap-and-trade approach and mandatory participation Both cover emissions from power generation The main differences: The NETS allows use of offsets that are not Kyoto compliant. As the Australia has not ratified the Kyoto Protocol it does not have any AAUs, while the EU emission allowances include the AAU.

The Australian NETS drafted by the National Emissions Trading Taskforce is still in its infancy. There is currently a debate on who will be in charge of creating a domestic trading scheme in Australia – Australian government or State and Territory Governments. Latter are the most active ones. The details of the NETS are not yet defined, but the discussion paper examines possibilities to link the NETS to other trading schemes.

The discussion paper recognises that the EU ETS is perhaps the most obvious candidate for bilateral direct linking but other trading schemes such as schemes in USA and Canada could also be considered. Moreover the discussion paper highlights the need for further examine the costs and benefits of bilateral linking before definitive position can be reached. The NETS discussion paper also highlights that despite the fact that schemes with different designs can be linked, it is easier to link bilaterally with similar design.

The NETS discussion paper also covers possibility to link schemes unilaterally. Unilateral direct link is seen as a “safety valve” of the allowance price in the domestic market. Unilateral link to the EU ETS could be done without any technical problems as the EU allowances include the AAU. However the discussion paper is concerned about the political acceptance of such link, since it might increase the allowance price in the EU ETS. Also emission reduction credits from the JI/CDM projects could be unilaterally linked to the NETS. This would require the NETS administrator to open an account in the Annex B country⁴ registry where the purchased credits would be cancelled and identical number of offset credits would be created in the NETS registry. There are many benefits from the unilateral linking of CDM to the NETS.

- Australia would be linked to the global carbon market even though it has not ratified the Kyoto Protocol.
- Australia would be helping in transferring clean technology to the developing countries
- Transactions costs would be small as the international infrastructure for administrating CDM is already in place
- Australian companies have not been very active on the CDM/JI market. This could boost they interest to participate in larger extent to the carbon market.

The draft NETS includes the unilateral link to the CDM market which would effectively link the NETS indirectly also to other trading schemes that allow the use of CDM emission reduction credits for compliance.

By and large, the NETS is still in its infancy but it is obvious that linking the scheme to other trading schemes will be further examined when the details of the NETS are planned. Due to unclear political situation in Australia it is difficult to draw strong conclusions weather there is a domestic trading scheme in place in the future or when it could be commissioned. In general, if such a scheme is implemented, it will be likely that at least CDM projects will be included in the scheme.

⁴ Country that has ratified the Kyoto Protocol and has emission cap.

3.2 Canada

Canada has a very challenging reduction target under the Kyoto Protocol. The greenhouse gas emissions of Canada were 26.6% above the 1990 levels in 2004 and Canada's Kyoto target is to reduce emissions 6% below the 1990 levels. In 2005 the Government of Canada published a plan how to reach its Kyoto target and reduce emissions some 270 MtCO₂e in 2008–2012. The plan included various policies and measures such as:

- Large Final Emitters -trading scheme (LFE)
- Climate fund that will purchase domestic emissions offsets and Kyoto emission reduction credits
- Promotion of renewable energy sources, improving carbon sinks
- Voluntary agreement of the car industry
- Promotion of greenhouse gas reduction programs, changing consumer behaviour and reducing the emissions of the authorities with green procurement policies.

The new conservative Government that entered into power in the beginning of 2006 has not yet made any specific decisions on climate policy and consequently the status of the Large Final Emitters Scheme and plan how to Canada is going to achieve its Kyoto target is unknown. On October 19th 2006 the Government introduced a clear air act that would set a short-term intensity-based greenhouse gas reduction targets with consultation of provinces and territories and all affected industry sectors. In the long term, the Canadian Government is committed to achieving an absolute reduction in GHG emissions between 45% and 65% from 2003 levels by 2050. However the conservative government is reluctant to purchase emissions reduction credits abroad. The proposal of the government did not include any plans to create emissions trading market. By and large, the current situation in Canada is unclear. Here, we evaluate the main challenges of linking the proposed LFE scheme to the EU ETS.

Canadian Large Final Emitters (LFE) scheme proposal in a nutshell

Status	Planned
Start	2008
Design	Baseline-and-credit
Mandatory/Voluntary	Mandatory
Trading periods	2008–2012
Coverage	Oil and gas
	Mining
	Pulp and paper production
	Chemical production
	Iron and steel production
	Smelting and refining
	Cement and Lime production

	Glass and glass container production (Process emissions would be excluded e.g. emissions from the underlying chemical reactions and not from the fuel combustion. About 50% of the Canada's greenhouse gas emissions would be included in the scheme)
Number of installations/companies	app. 700 companies of which 80–90 companies would have a market share of 85%
Canadian Large Final Emitters (LFE) scheme proposal in a nutshell	
Included gases	All 6 greenhouse gases
Allocation methodology	In the baseline-and-credit system, companies that emit less than their emissions intensity targets receive bankable and transferable (sellable) credits. The intensity target is based on reductions from the forecasted emissions intensities (tCO₂e/output). Typically the target would be 15% below the projected BAU emissions in 2010. For the new entrants the targets would be based on the Best Available Technology Economically Achievable approach
Allocation	Reduction target is 45 MtCO ₂ e/y (12% from the business-as-usual scenario)
Monitoring	Emissions are reported annually by June 30 th . The government would then evaluate the report and publish compliance status by September 30 th . After the reporting the companies would receive the emission credits that they can sell to companies that exceeded their targets. The companies would have to close their positions by December 31 st .
Penalty and price cap	Not decided but maximum 200 CAD/ton CO ₂ e (130 €) is proposed. The proposal includes a price cap of 15 CAD/ ton CO ₂ e (9.7 €). The price cap could be implemented in a way that companies could purchase credits from the Greenhouse gas Technology Investment Fund (Technology Investment Units) up to 9 million tons. If this limit is exceeded government considers an issuance of special credits. The revenues from these special credits would be directed to the Technology Investment Fund.
Linking to other schemes	Companies could use emission credits from the domestic offsets. In addition Kyoto protocol units CERs, ERUs and AAUs could be used for compliances. (AAUs would have to be from the Green Investment Schemes (e.g. not hot air) and government would publish further guidance for eligible AAUs). There is no published limit for how much companies could use Kyoto units or neither what type of projects would be eligible.
Banking Units	allowed 1 metric ton
Compatibility with the EU ETS	Design of the LFE scheme is not similar to the EU ETS but they have some common features: Both systems cover direct CO₂ emissions from the combustion of fossil fuels. In addition LFE include other gases. CDM/JI credits can be used for compliance. The trading periods are corresponding There are also some fundamental differences such as: The EU ETS is cap-and-trade scheme, while LFE is based on the baseline-and-credit approach. The emission credits of the LFE are issued <i>ex post</i> after the reporting of the emissions. The environmental value of the credits and EU emission allowances differ. By and large, in some cases the amount of emission credits can increase same time when the production increases and the absolute emissions increases. The penalty levels are far from each other: EU ETS 100 €/missing allowances + missing allowances have to be surrendered in the subsequent year. In LFE penalty of 130 € is mentioned but there is no mention whether the missing credits has to be surrendered later. LFE has a price cap of 9.7 €/tCO₂e. The EU ETS does not have price cap. LFE does not limit the use of emission reduction units from the carbon sinks under the Kyoto Protocol (LULUCF) of large hydro power projects The EU emission allowance includes the AAU but as the LFE is baseline-and-credit scheme the credits do not include the AAU.

The LFE scheme is based on the baseline-and-credit approach which is totally different from the cap-and-trade-based EU ETS. This creates several challenges for compatibility of the schemes. The emission allowances include the Assigned Amount Units (AAU) which are the trading units allocated to the countries under the Kyoto Protocol. In the EU ETS, when emissions allowances are sold to another country, the AAUs that are attached to the emission allowances are simultaneously transferred –this keeps the country level AAUs in balance. The proposed LFE scheme is based on emission credits which do not include the AAU. This would make it difficult for EU countries to accept LFE's credits for compliance in the EU ETS, as the imported credits would not increase the amount of AAUs in the EU and would not allow increase of EU's absolute emissions; the imported credit would not be accounted for the benefit of the EU countries under the Kyoto Protocol. In other words, the environmental equivalence of the LFE emission credits is different from the EU emissions allowances. One way to solve this problem could be that Canadian government would change LFE emission credits to AAUs if they are sold the EU ETS market.

The LFE scheme has a price cap of 15 CAD/ tCO₂e (9.7 €), whereas no such cap exists in the EU ETS. In other words the price cap would be the maximum price that the Canadian companies could pay for compliance. How the price cap is implemented in the LFE is not yet decided. If the markets would be linked, the markets would be segmented. Companies in the EU ETS could possibly pay higher prices for the emission allowances than the LFE's price cap. This would reduce the economic efficiency of the market.

The number of units that can be used for compliance are higher in the LFE scheme. Whereas the EU ETS allows only EU emission allowances and emission reduction units from the CDM/JI projects, the LFE schemes also allows greened AAU (from the Green Investment Schemes (GIS) or similar), emission reduction units from the carbon sinks (LULUCF) and CDM/JI emission reduction units from large hydropower projects. Effectively linking the EU ETS and LFEs would allow European companies to benefit from the larger number of compliance units as they could transfer those units through the LFE scheme.

In addition to the items above there are several differences in schemes. As the number of the emission credits in the baseline-and-credit, such as LFE, is known only after the reporting period is over it is difficult to estimate how liquid market the LFE scheme would create, or how much emission credits there would be in the market. Consequently, it is complicated to estimate how much the linking of the LFE and the EU ETS would improve the liquidity of both markets.

The International Institute for Sustainable Development (IISD) organised an expert workshop on emissions trading in Montreal on December

12th 2006⁵. One of the topics discussed in the workshop was linking of various greenhouse gas emissions trading schemes. Various views were expressed on the topic. Many workshop participants highlighted that it is challenging to link the proposed LFE scheme to the EU ETS due to many differences in the system design and approach. However, some workshop participants saw the linking critical for the LFE in order to guarantee sufficient liquidity for the market.

By and large, the overall climate policy of Canada is currently vague. The minority government, lead by the conservatives, has indicated that Canada is not able to achieve its Kyoto emission reduction target. According to the market experts, Canada is not able to meet its target without utilising the Kyoto mechanisms, which the current Government has been reluctant to do. Based on the current difficult political situation and major differences in the design of the LFE and the EU ETS, we find it unlikely that the proposed LFE scheme will be linked to the EU ETS in the near term.

⁵ IISD (2006). Report from Expert Workshop: Emissions Trading.

3.3 Japan

Japan's Voluntary Emissions Trading Scheme (JVETS) and Keidalen Voluntary Action Plan on Environment (KVAP) in a nutshell	
Status	JVETS: Implemented KVAP: Implemented
Start	JVETS: 2005 KVAP: 1997
Design	JVETS: Voluntary cap-and-trade system with subsidies KVAP: Different kinds of voluntary targets, no trading between Japanese companies, but purchasing of CERs and ERUs is possible.
Mandatory/Voluntary	JVETS: Voluntary KVAP: Voluntary
Trading periods	JVETS: 2005–2012 (may continue until 2012, if mandatory trading system will not be implemented). KVAP: Targets set in 1997, the system is likely to continue until 2012, if mandatory trading system will not be implemented.
Coverage	JVETS: 59 Companies KVAP: 35 industries covering at least about 80% of GHG emitted from industry and energy sector in Japan, and 45% of Japan's CO ₂ emissions.
Number of installations/companies	See above
Included gases	JVETS: CO ₂ emissions from energy conservation and switching from oil to a less carbon intensive fuels. KVAP: CO ₂
Allocation methodology	JVETS: History based allocation. (Average emissions in reference period minus companies' expected emissions reductions). KVAP: No allocation
Allocation	JVETS: Participants have promised to reduce emissions about 1.3 MtCO ₂ e (21% from the business-as-usual scenario). Targets are voluntary.
Monitoring	JVETS: Emissions are verified KVAP: Government reviews the process to the targets annually
Penalty and price cap	JVETS: No penalties, but participants must return subsidies, if targets are not met. No price caps. KVAP: No penalties. No price caps.
Linking to other schemes	CERs and ERUs can be used for compliance in both programs.
Banking	N/A
Units	N/A
Compatibility with the EU ETS	Linking the current Japanese system with the EU ETS would be very challenging. The programs are fundamentally different to the EU ETS, because of their voluntary nature. Even if they were mandatory, they have other significant differences with EU ETS. For example in JVETS companies receive subsidies due to emissions reduction. In KVAT bases companies can select between several kinds of different targets. Thus complex exchange rates would be needed in order to make trades between KVAT and EU ETS,

Japan's target under the Kyoto protocol is challenging: to reduce emissions by 6% from the 1990 level. In 2003 country's emissions were more than 12% over the 1990 level. Japanese government outlined the required

measures to fulfil the target in “Kyoto Protocol Achievement Plan” in 2005. Policies outlined in the plan are meant to cover significant part of the required emissions reduction. The rest of the target will be covered by governmental purchases through Kyoto mechanisms. The plan also indicates that establishing comprehensive cap-and-trade ETS in Japan is still under consideration. Japanese Ministry of Environment has stated that this kind of system would contribute in achieving cost efficient emissions reduction in Japan, and that linking the potential system with EU ETS would supposedly be useful. Ministry of Trade and Industry has objected such system because of its negative effects on competition.

Currently Japan has two implemented programs, which allow emissions trading for Japanese companies in one form or another. However both of the systems differ significantly from the EU ETS, from their basic principles.

Japan’s Voluntary Emissions Trading Scheme is a narrow system with only 59 participating companies in 2006. It allocates allowances to firms that establish voluntary emissions reduction targets, and provides subsidies for emissions reductions. The system concerns CO₂ emission reductions from energy conservation and switching from oil to a less carbon intensive fuels. The companies within the system can meet their targets by purchasing allowances from other companies, or by purchasing CERs. One purpose of the scheme is to practise company-based emissions trading. The scheme may be continued until 2012 if the covering mandatory scheme will not be established.

The other more covering program is the Keidanren Action Plan on the Environment. In 2005 the plan covered 35 industries and at least about 80% of aggregated emissions from the Japanese energy and industry sectors. Within the scheme industries can choose voluntary reduction targets from the areas of energy intensity, energy consumption, CO₂ emissions intensity and absolute CO₂ emissions. Companies can use CERs for compliance, but trading between companies is not possible within the scheme.

Currently Japan does not have emissions trading system even nearly similar to the EU ETS. The current programs allow emissions trading in some form, but they are fundamentally different from the EU ETS, mainly because of their voluntary nature. Even if they were mandatory, they have several other fundamental differences, which would make it very challenging to establish a link with EU ETS. Japan has considered implementing covering and binding trading scheme, which could be linked also into the EU ETS, but the current situation of such plans is not clear. However, setting up a domestic emissions trading scheme is also discussed in Japan.

3.4 United States

In 2004 the greenhouse gas emissions of the USA were 15.8% above the 1990 level. The emissions are projected to increase to 6,473–6,783 MtCO₂e by 2010. In 2001, President Bush announced that the USA will not ratify the Kyoto Protocol as it would harm the economy of the country. This was a significant drawback for the international climate policy as the USA is the largest emitter of greenhouse gases.

However, there are various initiatives in the USA to combat climate change and reduce greenhouse gas emissions (see Chapter 4). Currently the objective of the climate policy of the USA is to reduce greenhouse gas intensity of country's economy by 18% by 2012. Over the years there have been several proposals to create domestic federal level trading schemes for greenhouse gas emissions. The characteristics of proposals in the Senate are listed in Appendix 1.

As the situation of the federal level emissions trading scheme is unclear, we concentrate analysing the possibilities to link more advanced state level trading schemes to the EU ETS.

Regional Greenhouse Gas Initiative (RGGI)

Regional Greenhouse Gas Initiative (RGGI) in a nutshell	
Status	Planned
Start	2009
Design	Cap-and-trade
Mandatory/Voluntary	Mandatory
Trading periods	Three year periods
Coverage	Coal, oil and gas fired power generation with capacity over 25 MW The states participating in RGGI are: Connecticut, Delaware, Maine, New Hampshire, New Jersey, New York and Vermont. The State of Maryland recently adopted legislation requiring Maryland to join RGGI by June 2007.
Number of installations/companies	~700
Included gases	CO ₂
Allocation methodology	Not decided. 25% of the allowances would be set aside for consumer benefit (energy efficiency, new clean technologies etc.) and strategic energy purpose.
Allocation	Emissions would be capped to 110 million tons from 2009–2015 In 2016–2019 the allocation would reduce annually by 2.5%
Monitoring	Emissions reports are due March 1st annually with a certification statement from the CO ₂ authorized account representative.
Penalty and price cap	Penalty is not decided, but one earlier proposal a penalty of 3 x missing allowance has been discussed. E.g. for the each missing allowances, three allowances has to be surrendered.
Linking to other schemes	See units below. There has also been discussion with linking the RGGI to the Canadian trading scheme(s) but any decision on this field has not been made.
Banking	Allowed

Regional Greenhouse Gas Initiative (RGGI) in a nutshell	
Units	Various units can be used for a compliance: Allowances Early reduction credits Maximum 3.3% offsets units can be used for compliance. Offsets are from: Landfill gas Afforestation SF6 capture and recycling Energy efficiency units from end-use of natural gas, home heating oil and propane Methane capturing in farming Reduction of methane gas leakage in natural gas transmission and distribution The offsets can also be from the US states that do not participate RGGI - a memorandum of understanding between the authorities is then a prerequisite. If the average annual price of an emission allowance were to rise above USD 7, companies will be permitted to use offsets for up to 5% of a plant's reported emissions. If the average price rises above USD 10, then sources will be permitted to use offsets for up to 10% of a plant's reported emissions and offsets from international trading programs (CDM/JI) will be allowed.
Compatibility with the EU ETS	Many characteristics of the RGGI are similar to the EU ETS and the schemes could be linked relatively easily. The common features include: Both system are based on the cap-and-trade approach and mandatory participation Both cover CO₂ emissions power generation The main differences: The RGGI allows use of various type offsets. The limit how much offsets can be used depends on the market price of the allowances. The trading periods are not similar As the USA has not ratified the Kyoto Protocol it does not have any AAUs, while the EU emission allowances include the AAU. The carbon leakage has been seen a problem in the RGGI. Power companies in the neighbouring states without carbon constraints could export electricity to RGGI region – emissions in the RGGI area would reduce but emissions in the importing state would increase. RGGI has established a working group to evaluate possible mechanisms to address leakage. The final report of the working group is expected in December 2007. The leakage is important also when evaluating the possibility to link the RGGI to the EU ETS. If the leakage problem is not solved it would jeopardize the environmental integrity of the RGGI scheme and consequently EU might be reluctant to link the EU ETS to the RGGI.

The Regional Greenhouse Gas Initiative (RGGI) of the North-Eastern and Mid-Atlantic states resembles the EU ETS in many ways. However, as the USA has not ratified the Kyoto Protocol the ambition level of the RGGI is not as high as the level of the EU ETS. The RGGI caps emissions to 2000 levels for 2009–2015 and is then reduced by 10% by 2019. The EU, on the other hand, is aiming for 8% cut in the total greenhouse gas emissions from 1990 level in 2008–2012. The long term EU target is to reduce emissions by 20% by 2020 and if international climate agreement is accomplished by 30% by 2020. The EU ETS is in central role in achieving this target. The difference in the ambition level could impact

the competitiveness of the participating companies as the companies in the RGGI would likely to be on the selling side if the two schemes would be linked. Then again, the European companies would be able to purchase relatively cheap allowances from the U.S. companies. This would be problematic as the number of AAUs would not increase simultaneously when the emissions allowances from the RGGI are imported to the EU ETS. This problem could be avoided with some type of gateway system that would not allow number of allowances from the RGGI scheme imported to the EU to be larger than number of allowances from the EU ETS exported to the RGGI. In practise, limiting the transfer of the allowances would reduce the efficiency of the system.

The possible carbon leakage of the RGGI poses a problem. The EU has been strict on the environmental integrity of the climate policy and consequently it would be difficult for the commission to accept linking of the EU ETS to the scheme that might allow leakages. The RGGI has set up a working group to examine possible solutions for the leakage problem.

By and large, as the USA has not ratified the Kyoto Protocol and EU is working on creating global carbon market, it could be in the interest of the EU to link the RGGI to the EU ETS. This could pave way for other USA states to join the global carbon market.

Western Regional Climate Action Initiative

The Governor of California, Mr. Arnold Schwarzenegger approved the California Global Warming Solutions Act of 2006 that creates a framework for local emissions trading scheme. The bill caps the state greenhouse gas emissions to 1990 levels by 2020. The State Air Resources Board has to prepare and approve a scoping plan for achieving *the maximum technologically feasible and cost-effective reductions in the greenhouse gas emissions* by January 1st 2009. Among other issues, the plan shall identify and recommend market-based compliance mechanisms to achieve the 2020 target. The greenhouse gas emission limits (cap) will be implemented at latest in 2012. The bill states that the State Air Resources Board may include market-based compliance mechanism e.g. emissions trading but not necessarily. Prior to implementing a trading scheme, the board has to take into account its impacts on emissions, as well as on environmental and economic benefits for California.

On February 26th 2007, Governor Schwarzenegger signed together with the Governors of Arizona, New Mexico, Oregon and Washington a Memorandum of Understanding (MoU) creating the Western Regional Climate Action Initiative, a joint strategy to fight global warming. The five states agreed to establish a regional emission reduction goal within 6 months and a plan to meet that goal within 18 months. According to the MoU the plan shall include *a regional market-based multi-sector mechanism, such as load-based cap and trade programme*. The greenhouse gas

emissions of these five states are some 800 million tonnes CO₂e annually. There are no details of the trading scheme available yet but it is expected to include multiple sectors unlike the RGGI that concerns only electricity sector. The five states welcome also other states and Canadian provinces and Mexican states to join the initiative.

As the rules of the western states trading scheme are not available yet, one can not make any detailed conclusions about its compatibility with the EU ETS. Included states have established state level emission targets (Table 1) with various ambition levels, but they are relatively lax compared to EU's target to reduce emissions by 20% by 2020 and if international climate agreement is accomplished by 30% by 2020. This could similarly to RGGI be a barrier for linking the scheme to the EU ETS

By and large, the approach of the proposed the western states scheme has common features with the EU ETS: cap-and-trade mechanisms covering multiple sectors. This makes a good foundation for the linking, but as said, further details of the western states scheme are needed.

Table 1. Western Regional Climate Action Initiative, emissions and emission targets

State	Emissions 1990	Emissions 2000	Change,%	Emission targets
Arizona	70.40	96.70	37.36	To reduce to 2000 levels by 2020 and 50% below 2000 levels by 2050
California	417.50	463.20	10.95	To reduce 2000 levels by 2010, 1990 levels by 2020 and 80% below 1990 levels by 2050
New Mexico	58.70	67.80	15.50	To reduce to 2000 levels by 2012, 10% below 2000 levels by 2020 and 75% below 2000 levels by 2050
Oregon	40.80	52.60	28.92	To stabilize emissions by 2010, reduce 10% from 1990 levels by 2020 and reduce 75% below 1990 levels by 2050
Washington	88.60	100.70	13.66	To reduce to 1990 levels by 2020, 25% below 1990 levels by 2035 and 50% below 1990 levels by 2050

3.5 EFTA countries – Norway and Switzerland

3.5.1 Background

European Economic Area (EEA Agreement) enables Norway, Iceland and Liechtenstein to participate in the EU's internal market without assuming full membership of the EU. Switzerland has not signed the EEA Agreement; instead the country is linked to EU with Swiss-EU bilateral

agreements. However, Switzerland is member of European Free Trade Association (EFTA) similarly to Norway, Iceland and Liechtenstein.

The EU is inviting and encouraging all the EEA countries to join the EU Emission Trading Scheme under the specific arrangements between the EU and the EEA. The Commission wished that the EEA countries would have joined the scheme as of the start of the scheme but the process is still ongoing. The EU ETS is a clear internal market concern, and it would be beneficial that members of the EEA would be included in the scheme.

There have earlier been some controversies between the EEA countries and the EU regarding those countries wanting to join the system. The EU has the opinion that the EU ETS is a relevant part of the EEA and that the EEA countries should implement the existing system as such. This is being refused by the EFTA countries, but Norway now negotiates directly with the European Commission and the overall target is to link the Norwegian emissions trading system to the EU ETS when the second trading period starts in 2008.

Table 2. The status of linking in the EEA countries

Country	Status
Iceland	n/a
Liechtenstein	n/a
Norway	Currently negotiating with the EU to be linked up to EU ETS.
Switzerland	The Swiss government aims at linking the recently approved domestic ETS scheme to the EU ETS.

In 2004, Switzerland, Norway and Liechtenstein were not on the track to meet their Kyoto targets. Switzerland projects to reach its target with additional domestic policies and measures as well as the use of Kyoto mechanisms. Norway and Liechtenstein project to reach their targets with existing domestic policies and measures as well as the use of Kyoto mechanisms. Iceland was on track to achieve its Kyoto commitment of +10% under the Kyoto Protocol. By and large, Liechtenstein, Norway and Switzerland are planning to utilise Kyoto mechanisms and they could benefit from the improved economic efficiency of linking their domestic actions to the EU ETS.

3.5.2 Norway

Norwegian trading scheme in a nutshell	
Status	Operational, (2008–2012 in advance stage)
Start	2005
Design	Cap-and-trade
Mandatory/Voluntary	Mandatory
Trading periods	2005–2007
Coverage	Energy production, Mineral oil refining, Coce production, Production and process of iron and steel, including roasting and sintering or iron ore, Production of cement, lime, glass fibre and ceramic products [activities exempted: offshore petroleum activities, pulp and paper industry]
Number of installations/companies	51 installations, 32 companies.
Included gases	CO ₂
Allocation methodology	Free of charge. Based on average emissions 1998–2001. Allocation for installations that started operation after 2001, the technological and economic potential to reduce emissions are taken into account.
Allocation	5.9 million allowances in 2005; 20.5 million for the period 2005–2007
Monitoring	Emissions are reported annually by March 1 st , authorities <i>may</i> demand an independent verification of the emissions reports before they are submitted.
Penalty and price cap	40 €/missing allowance and missing allowances has to surrendered in the subsequence year. No price cap.
Linking to other schemes	CERs from the CDM projects (indirect link to the EU ETS) and emission allowances of the EU ETS can be used (unilateral direct link) for a compliance in the Norwegian scheme
Banking	Allowed inside the period
Units	1 metric ton
Compatibility with the EU ETS	Design of the Norwegian scheme is very similar to the EU ETS. The main differences: Offshore petroleum activities and pulp and paper industry are excluded from the Norwegian scheme There is not decision for continuation of the Norwegian scheme in 2008–2012 yet, but officials are working on the allocation methodology and linking to the EU ETS indicating that the continuation is very likely Verification of the emissions is not mandatory in the Norwegian scheme

The Government of Norway started to explore the potential design of an emissions trading system already in 1998. In August 2001, the Government released a white paper on climate policy, which included recommendations on a domestic emissions trading system that would replace the then current carbon dioxide tax law. The CO₂ tax has been the main climate policy tool in Norway since 1991.

Norway introduced its emission trading system simultaneously with the EU in January 2005. This system is much the same as the EU ETS, and the main difference is that the sectors that have a CO₂ tax are exempted from the trading scheme.

The current emission trading scheme is less extensive than what is planned for the Kyoto commitment period 2008–2012. In Norway 32 companies, which are responsible for about 13% of the emissions of greenhouse gases, are included in the current scheme. These companies have to apply for emission allowances from Statens Forurensingstilsyn. In September 2005 a total of 20.5 million emissions allowances were

allocated to 51 installations for the period 2005–2007. About 67% of the total allowances for the years 2005–2006 are allocated to the petroleum-related industry, that is, gas-fired power plants, natural-gas terminals, refineries, and the petrochemical industry. The mineral industry receives 26% of the allowances.

The Norwegian government has decided to allow linking of its domestic emissions trading scheme with the EU ETS through the European Economic Area (EEA) agreement. Such linking would make it possible to transfer allowances between companies in Norway and in the EU countries. This decision by the Norwegian government, however, does not mean that the issue is solved.

The Norwegian emission trading system is supposed to be linked to the EU ETS through a linking agreement according to Article 25 of the EU Emissions Trading Directive. The government is hoping that this will give more room for flexibility than if the EU Emission Trading Directive should be implemented as an EEA relevant directive as such. The directive itself is stating that emission trading is a part of the internal market and that it is EAA relevant, but this has been questioned. The Norwegian Government has approached the EU Commission on this issue. Norway will probably be the first country linking the domestic emission trading system to EU ETS.

One important discussion will be about how large amount of allowances should be allocated free of charge and how much will be auctioned. Inclusion in the EEA agreement will also depend on approval from Iceland and Liechtenstein. If the Emissions Trading Directive is incorporated in the EEA agreement, it implies that the offshore oil and gas sector as well as companies producing pulp and paper will be included in the trading scheme from 2008, along with those sectors already covered by the domestic scheme in the period 2005–2007. From 2008 the trading sector will represent more than 40% of the Norwegian greenhouse gas emissions. The Directive does not, however, stand in the way for applying other policies and measures such as carbon taxes or technological requirements.

The Norwegian government is now negotiating with the EU so that also Norway can join the European carbon market. The Ministry of the Environment is working on changes in the Norwegian emission trading law with the aim to adapt to the EU ETS. According to the Ministry of the Environment, a public hearing document was going to be sent out before Christmas 2006, and a law proposition will be presented during spring 2007. The law proposal suggest that the system include CO₂ emissions from installations as EU ETS expect for installations paying CO₂ tax and electricity production from natural gas, mainly for external output. The proposal also suggests a linking agreement with EU, not direct implementation of the Emissions Trading Directive as an EEA-country. The cap should be on free allowances and in common understanding with

industry. This includes 20% reduction of all six gases compared to 1990 from installations without CO₂ tax. A separate cap should be defined for gas receiving and process installations. Principles for free allowances will give approx. 95% of projected emissions, and with no reserves for new installations.

The commission has also invited Norway to participate in a working group that recently has been established under the EC Monitoring Mechanism for greenhouse gas emissions. This working group will consider methodological and technical issues relating to aspects of the emissions trading scheme, in particular the guidelines for monitoring and reporting emissions and the establishment of registries.

The Norwegian emissions trading scheme is very similar to the EU ETS and the negotiations between the European Commission and Norwegian officials are ongoing. It is very likely that the Norwegian scheme will be linked to the EU ETS from 2008.

3.5.3 Switzerland

Proposed Swiss trading scheme in a nutshell	
Status	Planned
Start	2008
Design	A hybrid system. CO ₂ tax and emissions trading scheme for companies that have made a voluntary agreement to reduce emissions and are exempted from the CO ₂ tax.
Mandatory/Voluntary	Voluntary
Trading periods	2008–2012
Coverage	CO ₂ tax is set for heating and process fuels. Companies that are large emitters and would be severely affected by the CO ₂ tax can be exempted from the tax if they take a voluntary agreement to reduce emissions.
Number of installations/ companies	n/a. Companies with CO ₂ emissions over 250 000 tons annually can participate scheme directly. Smaller companies have pool themselves with the agencies nominated by the authorities.
Included gases	CO ₂
Allocation methodology	Free of charge. Based on the voluntary agreements taking into account an absolute target and effectiveness indicators. The effectiveness indicator is used for adjusting the absolute target with changes in the output.
Allocation	Estimate: 4–5 million tonnes of CO ₂
Monitoring	Monitoring reports are submitted to the authorities annually. Reports include CO ₂ emissions and CO ₂ emission intensities.
Penalty and price cap	In case of non-compliance, companies have to pay the CO ₂ tax. The tax is: 8 €/tCO ₂ in 2008 if emissions exceed 94% the 1990 level 16 €/tCO ₂ in 2009 if emissions exceed 90% the 1990 level 24 €/tCO ₂ in 2010 if emissions exceed 86.5% the 1990 level No price cap.
Linking to other schemes	CERs from the CDM projects and ERUs from the JI projects can be used for compliance up to 8% of the allocation and consequently the proposed scheme is indirectly linked to the EU ETS.
Banking	n/a
Units	n/a
Compatibility with the EU ETS	Design of the Swiss scheme is not similar to the EU ETS but they have common features: Both systems cover direct CO ₂ emissions from the combustion of fossil fuels. CDM/JI credits can be used for compliance The trading periods are corresponding The main differences: The Swiss scheme is based on voluntary participation, which is promoted with tax exemptions The system is more based on the baseline-and-credit approach and reducing carbon intensity than capping the emissions of the trading sector

Having ratified the Protocol on 9 July 2003, Switzerland is now committed to reducing greenhouse gases emissions by 8% from 1990 levels between 2008 and 2012. To comply with its commitment, a new Federal law on CO₂ was approved by the parliament on October 8th 1999, and put into force on May 1st 2000. Climate policy in Switzerland is incorporated into other pre-existing sectoral policies. All policies are embedded in a general approach of sustainable development and specifically in a cross-sectoral approach to climate change contained in the sustainability strategy. A reduction of 4.2 MtCO₂e compared to the base year is re-

quired for Switzerland to meet the 2010 Kyoto target. Switzerland has decided that at least 2.2 MtCO₂e. Reductions are to be achieved through domestic policies and measures.

The parliament chamber of Swiss cantons recently approved a scheme to gradually introduce a CO₂ tax on heating fuels from 2008 onwards, which paves a way for the introduction of a domestic emissions trading scheme in Switzerland. The system is being worked out at the moment by the Swiss government with the goal of introducing it from 2008. To meet Switzerland's national target to reduce heating fuels emissions by 15% compared to 1990, the CO₂ tax is launched. This is a part of its Kyoto target to reduce greenhouse gas emissions by 8%. Switzerland's CO₂ legislation allows companies to opt out of the CO₂ tax scheme and participate in a domestic cap-and-trade scheme instead. A clear majority in the chamber of Swiss cantons have agreed to the plan adopted by the national assembly in June, and rejected an alternative proposal to link the introduction of the CO₂ tax to a decline of the oil price, which was recently tabled by the chamber's own environmental commission.

The plan provides that if CO₂ emissions from fossil fuels are higher than 94% of 1990 emissions, a tax of €8/tCO₂ will be introduced from 1 January 2008. The tax will rise to €16/t CO₂ from 1 January 2009 if CO₂ emissions are above 90% of 1990 levels and finally to €24/t in January 2010 if emissions are higher than 86.5% of 1990 levels. Heating fuel emissions have been relatively stable over the last years but 2005 saw a small decrease to about 6.2% below the 1990 level, making the introduction of the tax and the domestic emissions trading scheme likely from 2009.

The planned domestic ETS is estimated to cover 4–5 million tonnes of CO₂, about 10–15% of Switzerland's total CO₂ emissions. The sectors included in the Swiss system will be similar to those in the EU ETS, although electricity production's share will be limited, as hydro and nuclear power dominate the power production. The Swiss government aims at linking the domestic scheme to the EU ETS. There have already been first contacts with the European Commission and further meetings will follow.

Companies will have the possibility to use JI or CDM credits for compliance reasons, including from land-use projects, but the amount will be limited to 8% of the companies' reduction obligation.

4. The impact of state level trading schemes in the USA to the carbon markets

4.1 Background

President Bush announced in 2001 that USA will not ratify the Kyoto Protocol as it would harm the economy of the USA. Currently the objective of the climate policy of the USA is to reduce greenhouse gas intensity of the country's economy by 18% by 2012. While the federal level climate policy in the USA has been lacking ambition, individual states and groups of states have established targets and programmes to reduce greenhouse gas emissions. Table 3 summarises some of the policies currently in place. 14 states have a emission target and 12 states are participating one of the planned regional cap-and-trade schemes. In addition some 29 states (Figure 2) have a climate action plan and 23 states have mandated electricity utilities to have a specified amount of electricity from renewable energy sources in their portfolio (Renewable Portfolio Standard, RPS, Figure 3)⁶. The motivation for state level policies varies but typically state governments are hoping, in addition to curbing climate change, that the policies and initiatives promote economic development and stabilise fluctuating energy prices.

⁶ Pew Center on Global Climate Change (2007a), Learning from State Action on Climate Change, March 2007 update.

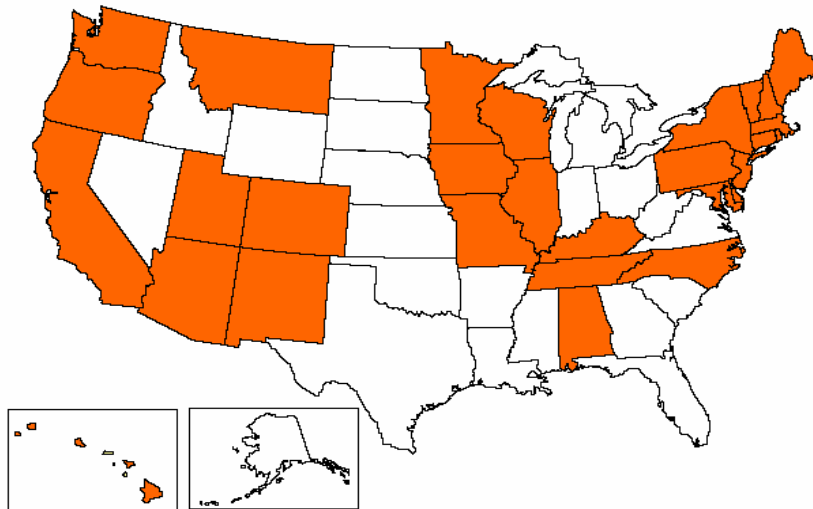


Figure 2. States with Climate Change Action Plans. Source: CRS Report for Congress (2007). Climate Change: Actions by States To Address Greenhouse Gas Emissions.

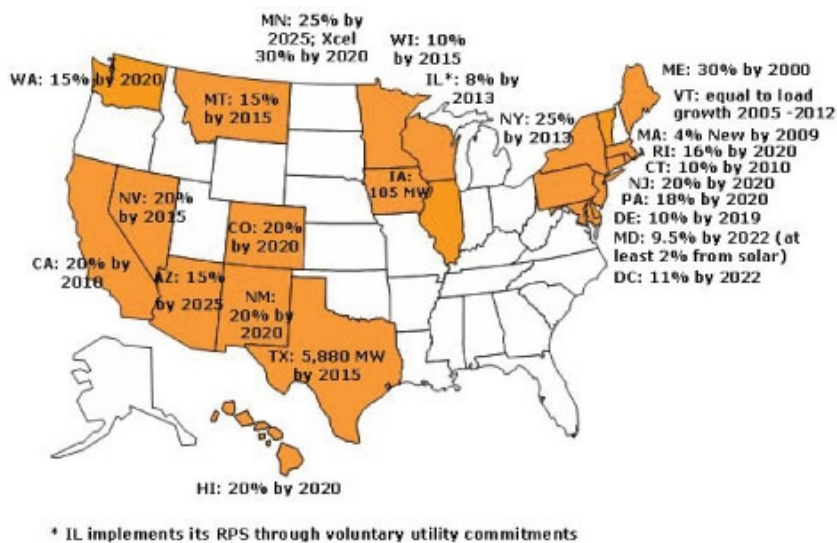


Figure 3. States with Renewable Portfolio Standards (RPS). Source: Pew Center on Global Climate Change, <http://www.pewclimate.org>.

Table 3. Greenhouse gas emissions in 1990 and 2000 and selected state level climate initiatives in the USA. Source: Pew Center on Global Climate Change www.pewclimate.org. Climate Analysis Indicators Tool (CAIT US) Version 1.0. (Washington DC: World Resources Institute 2007)

State	Emissions 1990	Emissions 2000	Change,%	Emissions target	Western Regional Climate Action Initiative	RGGI
Arizona	70.40	96.70	37.36	To reduce to 2000 levels by 2020 and 50% below 2000 levels by 2050	x	
California	417.50	463.20	10.95	To reduce 2000 levels by 2010, 1990 levels by 2020 and 80% below 1990 levels by 2050	x	
Connecticut	43.20	45.00	4.17	To reduce to 1990 levels by 2010, 10% below 1990 levels by 2020 and 75–85% below 2001 levels in the long term		x
Delaware	19.40	17.70	-8.76			x
Illinois	238.50	275.60	15.56	To reduce to 1990 levels by 2020 and 60% below by 2050.		
Maine	20.80	23.90	14.90	To reduce to 1990 levels by 2010, 10% below 1990 levels by 2020 and 75–85% below 1990 levels in the long term		x
Massachusetts	89.50	88.90	-0.67	To reduce to 1990 levels by 2010, 10% below 1990 levels by 2020 and 75–85% below 1990 levels in the long term		
New Hampshire	15.60	18.40	17.95	To reduce to 1990 levels by 2020 and 80% below 2006 levels by 2050		x
New Jersey	123.70	134.30	8.57	To reduce to 2000 levels by 2012, 10% below 2000 levels by 2020 and 75% below 2000 levels by 2050		
New Mexico	58.70	67.80	15.50	To reduce 5% below 1990 levels by 2010 and 10% below 1990 levels by 2020	x	
New York	236.40	245.00	3.64	To stabilize emissions by 2010, reduce 10% from 1990 levels by 2020 and reduce 75% below 1990 levels by 2050		x
Oregon	40.80	52.60	28.92	To reduce to 1990 levels by 2010 and 10% below 1990 levels by 2020	x	
Rhode Island	9.60	13.30	38.54	To reduce to 1990 levels by 2020, 25% below 1990 levels by 2035 and 50% below 1990 levels by 2050		
Washington	88.60	100.70	13.66	To reduce to 1990 levels by 2010, 10% below 1990 levels by 2020 and 75–85% below 2001 levels in the long term	x	
Vermont	6.90	8.30	20.29			x

The impact of the state level trading schemes and climate policies to the carbon markets can be seen twofold. Firstly the state level policies and schemes have an impact to the federal level policy. Secondly, the implemented trading schemes can be linked to the other regional emissions trading schemes such as the EU ETS or they could be linked indirectly through CDM/JI credit markets.

4.1 Impact on the federal climate policy

The states have legislative power but at the same time there are some constitutional constraints relevant to emissions trading. One of the most important one is the fact that states cannot enter into international agreements. However, in recent decades states policy diffusion has been common – the legislation of one state is adopted in a similar manner in another states. For example, RPS was first introduced in 1991 in Iowa and now it has spread to 23 states. By and large, state's influence in the environmental policy of the USA is significant and states can be seen as a "policy laboratories" for climate policy and putting pressure to the federal climate policies.⁷

In addition to the pressure from the states to address climate change there are several law proposals in the US Senate about federal level cap and trade scheme (See Appendix 1). Also businesses have joined forces in various organisations are calling for federal level action. The U.S. Climate Action Partnership (USCAP), formed 2007, is calling for a federal level cap-and-trade scheme including large stationary emissions sources, transportation, and energy use in commercial and residential buildings. The members of the USCAP include companies such as The Dow Chemical Company, General Motors Corp., Johnson & Johnson, Shell, and Siemens Corporation. In general, one can conclude that there is an increasing pressure both internationally and domestically to further address climate change in the federal level in the USA.

4.2 Impact on the global carbon markets

There currently two regional emissions trading schemes planned in the USA. The RGGI is more advanced state and covers seven Northeast and Mid-Atlantic states. RGGI is a cap-and-trade scheme that allows use of domestic offsets and international CDM/JI emission credits for compliance. The scheme will start in 2009 and it is estimated to cover 700 in-

⁷ Selin H., Vandeveer S. (2006). *Climate Leadership in Northeast North America*. Woodrow Wilson International Center for Scholars.

stallations with emissions near 120 million tonnes CO₂ in 2009 and the estimated price of the emission allowances is 2–5 USD/t⁸⁹ (2.2–3.6 €/t).

Based on the current model rules of the RGGI, the direct impact of the RGGI to the global carbon market will be small. The scheme allows use of the emission reduction credits of from the CDM/JI project but the expected price level in the RGGI is lower than the CDM/JI emission credit prices. Currently the price of the CDM/JI credits is the range of 6–13 €/t. Moreover the demand for the CDM/JI credits is estimated to be high – a shortage of 300 million credits in 2008–2008¹⁰. This puts pressure on the CDM/JI credit prices. Based on the current estimates, it seems that the use of CDM/JI credits in the RGGI will be small and consequently the direct impact of the RGGI to the global carbon market via Kyoto mechanisms will be modest.

The Western Regional Climate Action Initiative is still in infancy and there is no detailed information available. The scheme is expected to have larger coverage than the RGGI but at this stage it is impossible to estimate the expected price level of the allowances. Moreover, the possibility to use CDM/JI or other international carbon units for compliance is not known.

The details of the RGGI might still change and the rules of the Western Regional Climate Action Initiative have not been published. In general, as long as the USA has not committed to international climate agreement we expect that the emission reduction targets in the both regional schemes will remain in the moderate level in mid-term (–2012). This is likely to keep the demand of CDM/JI credits of the companies included in the US regional schemes in a low level.

At this stage, the most impact of the regional trading schemes on the global carbon market is indirect – their pure existence increases the confidence that there will be a price on the CO₂ in the post-Kyoto world and possibility that the US will join international climate agreement exists.

4.3. Future US international climate policy

There is both international and domestic pressure for federal government to control its greenhouse gas emissions. It is very unlikely that the USA will ratify the Kyoto Protocol. If there will be a climate agreement similar to the Kyoto Protocol in 2013–2017 it is still unlikely that the USA will participate in this regime as it does not favour the architecture of the Kyoto Protocol.

⁸ RGGI. (2006) Carbon Policy Scenarios. RGGI Package Scenario (Updated 10/11/06)

⁹ Patrick J. What is the Prospect for Trading under RGGI. IETA Greenhouse Gas Market 2006.

¹⁰ The World Bank. State and Trends of the Carbon Market 2007.

The main items being:

- The Kyoto Protocol lack emission targets for developing countries
- The USA prefers intensity based emission limits to absolute emission caps.

An important political turning point will be next presidential elections held in November 2008. It is very likely that the next president will support strong climate policy (72%)¹¹. However a most likely future scenario is that the climate policy of the USA will be based on the development in the USA. With regards to environmental treaties in general, the USA typically first acts at home and after that builds on approach chosen at the international level¹². Based on our analysis of the current situation, it is expected that climate policy of the USA will become stronger but participation of the international Kyoto type climate agreement is unlikely prior 2017. There are many initiatives to create a federal level cap-and-trade scheme (US ETS) and such a scheme could become operational already in the Kyoto period or post Kyoto period (2013–2017). Linking directly the US ETS to the EU ETS would be attractive solution but in minimum we expect that these schemes would be at least linked indirectly via CDM/JI emission credit markets. The impact of the US ETS would be very significant to the global carbon market due to increased number of participants and larger coverage.

¹¹ Point Carbon (2007). Global climate policy after 2012: Will the US make it again? The probability of the next presidents climate policy was based on analysis of the 6 top candidates on the Tradesports.com website January 16th 2007 and their climate policy score (1 or 0). The score 1 was given to the candidates that were reasonably confidently expected to bring the USA back to international negotiations and support domestic federal level emission trading scheme.

¹² Purvis N. (2004). The perspective of the United States on climate change and the Kyoto Protocol. *International Review for Environmental Strategies* 5(1).

5. Review of studies

5.1 Background

Linking other, existing or planned, greenhouse gas emissions trading schemes (ETSs) with the EU ETS scheme is becoming an increasingly topical issue and it has been discussed in several papers, most of which have been published quite recently. Reports concentrate on at least one of the two areas: benefits and/or feasibility of the linking. Some papers also provide recommendations for policymakers.

The OECD and the IEA have produced four papers on this issue. The papers are addressed to Annex I expert group of the UNFCCC and for policymakers in general. The first paper published in 2002, discusses generally possibilities to link domestic ETSs. Two latter ones (2004, 2006) discuss especially possibilities to link EU ETS with other domestic schemes. This issue is also discussed as a part of an OECD/IEA paper released in 2005.

A research project “Joint Emissions Trading Systems as a Socio-Ecological Transformation” (JET-SET, 2004–2006) funded by German Federal Ministry of Education and Research and coordinated by the Wuppertal institute issued three working papers in 2006 on linking the EU ETS with other schemes. These papers discuss readiness of schemes to be linked up, as well as economic effects of the linking.

The German research institute, Centre for European Economic research (ZEW), evaluated economic implications of linking the EU ETS with other trading schemes in a discussion paper published in 2006.

Consulting companies Ecoplan (based in Switzerland) and Natsource (International) have also discussed the compatibility of other emissions trading schemes with the EU ETS in an EU-funded report published in May 2006.

The latest report from the area was issued in January 2007 in cooperation with Swedish Energy Agency (SEA) and Swedish Environmental Protection Agency (SEPA). The report provides a proposal on the development of the EU ETS after 2012 and in this context also discusses linking the EU ETS to other trading schemes from the perspective of possibilities and benefits of the linking.

5.2 Summary of main findings – report by report

OECD/IEA (2002), *Towards International Emissions Trading: Design implications for Linkages* discusses generally how GHG trading schemes with different design options may be linked in order to take advantage of related benefits; possible barriers to linking; and solutions. The report sees few technical barriers for linking, and states: *where barriers do exist, solutions can be designed.*

OECD/IEA (2004), *Linking non-EU domestic emissions trading schemes with the EU emissions trading scheme*, discusses possibilities to link other trading schemes with the EU ETS and concludes that schemes with different designs can be linked with the EU ETS and thus the EU ETS does not need to be a blueprint for other schemes. However, the paper recognizes that economic benefits of linking will depend to some extent on the differences in the design details of the two schemes to be linked.

OECD/IEA (2005); *Act Locally, Trade Globally*; underlines that efficiency gains achievable by linking domestic schemes will argue strongly in favour of linking. Barrier for linking are not overwhelming but linking requires need dedication from the policy makers due to fact that as all systems linked will need adjusting.

OECD/IEA (2006), *Linking GHG Emission Trading Schemes and Markets*, is a brief paper with a clear overlook into the possibilities to link different emissions trading schemes. The paper presents general level solution for different characteristics potentially hampering linkage of ETSs and concludes that:

- Problems arise from different characteristics of the different systems that potentially prevent linking.
- There are no conceptual reasons why links between Emissions trading schemes cannot be expanded, but technical adjustment to the schemes may be needed as well as a greater degree of harmonization of the schemes.
- Among currently operating schemes, EU ETS is so large that it would likely be a price setter while any system linking to it would be a price taker.

The project Joint Emissions Trading As a Socio-Ecological Transformation assessed the implications of the EU ETS and formulated policy recommendations for the design of future trading schemes. Concerning linking the EU ETS with other schemes the working papers I-III/06 of the project (JET-SET 2006a, 2006b & 2006c) conclude that:

- Differing designs of ETSs should not form fundamental barriers for linking other ETSs to the EU ETS. Recognition of trading units will probably cause debates between the EU ETS and all other schemes but if this challenge can be solved, many of the emerging non-EU systems should potentially be compatible with the EU ETS.
- Australian, Canadian, Japanese and potential U.S. schemes (if the U.S. scheme is developed along the Bingman proposal)¹³ cannot be linked with EU ETS: Japanese system is too small and the other systems include safety valves or price caps, which are fundamental obstacles to linking. Linking other than the Norwegian and Swiss schemes with EU ETS is estimated to happen later than 2010.
- Linking the Canadian scheme to the EU ETS would include more problems than benefits, mainly because of planned relative targets. Thus the most desirable solution from the EU perspective would consist in convincing the Canadian policymakers to introduce absolute instead of relative targets.

Ecoplan & Natsource (May 2006), Linking domestic emissions trading schemes to the EU ETS, is a comprehensive report on compatibility of proposed and existing domestic emissions trading schemes in Canada, Japan, Norway, Switzerland and the United States with the EU ETS. Compatibility assessment is based on a set of criteria from various sources. Criteria are related to system design, targets, allocation and compliance rules. The report concludes that:

- The EU ETS is not likely to be expanded to a uniform global carbon market in the near term, but in long term changes to linkages seem to be greater.
- Willingness of European Commission to adopt linkages with other schemes not fully compatible with EU ETS are likely to increase, because tightening emissions targets within EU ETS will potentially cause competitive disadvantages for European companies, and linking the schemes could offer coordinated approach to affect other countries' climate policies.
- Schemes in Norway and Switzerland have a good chance to be linked with the EU ETS in a near future. The linkages can be expected to benefit substantially Norwegian and Swiss economies, but benefits for EU are expected to be negligible.
- Linking Schemes in North America and Japan with EU ETS is much less likely, because of several compatibility problems. Linking them would produce considerable economic benefits for EU.

¹³ In 2005 Senator Bingeman developed a draft bill concerning a national level ETS in USA, but the bill was not adopted. However *Ecoplan & Natsource (2005)* suppose that the bill may still be further considered, and it might get more political support than the McCain-Lieberman proposal (the first proposal on the national ETS in USA, of which a revised version was recently (Jan 2007) introduced.)

- The most severe obstacles for linking are price caps, the voluntary nature of selected programs and diverging rules for the import of credits from Kyoto mechanisms. Also the fact that U.S. allowances are not valid for Kyoto compliance is a problem. Relative caps and differing sectoral coverages are not so problematic.
- The path dependent nature of the climate policy (instrument once implemented is likely to persist) underlines that the new policies should be carefully designed and evaluated before implementation.
- Linkages require that schemes have common key elements such as participation and compliance rules.
- Linked schemes cannot be developed independently.

Centre for European Economic research (ZEW, 2006), Emissions Trading beyond Europe: Linking Schemes in a Post-Kyoto World, assesses the economic impact of linking the EU ETS internationally in the presence of a post-Kyoto agreement in 2020. Compared to other reviews, this paper is more theoretical and academic. It addresses the economic impact of company-based emissions trading¹⁴ beyond the EU ETS by linking to emerging non-EU schemes. Report also analyses the efficiency of implications of linking in the presence of parallel country level trading under a post-Kyoto regime (government trading). The paper introduces a possible joint future trading system between the ETS companies and Kyoto governments. As a conclusion the paper:

- States that linking the EU ETS in absence of post-Kyoto governmental GHG trading¹⁵ produces no or only marginal economic benefit for EU (total compliance cost decrease 1%) because included energy intensive industry is estimated to enjoy generous allocations and the major compliance burden is estimated to be carried by non-ETS industries i.e. non-energy-intensive industries.
- States that a desirable solution would be a joint trading system enabling international emissions trading between ETS companies and governments. In presence of parallel government trading under a post-Kyoto agreement linking EU ETS to Canada, Japan and Former Soviet Union, total EU compliance cost could be reduced by 60%. A further ETS enlargement to Australia and the USA is estimated to further cut EU compliance cost by 50%. These parallel trading regimes would be beneficial also for the non-EU regions.
- Estimates that CDM is not expected to relieve the inefficiencies of linked ETS, but within the parallel or joint trading governmental access to low-cost abatement options of developing countries would produce large additional cost savings.

¹⁴ An ETS allowing trading of emissions allowances between companies.

¹⁵ An ETS allowing trading of emissions allowances between governments.

- Reminds, however, that post-Kyoto agreements are uncertain, and company-based ETSs have potential to become more efficient due to stricter emissions allocations and enlarged sectoral scopes. Thus company-based emissions trading provides fertile ground for developing competitive market for emissions, and linking company-based ETS beyond Europe may be a vital option for future climate policy on the global level.
- Indicates that, while aiming to link EU ETS with other company-based ETSs, it would also be wise to develop a scheme which enables international emissions trading between companies and governments.

Swedish Energy Agency & Swedish Environmental Protection Agency (SEA & SEPA 2007): The EU Emissions Trading Scheme post-2012 provides a proposal how the EU ETS should be developed after 2012. Concerning linking the EU ETS to other ETS the paper:

- Recommends Sweden to press for the EU ETS to be linked with other trading schemes.
- Considers that globally linked ETS could form a bridge to a new comprehensive climate agreement.
- States that linking with countries having international emissions reduction commitments can strengthen ties in climate policy.
- Affirms that linking with countries not having such commitments is a potential way to influence them towards participation in climate change agreements.
- Sees linking also as a tool to increase effectiveness of separate schemes because of decreasing cost of emission reductions (lowering MAC curve), increasing liquidity and reduced risk of distortion by international competition.
- Recognises that it is possible to link schemes with differing designs but differing designs still cause problems and reduce benefits of linking.
- States that it would be desirable that new and emerging schemes would be designed already in their early stage in a way that linking would be possible.
- Recognises that outside EU there is not much emphasis to link the system, but still summarises that American initiatives are considering the possibility of linking, assumes that the Norwegian scheme will be linked in 2008 and the Swiss scheme will be linked not later than 2013.
- Underlines benefits of global sector-wise ETSs (i.e. reduction of distorted competition).
- Notes that in addition to linking the schemes, offset projects (including domestic offset projects and CDM & JI) are important tools for decreasing compliance costs under the EU ETS also beyond 2012, and should thus be widely allowed in EU ETS.

5.3 Summary of main findings – synthesis

Main conclusions of the reports on linking various emissions trading schemes seem to be quite similar: linking would be beneficial and it is possible to link trading schemes with diverging system designs, but some design differences are likely to create more challenges for linking than others. Thus some schemes could be linked with the EU ETS easier and within shorter timeframe than others.

It has been shown by JET-SET project (2006) that linking the EU ETS to emerging domestic ETSs would lower Kyoto compliance cost of the EU. The linking would be even more beneficial for EU in future, if the emissions abatement targets will tighten. On the other hand ZEW (2006) has argued that linking other existing or planned company-based ETSs with the EU ETS with their current or planned coverage will not necessarily lower post-Kyoto compliance cost for EU in practise. In order to achieve significant cost reduction, excluded sectors should be covered by parallel governmental emissions trading (country-level), or company-based trading should cover more sectors. OECD (2006) has noted that among existing and planned schemes, EU ETS is so large that it would likely to be price setter while any system linking to it would be price taker. The conclusion indicates that EU companies would not enjoy considerable benefits from the linkages. However, this argument probably concentrates much on the current situation: the EU ETS probably would be price setter, if the schemes were linked in the near future, but in the longer time frame, linked schemes could be widened and their fundamentals would become more important part of the price formation.

In parallel to the economic benefits, linking the EU ETS with other company-based ETSs is seen as a tool to secure continuation of international climate commitments after the Kyoto-period and a step towards international company-based emissions trading system, which could guarantee more equal rules for companies in covered region, and thus reduce competitive distortions caused by domestic ETSs (ZEW 2006, SEA & SEPA 2007). By linking the EU ETS with other schemes, EU could get more tools to affect the design of the linked schemes in order to create equal competition conditions for the European companies. This reason has been estimated (Ecoplan & Natsource 2006) to drive the European Commission to be more approving to consider linking of schemes with diverging designs with the EU ETS. As stated by Ecoplan & Natsource (2006), linked schemes cannot be developed separately, and they should have common key features. This argument easily leads to a conclusion that rules of the linked schemes would equalize gradually. It may also indicate that, from the Nordic perspective, it would be wise to

aim at establishing linkages between EU ETS and other domestic schemes.

However, linkages would not be completely unproblematic. Every scheme, existing and planned, has its own design, and even if there seems to be technical solution for every compatibility problem, these solutions can be difficult to execute. Every diverging design feature between the linked schemes would require an artificial solution reducing the benefits of the linkage. The most efficient scheme is one with common rules for every participating region and company.

Doubts presented on political acceptance of linking schemes with diverging rules for participating companies are also well grounded. Thus, as stated in the case of Canada and relative caps (JET-SET, 2006a) it could be wise to first try affecting the designs of the schemes under construction in a way which would ensure the compatibility, and only if this does not work consider linking schemes with incompatible designs. In this context underlining the path dependency of climate policy (Ecoplan & Natsource 2006) is in its place: after a region has implemented a climate policy tool, it is hard to change. This is very important issue also from the Nordic point of view. As stated by the Swedish agencies (SEA & SEPA 2007), it would be desirable that new and emerging schemes would be designed already in their early stage in a way that linking would be possible.

Linking North American Schemes with the EU ETS has been seen harder than linking the Norwegian and Swiss schemes. The most important reason for this is that North American Schemes include safety valves or price caps, which have been seen as incompatible with the EU ETS.

It should also be noted that linking the EU ETS with other schemes would impact various stakeholders in different ways. Thus in this context there is no common Nordic perspective, but rather perspectives of the Nordic:

- In general (feasibility of the linkage, overall efficiency and functionality of the linked scheme);
- Industry (perspective of compliance costs and competitive distortions);
- Environment (perspective of environmental effectiveness of linked schemes).

The Table 4 below enlists selected conclusions from the reports in selected cases from these perspectives.

Table 4. Summary of conclusions of the reviewed studies.

	In general	Industry perspective	Environmental perspective
Linking a scheme with the EU ETS in general	Has been seen generally as desirable because of its overall benefits and increasing possibilities to affect climate policy and to avoid competitive distortions caused by EU ETS and European relatively strict climate policy.	Linking the schemes is generally expected to reduce compliance costs. In addition linking requires schemes to establish common key elements, and after the link has been established, the schemes should be developed as a whole (Ecoplan & Natsource 2006). These facts could yield to reduced competitive distortions between regions.	Linking company based schemes can be seen as a tool to reach for a continuation for binding climate agreements and covering international emission targets (SEA & SEPA 2007; ZEW 2006).
Linking schemes of Canada or U.S. (in accordance with the Bingmann proposal) with EU ETS	These schemes include safety valves/price caps, which have been seen as severe obstacles for linking the schemes with the EU ETS. Linking schemes with safety valves with the EU ETS are improbable in short term. On the other hand linking those schemes, would greatly expand the market and generate considerable economic benefits (Ecoplan & Natsource 2006)	Expansion of the market would potentially reduce significantly compliance cost. In addition links with these schemes could make possible for industry to benefit from the price caps (if specific provisions to prevent that would not be implemented). The price cap would set a maximum price also for the EU ETS (JET-SET, 2006a). This would lower emissions trading related risks of the Nordic Companies.	Because of the price caps environmental efficiency of the EU ETS could be reduced (JET-SET, 2006a; OECD 2006)
Linking Norwegian and Swiss schemes with EU ETS	Linking the schemes is generally seen probable in the near future.	Desirable for Norwegian industry. Negligible for Finnish and Swedish industries, because of the small sizes of the schemes would not lower compliance cost significantly. (Ecoplan & Natsource 2006)	
Linking a scheme with diverging sectoral scope (all schemes in some extend) with the EU ETS	Diverging sectoral scope or coverage is seen as one of the minor technical problem for feasibility of linking. This may, however, generate political barriers for linking.	Diverging scopes would also exist, if the link were not established (OECD/IEA 2006).	
Linking a scheme with significantly unequal strictness of allocation (all schemes in some extend) with the EU ETS	Politically problematic – comparatively equal efforts are probably political precondition for linking (JET-SET, 2006)	Diverging strictness would also exist, if the link were not established (OECD/IEA 2006).	
Linking a scheme with relative targets (Japan or Canada)			Environmental efficiencies of the linked schemes may decrease (OECD 2006; Ecoplan & Natsource 2006)
Linking a scheme with differing way of allowance distribution (all schemes in some extend)		Insignificant (JET-SET, 2006a)	Negligible (JET-SET, 2006a)

Norway's point of view should be discussed separately from the other Nordic countries, because the country has not yet been linked to the EU ETS. Ecoplan & Natsource (2006) expects the foreseen link between Norwegian scheme and EU ETS to benefit Norwegian economy substan-

tially. It has been estimated that wide mix of climate policy instruments applied in Norway makes the current system inefficient because marginal abatement costs do not equalise between sectors. Thanks to the linkage, the Norwegian ETS sector will enjoy benefits from larger system (including increased liquidity and efficiency of the scheme, and potentially reduced compliance costs). Linking will help to equalise the competitive distortions between Norwegian ETS sector and the other European industry caused by the differing schemes. It will also make it possible for the Norwegian ETS sector to benefit from possible other linkages of the EU ETS with other trading schemes in future.

Especially offshore petroleum industry and pulp and paper industry benefit from the linking of the Norwegian scheme to the EU ETS if they will be included in the ETS and excluded from the CO₂ tax system. These sectors are currently excluded from the ETS, because they are obligated to CO₂ tax, considerably higher than price of emissions allowance within EU ETS (for offshore petroleum activities the tax is EUR 35–39 per tonne CO₂). In addition the tax is paid from every emission unit whereas within the EU ETS most of the allowances are allocated for free of charge. Ecoplan & Natsource (2006) recommends inclusion of Norwegian offshore petroleum and pulp and paper industries to the ETS.

5.4 Discussion

The literature review seems to lead to a question: is it reasonable to rush in linking with more or less incompatible schemes or patiently give them time to develop and try to push them in desired direction before linking? Would it be wise or even politically acceptable that Nordic companies or sectors would operate under ETS with different rules than similar companies or sectors in other regions linked to the same emission markets? It may be – the rules are not equal within EU ETS either, and linking the schemes will not, in cases of many divergences, cause competitive distortions, but they would exist if the schemes would not been linked.

For example, differing scopes of the linked schemes are seen as one of the minor technical problems for linking; linking schemes with differing scopes do not in principle cause competitive distortions between schemes, as those problems would exist also in the absence of the link. Nevertheless, in the linking negotiations EU might have a possibility to push other schemes towards similar rules than companies have in the EU ETS (naturally, also rules of the EU ETS could be changed).

Linking schemes with diverging designs can be a step towards developing more common rules and more equal competitive conditions within the linked schemes. Affecting the rules of other schemes may be harder without the link established, but not to establish a link may also be a tool

to pressure designs of the schemes wishing to be linked with EU ETS in desired direction.

The Nordic countries should pay special attention to the impacts of the possible linkages on competitive situation of industries especially important in the Nordic countries, but not so significant in the EU level. It may be assumed that the EU will do its best to ensure the competitiveness of the industries which are especially important for whole EU. From this perspective the pulp and paper industry is in a rather special position. The sector is dominated by the Nordic (Finnish and Swedish) and the North American companies, while it is less important in other regions. Markets for the pulp and paper industry's products are global, and thus the sector is vulnerable for competitive distortions. While linkages of the North American schemes with the EU ETS are planned, the Nordic Countries could aim to push designs of the schemes and links in the direction, which would ensure equal competitive conditions between the areas.

6 Conclusions

The international carbon market is developing rapidly. There are currently several emissions trading schemes operational or such schemes are planned to be implemented. There are only few links between the trading schemes – although many schemes are indirectly linked via CDM/JI market. In theory, linking the schemes improves the economic efficiency of the schemes but may turn out to be challenging in some cases.

According to various studies, the differences in the design of the trading schemes create problems but where such barriers exist, solutions can be designed. The most difficult issues for linking other trading schemes to the EU ETS include:

- Environmental stringency of the schemes e.g. the ambition level of the targets.
- Relative emission targets or baseline-and-credit approach (Canadian Large Final Emitters Scheme, New South Wales CCAS and Japanese schemes)
- Price caps and penalty levels
- Eligibility and restrictions of use CDM/JI credits.
- Possibility to use AAUs or Verified Emission Reductions¹⁶ for compliance
- Voluntary approach of the schemes
- Linking schemes located in the countries that have not ratified the Kyoto Protocol.

Negotiations are ongoing to link various schemes to the EU ETS. Linking the Norwegian trading scheme to the EU ETS is likely to take place in 2008. The EU Commission has shown interest to negotiate also with other countries and we believe that the linking of the EU ETS with other schemes will take place in medium or long term (post-Kyoto period)

The climate policy in the USA is currently state driven, which is also putting pressure for the federal level action. It is unlikely that the USA would ratify the Kyoto Protocol but one can expect increasing activity both in state and federal level. There are many initiatives for a federal level cap-and-trade scheme and two regional schemes underway. At this stage the direct impact of these schemes and proposals to the global carbon market is relatively small but their significance is likely to increase in the post-Kyoto period.

¹⁶ Verified Emissions Reduction (VER) are emission reduction credits that are not Kyoto compliant.

From the Nordic perspective a well functioning carbon market is beneficial, as it provides cost efficient way to comply with the emissions targets. With regards to linking various schemes, the Nordic countries should pay special attention to the impacts of the linking on competitive situation of industries especially important in the Nordic countries, but not so significant in the EU level.

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Sammandrag

Den globala marknaden för utsläppsrätter och utsläppsminskningar ("CO₂-marknaden") har vuxit snabbt sedan början av 2006. EU:s utsläppshandelssystem som startade i början av år 2005 sätter ett tak på växthusgasutsläpp från vissa sektorer och ger företagen inom dessa sektorer möjligheten att handla utsläppsrätter sinsemellan. Även andra länder har infört eller har planer på att införa system för handel med växthusgasutsläpp, bl.a. Kanada och Japan samt vissa stater i nordöstra och östra USA liksom Kalifornien.

Den underliggande tillgången på kolmarknaden är växthusgasutsläpp. System för handel med växthusgasutsläppen kan länkas direkt eller indirekt. Genom länkmöjligheten ökar marknadens storlek, vilket förbättrar både dess likviditet och effektivitet. Det finns dock ett antal tekniska och politiska utmaningar i samband med att man implementerar länksystemet. Dessa utmaningar inverkar på våra analyser av vilka handelssystem som kommer att länkas och när länkningen kan komma att ske. Handelsystem kan länkas på olika sätt:

- Två handelssystem kan länkas fullständigt på ett sätt som tillåter användningen av utsläppsrätter från båda systemen utan större begränsningar ("bilateral länk").
- Ett handelssystem kan godkänna användningen av utsläppsenheter från ett annat handelssystem men inte vice versa, m.a.o. länken mellan handelssystemen är enkelriktad ("unilateral direkt länk").
- Ett handelssystem kan godkänna att man utnyttjar tillgodohavanden från projektbaserade mekanismer, vilket möjliggör länkning av ett handelssystem genom marknaden för utsläppsminskningsenheter ("indirekt länk").

Det finns ett antal verksamma och planerade utsläppshandelssystem som i dagsläget kan anses vara lämpliga att länkas med EU:s system för handel med utsläppsrätter. Nedan presenteras några av dem och de utmaningar som en länkning till EU:s handelssystem medför:

- New South Wales har infört ett system The New South Wales Greenhouse Gas Abatement Scheme. Detta är det näst största verksamma utsläppshandelssystemet på regional eller federal nivå i dagsläget. GGAS bygger på principen om baseline & credit. Utsläppsminskande projekt spelar sålunda en stor roll. GGAS har en annorlunda konstruktion än EU:s utsläppshandelssystem, vilket skapar

utmaningar för länlandet. Dessutom har Australien inte ratificerat Kyotoprotokollet, vilket skapar ytterligare utmaningar.

- Det kanadensiska systemet för företag med stora utsläpp (Large Final Emitters) planeras att startas 2008. Detta skiljer sig på avgörande punkter från EU:s handelssystem, bland annat är LFE inte ett cap & trade -system utan bygger på principen om baseline & credit, liksom i South Wales. LFE har också ett pristak på 15 CAD (9,7 euro) per koldioxidekvivalentton till skillnad mot EU:s system och accepterar en bredare flora av utsläppskrediter varav vissa ej är Kyotokompatibla. LFE accepterar gröntvättade tilldelade utsläppsenheter (Assigned Amount Units) från gröna investeringsprogram och utsläppsminskningsenheter från kolsänkor (Land Use, Land-Use Change and Forestry) och utsläppsminskningsenheter från stora vattenkraftprojekt, vilket EU:s system inte gör. Vår bedömning är att länkningen skulle segmentera marknaden.
- Regionala växthusgasinitiativet (Regional Greenhouse Gas Initiative) i USA:s nordöstra och östra delstater har flera likheter med EU:s handelssystem. Ambitionsnivån i RGGI är dock inte lika hög som i EU:s system pga. att USA inte har ratificerat Kyotoprotokollet. RGGI stabiliserar utsläppen 2009–2015 på 2000 års nivå och minskar dem med ytterligare 10 procent fram till 2019. EU har som mål att minska utsläppen av växthusgaser med 8 procent från 1990 års nivå mellan 2008 och 2012. Dessutom har EU som mål att minska utsläppen med 20 procent fram till 2020 och ytterligare med 10 procentenheter om andra länder åtar sig utsläppsminskningar i en ny internationell överenskommelse.
- Norska handelssystemet är mycket likt EU:s handelssystem. Det finns planer på att ansluta det norska handelssystemet till EU:s handelssystem 2008 genom ett länkavtal enligt artikel 25 i EU:s utsläppshandelsdirektiv.

Trots avsaknaden av en federal klimatpolitik i USA så har enskilda delstater och grupper av delstater, på eget initiativ, satt mål och program för minskning av växthusgasutsläpp. Klimatpolitik och handelssystem på delstatsnivå kan sägas påverka kolmarknaden på två sätt. För det första påverkar handelssystem på delstatsnivå även klimatpolitiken på federal nivå. För det andra kan verksamma handelssystem på delstatsnivå länkas till andra regionala handelssystem, som t.ex. EU:s utsläppshandelssystem, antingen direkt eller indirekt genom marknaden för utsläppsminskningsenheter.

Delstaterna i USA har legislativ makt, men den begränsas av ett antal konstitutionella bestämmelser, av vilka en del är relevanta för handel med utsläpp. En av de mest relevanta är bestämmelsen om att delstater inte får sluta internationella avtal. Det har dock blivit allt vanligare under senaste

årtionden att delstater tillämpar varandras politiska program. Delstaternas påverkan på miljöpolitik i USA har varit av stor betydelse. Delstaterna kan ses som laboratorier för klimatpolitiska program, som sätter press på den federala klimatpolitiken.

För tillfället planeras två regionala utsläppshandelssystem i USA. Regionala växthusgasinitiativet (Regional Greenhouse Gas Initiativet) är i startgroparna medan det västra regionala klimatinitiativet (Western Regional Climate Action Initiative) ännu inte presenterat dess regler. Så länge som USA inte skriver under internationella miljöavtal så förväntar vi oss att utsläppsminskningsmålen i de båda handelssystemen kommer att stanna på medelstor nivå på medellång sikt (före 2012), vilket håller priset på utsläppsrätter lågt. Vi tror inte att RGGI och WRCIAI kommer att påverka den globala kolmarknaden i någon större omfattning, eftersom det låga priset hämmar efterfrågan på utsläppsminskningsenheter från de projektbaserade mekanismerna enligt Kyotoprotokollet.

Litteraturoversikten lyfter fram frågan om man istället för att göra förhastade beslut och länka inkompatibla system borde vänta och ge systemen tid att utvecklas i rätt riktning. Vore det inte förnuftigt och t.o.m. politiskt acceptabelt att verksamhetsutövare i Norden som ingår i EU:s utsläppshandelssystem följer andra regler än verksamhetsutövare i andra områden som ingår i utsläppshandelssystem som är länkade till EU:s system? Om reglerna inom EU:s utsläppshandelssystem inte är lika för alla verksamhetsutövare, är det möjligt att länkningen av handelssystem reducerar existerande snedvridningar i konkurrenskraften. De nordiska länderna bör dock fästa speciell uppmärksamhet på hur länkningen av handelssystem påverkar konkurrenskraften för sådana industrier som är speciellt viktiga i Norden, men mindre viktiga i övriga Europa.

Kolmarknaden förväntas växa och förhandlingarna för perioden efter Kyotoavtalet (2013–2017) har inletts. Trots utmaningarna tror vi att länkningen av regionala handelssystem till varandra blir allt vanligare i framtiden. Länkningen av utsläppshandelssystemen förbättrar klimatåtgärdernas effektivitet, vilket är ett av huvudargumenten för att man skall handla snabbt.

Appendice 1, Recent Cap-and-trade proposal in US Senate

	Bingaman/Specter	Sanders/Boxer	Feinstein/Carper	Lieberman/McCain	Kerry/Snowe
Scope	Economy-wide	Economy-wide	Electricity sector	Economy-wide	Economy-wide
Coverage	Coal mines Petroleum refineries natural gas processors importers of fossil fuels selected non-fuel entities	To be determined by the Environmental Protection Agency (EPA)	All electricity generation above 25 MW	All installations that emit over 10 000 tonnes CO ₂ e/a	To be determined by the Environmental Protection Agency (EPA)
Included gases	All six greenhouse gases	All six greenhouse gases	All six greenhouse gases	All six greenhouse gases	All six greenhouse gases
Emissions targets	2012: GHG intensity 2.6% below 2011 levels, decreasing by a further 2.6% each year through 2011 2022: emissions intensity to drop by 3% each successive year	2020: 1990 GHG levels 2030: 26.7% below 1990 levels 2040: 57.4% below 1990 levels 2050: 80% below 1990 levels	2011–2014: capped at 2006 levels 2015: 26.7% capped at 2001 levels 2016–2019: cap declines 1% from previous year 2020 and thereafter: emission cap declines 1.5% each year	2012–2019: 6130 MtCO ₂ e/a 2020–2029: 5239 MtCO ₂ e/a 2030–2049: 4100 MtCO ₂ e/a 2050–: 2096 MtCO ₂ e/a	2020: 1990 levels 2021–2030: emissions reduced by 2.5% per year 2031–2050: emissions reduced by 3.5% per year
Allocation	10% auctioning in 2012–2016, increasing 2% per year thereafter to a maximum 65%	To be determined by the EPA	2011: 15% auctioning 2012–2031 additional 3% per year auctioned 2031–2036 additional 5% per year auctioned 2036: 100% auctioned	Partly auctioning. To be decided by the EPA and Sec. of Commerce	President will assign the authority that will decide how many percentages will be auctioned.
Price caps	7 USD/tCO ₂ e	To be determined by the EPA			
Domestic offsets	Yes	Yes	Yes	Yes	Yes
International offsets	CDM and credits/allowances from other mandatory schemes		CDM and credits/allowances from other mandatory schemes	Yes, emissions reduction projects in developing countries	

Source: Summary of Climate Change Bills Introduced in the 110th Congress, Resources for the Future, February 16, 2007