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ENVIRONMENTAL REGULATORY DIFFERENCES IN THE US AND THE EU THROUGH THE EXAMPLE OF EMISSIONS TRADING

INTRODUCTION

As global temperatures have been steadily rising and the icecaps on the Poles have been melting, it has become inevitable to come to know the notion of climate change. Climate change is a serious problem, and calls for immediate action. From all the different tools that have been used to tackle the problem, two main approaches can be mentioned, the mandatory and the voluntary regulatory approach, the former properly realized in the European Union and the latter realized in the United States.

There are debates among scientists across the world about the most effective ways to reduce GHG emissions. Some argue that only the traditional mandatory approach, the so called 'command and control' can bring significant abatement results, even if it is less flexible and sometimes more costly. This view is mostly followed by the European Union, which acts as an international leader in fighting climate change and can be set as an example for other nations. Others believe that a free (voluntary) market approach with flexible methods is a better option, even though its efficacy is highly arguable -which is mostly due to its voluntary nature-, and some of these programs don't result in more GHG emissions than what would happen anyway in a business-as-usual scenario. Nevertheless, voluntarily initiated programs are dynamically multiplying across the world, especially in the United States. There are several voluntary approaches in operation today that can become very important in the near future. Not only because a) they can be an effective tool to reduce GHG emissions (ALBERINI and SEGERSON, 2002; PRICE, 2005; HOFFMAN, 2005), but also because b) they hold potential business opportunities (HOFFMAN, 2005; PRICE, 2005; HELBY, 1999). Voluntary approaches are also good measures to c) strengthen cooperation between the different actors of economical life (OECD, 2003) at a national and at an international level as well, and d) can form the foundation of future mandatory systems, as the literature suggests.

This paper is dedicated to present environmental regulatory differences and aims to compare the American voluntary approaches to the European regulatory ones. It will make an attempt to answer the question whether voluntary approaches can be as effective as regulatory ones by comparing two climate exchanges operating in the different regulatory systems.

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In the remaining part of the Introduction, the notion of climate change will briefly be presented, with respect to the facts we know about it today and the main drivers of it, as well as humanity's options for the future.

Climate change

According to the IPCC (2007), the warming of the climate system is unequivocal. The temperature increase is widespread over the globe and the 100-year linear trend (1906-2005) of 0.74 °C is larger than the corresponding trend of 0.6 °C (1901-2000). Average Northern Hemisphere temperatures during the second half of the 20th century were higher than during any other 50-year period in the last 500 years and it is likely that they were the highest in at least the past 1300 years. The increases in sea level are consistent with the temperature increase as well as the decreases in the extent of snow and ice on the globe. Some extreme weather events have also changed due to higher temperatures in the last 50 years.

According to the IPCC (2007) the global greenhouse gas emissions resulting from human activities have increased by 70% between 1970 and 2004 (most of which comes from energy supply, transport, and industry), and most of the observed increase in globally-averaged temperatures is due to the increase in anthropogenic GHG concentrations in the atmosphere. Human activities result in emissions of four long-lived GHGs: CO₂, methane (CH₄), nitrous oxide (N₂O) and halocarbons (a group of gases containing fluorine, chlorine or bromine). The most important anthropogenic GHG is CO₂ whose emissions have grown by 80% between 1970 and 2004, and this increase is primarily due to fossil fuel use. There is strong evidence that the changes in the concentrations of GHGs and aerosols in the atmosphere, land cover and solar radiation alter the energy balance of the climate system and are drivers of climate change.

For the next two decades, a warming of about 0.2°C per decade is projected. Even if the concentrations of all GHGs and aerosols had been kept constant at year 2000 levels, a further warming of about 0.1°C per decade would be expected. Afterwards, temperature projections increasingly depend on specific emission scenarios. This suggests that the future depends on us. However, a truly effective way to reduce global GHG emissions at an international level is only possible through worldwide cooperation, the foundations of which have been laid by the Kyoto Protocol and if climate talks are successful, the determination to solve the problem of climate change will be even stronger beyond Kyoto.

In the first part of the paper, the mandatory approach of the EU will be presented with respect to the Kyoto Protocol and the EU Emissions Trading Scheme (EU ETS). The second part will present the voluntary model manifested in the United States. The climate policy of the United States will be looked at as well as the different voluntary programs that are in operation in the country today. The final section of the paper will build upon these findings, and a well-functioning voluntary approach, namely the Chicago Climate Exchange will be compared to the European Climate Exchange, which represents the mandatory regulation style. Finally, conclusions will be drawn based upon the findings of the comparison.

I. THE MANDATORY APPROACH IN THE EUROPEAN UNION

The first part of the paper will examine the mandatory regulation approach in tackling climate change. First, the Kyoto Protocol will be looked at, and afterwards the EU's Emission Trading Scheme will be presented, which forms the basis of the Union's regulatory approach.

1. The Kyoto Protocol

The Kyoto Protocol is a global response to the climate change problem, which has made significant achievements in raising awareness of the global warming at an international level, has stimulated an array of national policies as well as many voluntarily initiated programs, has created an international carbon market and established new institutional mechanisms that “*may provide the foundation for future mitigation efforts.*” Although it is a significant step towards limiting global GHG emissions, this commitment period expires in 2012 and a new international framework will need to have been introduced by then which can result in more serious amounts of GHG abatement.

The Protocol was adopted at the third Conference of the Parties to the UNFCCC in Kyoto, Japan, on 11 December 1997 and came into force on 16 February 2005. The rules concerning its implementation were adopted in Marrakesh in 2001 and are called the “Marrakesh Accords” (UNFCCC, Undated).

How it works

Under the agreement, industrialized countries are required to reduce their collective emissions of greenhouse gases by 5,2% compared to the year 1990. It is a so called 'cap and trade' system. (Another example of a 'cap and trade' system is the EU ETS, which will be examined later on in this paper). The national abatement is specified for each of the countries in the Treaty (see the table below); for example the EU has to make a reduction of 8%, it is 6% for Japan, 7% for the USA (being the second largest emitter and not having ratified the Protocol), 0% for Russia, and some other countries are permitted to increase their emissions, such as Australia (8%) and Iceland (10%) (United Nations Environment Program, 1997). The final goal is to lower overall emissions of the six greenhouse gases - carbon dioxide, methane, nitrous oxide, sulphur hexafluoride, hydrofluorocarbons, and perfluorocarbons - averaged over the 2008-2012 period, which is the second period of the Protocol. It's the United Nations that oversees these commitments.

There is an important principle that the Protocol follows, namely the “*common but differentiated responsibilities*”. This means that the Protocol places a heavier burden on developed nations because on the one hand, they can deal with the incurring costs of cutting emissions much easier, and on the other hand, they have contributed more to the existing problem by emitting larger amounts of greenhouse gases to the atmosphere.

Table 1 shows the reductions that have to be made by the countries that signed the Protocol in the second Phase from 2008-2012.

To facilitate the task of the participating countries, the Kyoto Protocol has developed three innovative mechanisms, also known as the “*market-based mechanisms*” or „flexible mechanisms”, with the help of which developed countries can achieve abatement goals in the least costly way as well as attract the participation of private sectors. While *Emissions Trading* allows developed countries to trade with their allowances, based on the *Joint Implementation* mechanism, participating countries can obtain additional emissions quota if they invest in projects generating GHG reductions (OECD/IEA, 2005). The purpose of the *Clean Development Mechanism* is to assist non-Annex I countries to achieve sustainable development and contribute to the ultimate objective of the UNFCCC. According to the CDM, developed countries may undertake different mitigation projects in developing countries to earn certified emission reductions (CERs) that can be used to comply with their Kyoto obligations.

Table 1
Countries included in Annex B to the Kyoto Protocol and their emissions targets

Country	Target (1990** - 2008/2012)
EU-15*, Bulgaria, Czech Republic, Estonia, Latvia, Liechtenstein, Lithuania, Monaco, Romania, Slovakia, Slovenia, Switzerland	-8%
US***	-7%
Canada, Hungary, Japan, Poland	-6%
Croatia	-5%
New Zealand, Russian Federation, Ukraine	0%
Norway	+1%
Australia	+8%
Iceland	+10%

Source: UNFCCC

* The 15 States who were EU members in 1990 will redistribute their targets among themselves, taking advantage of a scheme under the Protocol known as a "bubble", whereby countries have different individual targets, but which combined make an overall target for that group of countries. The EU has already reached agreement on how its targets will be redistributed.

** Some EITs have a baseline other than 1990.

*** The US has indicated its intention not to ratify the Kyoto Protocol.

This section presented the Kyoto Protocol and its main operational features as well as the flexible mechanisms. Under the so called 'Kyoto umbrella,' the EU established its own Emissions Trading Scheme, which helps Member States achieve their specific targets, and the Union as whole to meet the 8% reduction goal by 2012. The next section presents the EU ETS.

2. The EU's Emissions Trading Scheme (EU ETS)

For parties committed under the Kyoto Protocol, domestic emissions trading is an adequate means to comply with their obligations and it is also considered as a least-cost approach to reducing GHG emissions. The European Parliament and the Council of the European Union adopted Directive 2003/87/EC in October 2003, establishing the EU's own emissions trading scheme (EU ETS), which helps the EU achieve its Kyoto target. This section of the paper will present the main features of this scheme.

The EU ETS was introduced in January 2005 and it is the largest international emissions trading scheme implemented so far (CENDRA, 2006). Under the Kyoto umbrella, the EU is committed to reducing its overall emissions by 8% during the period of 2008-2012 compared to 1990 levels. Under Article 4 of the Protocol, the EU member countries are entitled to split this common target into shares of different stringencies according to the EU's burden-sharing agreement (OECD/IEA, 2005). So individual targets can vary on a large scale (for example it's +27% for

Portugal, but -28% for Luxembourg). The (former) accession countries that joined the EU in May 2004 and the countries that joined the Union in 2007 are not part of the Burden Sharing Agreement but they have their own Kyoto targets.

The scheme covers about 45% of the EU's total CO₂ emissions, including energy, oil, steel, aluminium, paper and cement industries. Within the chemicals sector, it covers all combustion installations above 20 MW (MILMO, 2005). As of January 2005, approximately 11,500 plants across the EU-25 were authorized to buy and sell emissions over the first period that ran from 1 January 2005 until 31 December 2007. The second phase of the EU ETS coincides with the Kyoto Protocol's second phase. It started 1 January 2008 and finishes on 31 December 2012. As the Directive has specified, each subsequent period covers five years. In the first period, the allocation had to be done for free in relation to at least 95% of the allocated allowances, and 5% could be auctioned. In the second period, these percentages are 90% and 10% (EC, 2003/87/EC). The allocation method for the third period has not yet been decided.

Main Features

The EU ETS is a cap-and-trade system, which is important for the EU in minimizing the impact of emissions abatement on competitive advantage. The member countries shall not emit above their given "cap", yet if they do, they can buy European Union Allowances (EUAs) from countries that have an excess in allowances. One EUA corresponds to one ton of CO₂. The EU ETS is a downstream trading system, which means the allocation of allowances to the point sources of emissions such as fossil fuel combustion installations (OECD/IEA, 2005). The method in which allowances are allocated is the so called grandfathering (the allowances given are based on historical emissions). The EU ETS has been set on a permanent basis and allowances have a limited temporal validity.

The Directive allows Member States to comply with their commitments with the use of the Kyoto Protocol's project-based mechanisms (JI and CDM), so the two markets can be linked in this way. Installations covered by the EU ETS can comply with their target by surrendering:

- *European Union Allowances* (EUAs): can be their own or can be acquired from other installations.
- Starting from 2005: *Certified Emission Reductions* (CERs): can be earned from CDM projects and can be used in the second commitment period as well.
- Starting from 2008: *Emission Reduction Units* (ERUs): can be earned from JI projects.

The operation of the EU ETS follows an annual cycle. At the end of each year, the installations have four months to gather their allowances to comply with the previous year's target. Unused EUAs can be used the next year, but only within the same compliance period. A penalty of €100 per excess ton of CO₂ must be paid by the installations that do not surrender their allowances commensurate with the reported emissions in the second phase. Moreover, they must surrender the missing allowances the next year (OECD/IEA, 2005).

The EU ETS does not specify how or where the market for EUAs should operate, so companies can trade their allowances directly with each other, through a broker or an exchange, or another market intermediary. There are several exchanges all across Europe (such as: the European Climate Exchange, the NordPool or the Climex) that are dealing with EUA trading. The growing number of exchanges in

Europe shows the growing significance of carbon trading and the rapid growth of the EU ETS market. Since its launch in 2005, we could observe a massive increase in volumes (multiplied by 3.5 between 2005 and 2006). In 2006, 1.1 billion tonnes of CO₂ were exchanged (a market of €18 billion) and 5 million tonnes were traded per day on average, of which 60% was OTC (Orbeo, 2008).

National Allocation Plans

Member States are to develop their National Allocation Plans (NAPs) for each compliance period, which form the backbone of the EU trading scheme. In the NAPs, they specify the amount and method of EUA allocation as well as other conditions concerning the system's operation in each country (OECD/IEA, 2005).

Based on the lessons learnt from Phase I (2005-2007), the Commission adopted further guidance for Phase II (2008-2012). On *Table 2*, we can see the 2005 allowances for each Member State, their 2005 verified emissions, as well as the submitted NAPs for the second Phase and the guidance of the Commission.

Table 2
Submitted second phase NAPs and the guidance of the European Commission¹

Member State	Data in million tons			
	2005 allowances	2005 verified emissions	Submitted NAP II	European Commission
Austria	33.0	33.4	33.1	30.7
Belgium	62.9	55.4	60.8	58.5
Bulgaria	50.5	50.5	67.1	42.3
Cyprus	5.7	5.7	7.5	6.2
Czech Republic	97.6	82.5	102.0	86.8
Denmark	33.5	26.5	26.5	24.5
Estonia	19.0	12.6	24.6	12.7
Finland	45.5	33.1	39.6	37.6
France	156.5	131.3	155.6	132.8
Germany	499.0	474.6	482.0	453.1
Greece	74.4	71.3	75.5	69.1
Hungary	31.3	26.0	33.0	26.9
Ireland	22.3	22.4	22.6	22.3
Italy	232.5	225.9	209.0	195.8
Latvia	4.6	2.9	7.5	3.4
Lithuania	12.3	6.6	13.9	8.8
Luxembourg	3.4	2.6	3.8	2.5
Malta	2.9	2.9	3.0	2.1

¹ Source: Orbeo

*Table 2 (continued)
Submitted second phase NAPs and the guidance of the European Commission*

Member State	Data in million tons			
	2005 allowances	2005 verified emissions	Submitted NAP II	European Commission
Netherlands	95.3	80.4	90.4	85.8
Poland	239.1	202.2	279.0	208.5
Portugal	38.2	36.4	37.9	34.8
Romania	72.5	72.5	102.8	75.9
Slovakia	30.5	25.2	43.1	30.9
Slovenia	8.8	8.7	8.3	8.3
Spain	174.4	183.6	152.7	152.3
Sweden	22.9	19.4	25.2	22.5
UK	245.3	242.5	245.4	246.2
Total EU27	2313.9	2137.1	2351.9	2081.3

The future of the EU ETS-Beyond Kyoto

The future of the EU's Emissions Trading Scheme depends on whether or not there will be global emission reduction targets after 2012 (ZWICK, 2008). If there are no global targets by 2012, the EU will "only" reduce its emissions 20% below 1990 level by the year of 2020 and in this case, prices of EUAs will be higher (anywhere between €30 and €40 per ton). But if global reduction targets are agreed, the EU will reduce its emissions by 30% and prices will drop (between €20 and €30 per ton) (ZWICK, 2008). In any way, the EU ETS will be expanded to sectors currently not obliged to participate and the participants in some sectors will have to buy the allowances through an auction instead of obtaining them for free.

All in all, Europe continues to play the role of an international leader in fighting climate change. This role of leadership manifests itself in the establishment of the EU Emissions Trading Scheme, which is the largest international carbon trading market in the world as of today. This part of the paper discussed the European way of combating climate change under the Kyoto umbrella through the EU ETS. We could see that Europe has chosen the regulated way to reduce GHG emissions. In the next part, attention will be turned to the American methods, where the lack of federal CO₂ mandates has led to the emergence of several voluntary projects.

II. THE VOLUNTARY APPROACH IN THE UNITED STATES

This section of the paper focuses primarily on the role that the United States plays in environmental protection. First of all, the country's climate policy will be examined. Although there is no federally regulated way for reducing greenhouse gases in the United States today, there are several voluntarily initiated projects all across the country, especially in the Northwestern and Western areas. In the second section, some of these voluntary approaches will be presented.

1. Climate policy in the USA

The daily output of man-made CO₂ today is reportedly 11% greater than it was a decade ago (primarily from fossil fuels and burning coal). Being the world's second largest contributor to GHG emissions, the USA's power generation emits about 40% of all CO₂, which means approximately 10% of the total global emissions (MCNAMARA, 2004), yet CO₂ remains an unregulated pollutant in the United States as of today. This section will review the recent history of climate policy in the United States.

In recent years, President BUSH has been resistant to any notion of CO₂ limits, although he has expressed his support for a free-market approach to reduce not only CO₂, but other GHGs as well, such as sulphur-dioxide (SO₂), nitrous oxide (NO_x) and mercury. (It's important to note that liquid trading markets for NO_x and SO₂ have been operating for over a decade in the country in response to federally mandated reductions under the Clean Air Act). As far as the Kyoto Protocol is concerned, President Bush withdrew support for it in 2001 out of a concern that regulating CO₂ would make domestic electricity prices soar and that the goals of the treaty were unachievable because developing countries such as China and India would be exempt. As of today, the United States has still not ratified the "*fatally flawed*" Protocol (CHRISTIANSEN, 2003), which is a big concern for other developed countries in the world, given the fact that the US is one of the biggest polluters on the globe.

The BUSH administration's approach to climate change was marked by two stages. First, in February 2002, the Administration presented the Global Climate Change Initiative (GCCCI), the main features of which included an international strategy focusing on technological innovation, a partnership with the developing countries as well as a domestic strategy to reduce GHG emissions by 18% between 2002 and 2012. This has been criticized by many, because the GCCCI relies on weak policy measures (Victor, 2004 as cited in HOVI, 2008). In May 2007, the BUSH administration presented another international strategy on climate change, although its main elements remained the same since 2002, as far as the lack of mandatory cuts, or the rejection of a cap-and-trade system are concerned. With the new strategy, the USA initiated a dialogue with the major economies of the world to reach an agreement on a "*long-term global goal to reduce greenhouse gases*" by the end of 2008 (HOVI, 2008). Other recent actions in which the United States is participating include the launch of a program called the International Carbon Action Partnership (ICAP), which was established in October, 2007 by 16 US states, six Canadian provinces, seven European countries, Australia and New Zealand. The purpose of the Partnership is to "*create an international forum of governments and public authorities that are engaged in the process of designing or implementing carbon markets. ICAP will establish an expert forum to discuss relevant questions on the design, compatibility and potential leakage of regional carbon markets*" (HOVI, 2008).

All in all, the resistance to mandatory CO₂ cuts has not stopped democrats, other federal officials and environmentalists from offering their proposals for a regulated GHG reduction system, even though they have had to experience continuous rejection from the part of the power sector and the government. Due to the growing pressure, the private sector has started to initiate its own voluntary efforts to reduce CO₂ and create a carbon trading system.

Having examined the most important steps taken by the USA to fight global warming, it has been concluded that there is no federal regulation to reduce the

amount of GHG emissions, which led to the emergence of several voluntary programs. The next section will have an overview of these approaches.

2. American voluntary approaches

“In the absence of meaningful federal action, it is up to the states to take action to address climate change and reduce greenhouse gas emissions in the country.” (Janet Napolitano)

As we have seen, the mandatory model for GHG reduction is not in function in the United States due to the lack of legally binding regulations. As a consequence, many companies from the private sector and several individual state governments have grouped up to take efforts to improve their environmental performance, and there are several different voluntary programs in effect all across the country, which this section will overview.

A recent one, for example, is the United States Climate Action Partnership (USCAP), which was launched with considerable publicity in early 2007. It is a coalition of major businesses and environmental organizations advocating a mandatory cap-and-trade system (JONES et al, 2007).

Although today the American carbon market is limited, it is certainly expected to expand over time based on two basic principles (McNamara, 2004), which are much the same as those that have encouraged other emissions trading schemes to come to existence. On one hand, companies that have major power producing assets will want to keep the overall costs of their CO₂ reductions down. This means that they will try to find the best and most cost effective measures to do this, and emissions trading can be one of these measures. On the other hand, there is also a potential gain in emissions trading. Companies that manage to emit less may find that they can profit from selling their unneeded allowances to others that can't stay within their given quotas.

Now let us have a brief overview of some of the significant voluntary programs that are in operation in the United States today.

An overview of American voluntary approaches

The Regional Greenhouse Gas Initiative (RGGI)

“The Regional Greenhouse Gas Initiative (RGGI or ‘ReGGIe’) is a cooperative effort by 9 Northeast and Mid-Atlantic states to discuss the design of a regional cap-and-trade program initially covering carbon dioxide emissions from power plants in the region. In the future, RGGI may be extended to include other sources of greenhouse gas emissions, and greenhouse gases other than CO₂” (RGGI, undated). Currently, eight states are participating in the RGGI that include Connecticut, Delaware, Maine, New Hampshire, New Jersey, New York, Maryland and Vermont. In addition, the District of Columbia, Massachusetts, Pennsylvania, Rhode Island, the Eastern Canadian Provinces, and New Brunswick are observers in the process.

The goal of RGGI is to develop a multi-state cap-and-trade program to reduce GHG emissions (primarily carbon dioxide) of power plants in the participating states while maintaining energy affordability and reliability, to an extent feasible for the diverse policies and programs in individual states. The action plan includes guiding principles for the setting up of the program, making it available for other states to join as well.

The states agree to curb CO₂ emissions from power plants starting in 2009, with cuts in emissions starting in 2016 (until then, emissions would be capped at current

levels of about 121 million tons). Under RGGI, at least 25% of a participating state's CO₂ allowances are to be dedicated to clean energy development and energy efficiency (GARDNER, 2008).

The Western Climate Initiative (WCI)

As a result of climate change, several western states in the United States have been suffering from severe and devastating natural phenomena and are expected to be especially affected in the future by extreme climatic changes. Realizing how serious the matter is, five western states have decided to take action, and have established the Western Climate Initiative to tackle global warming.

"The Western Climate Initiative is a collaboration which was launched in February 2007 by the Governors of Arizona, California, New Mexico, Oregon and Washington to develop regional strategies to address climate change. WCI is identifying, evaluating and implementing collective and cooperative ways to reduce greenhouse gases in the region" (Five Western Governors, WCI National Press Release, 2007). Later, the State of Utah, British Columbia, Manitoba, Montana and Quebec have also joined the initiative, and many other states (such as Alaska, Colorado, Idaho, Kansas, Nevada, Wyoming as well as states in Canada and Mexico) are observers in the process.

WCI builds on individual state efforts as well as earlier existing regional greenhouse gas reduction efforts; the West Coast Global Warming Initiative, which was created by California, Oregon and Washington in 2003 and another one created by Arizona and New Mexico in 2006, the Southwest Climate Change Initiative. The group-wide greenhouse gas emissions target of WCI is 15 % below 2005 levels by 2020. Partners to WCI have all joined the Climate Registry which will play an important role in establishing a measurement basis for the WCI cap-and-trade program (that is expected to start operating in 2009) with accurate reporting mechanism and accounting infrastructure (WCI Work Plan, 2007).

Sierra Club's Cool Counties Climate Stabilization Declaration

In the summer of 2006, the Sierra Club launched its Cool Counties program with 12 American counties (such as King County, Washington, Fairfax County, Virginia, and Nassau County, New York) to reduce GHG emissions and combat climate change. The number of participating counties has increased to 30 recently (Hill, 2008). The counties that signed the Declaration pledged to reduce their emissions 80% by 2050, which is an achievable annual average reduction of 2%. The Cool Counties Climate Stabilization Declaration also urges the federal government to take action and to enact the 80% emissions reduction by 2050, as well as to raise fuel economy standards to 35 miles per gallon within a decade. Sierra Club helps counties improve their environmental performance by implementing different policies that fight global warming and encourages concrete actions that can be taken by counties to reduce emissions in several key areas, such as: energy efficiency, renewable energy, greening county vehicle fleets, land use, transportation, water conservation, and educational outreach (Cool Counties Launch, Press Release, 2008).

Sierra Club has another program, which is especially designed for American cities. In the Cool Cities program, cities are encouraged to sign on and implement the US Mayor's Climate Protection Agreement, which was initiated by Seattle Mayor Greg Nickels in 2005. As of today, nearly 600 cities have decided to take part, and signed on to the agreement.

Individual State efforts to reduce emissions

In this section, the efforts of only a few states will be shown, without aiming at showing all of the actions of all individual states that try to combat global warming.

The *State of Oregon* is one of the front-runner states in the United States to fight climate change. The State Governor signed an ambitious bill in August 2007 which will pave the way for strict greenhouse emissions (TED KULONGOSKI signs bill, 2007). The new energy bill requires the state to stop adding new greenhouse emissions by 2010; reduce emissions by 10 percent below 1990 levels by 2020; reduce emissions by 75 percent below 1990 levels by 2050.

Moreover, many Oregon farmers have pledged to convert to solar and wind energy, as well as use bio-diesel instead of regular diesel. Another big achievement in Oregon has been reached recently. Ash Grove Cement has signed a voluntary deal with regulators at the Department of Environmental Quality to cut its mercury emissions by 75% within the next three years (Oregon's largest source of mercury, 2008). (And voluntary that is: as neither the Environmental Protection Agency, nor the State of Oregon requires cement plants to reduce mercury emissions.) If the agreement is approved, Ash Grove will be the first cement plant in the United States to cut emissions of mercury, which is a toxic substance that can cause nervous disorders in humans. Although it is a completely voluntary agreement, if the cement plant cannot meet its emission reduction targets and falls below the 75% capture rate, it could face civil penalties.

The *State of California* is also a pioneer among the US states in environmental protection. It has initiated its plan to tackle global warming by reducing GHG emissions statewide and by doing so, it has become one of the front-runners in America to address the problem of climate change. Of course, the motives behind that are easy to see. Not only is California extremely hard hit by the earth quakes and hurricanes as direct consequences of climate change, but also, if California was a separate country, it would rank among the top 12 polluters of CO₂ in the world (see *Table 3*).

Table 3
Carbon dioxide emissions, 2002 (million metric tons of carbon)¹

United States	1,576	South Korea	136
China	1,033	Italy	123
Russia	419	Mexico	108
Japan	331	California	107
India	302	France	103
Germany	236	Iran	101
Britain	148	South Africa	99
Canada	141		

¹ Source: Natural Resources Defense Council.

Nevertheless, California's efforts to reduce GHGs are remarkable within the borders of the United States. In 2004, California was the first state to adopt regulations to limit greenhouse gas emissions from automobiles. Later on, many other states in the Northeast followed suit (MOUAWAD and PETERS, 2006). The world's largest automakers have been suing many of these states to hinder the laws from going into force, since they would have to increase fuel economy in the 2009 model vehicles to meet them.

The year of 2006 was a fruitful one in the life of California when it comes to environmental protection. The Governor announced the "*world's first Low Carbon Fuel Standard*" (LCFS) for transportation fuels that requires fuel providers to reduce the carbon intensity of California's passenger vehicle fuels by at least 10 percent by 2020. Many other states adopted California's vehicle emissions standards including: Florida, Vermont, New York, New Jersey, Massachusetts, Connecticut, Maine, Rhode Island, Pennsylvania, Maryland, Washington and Oregon. This was the year, when the Governor signed the Global Warming Solutions Act. This law will require a 25% cut in emissions by 2020, which would bring back emissions to 1990 levels (EILPERIN, 2007) and 80% below 1990 levels by 2050. Also in 2006, the Governor signed legislation about the Million Solar Roofs Plan. This plan will provide 3000 megawatts of clean energy and reduce the greenhouse gas output by 3 million tons, which is equivalent to taking one million cars off the roads. The 2.9 billion dollar plan will lead to one million solar roofs in California by the year 2018 (SCHWARZENEGGER applauds Florida, 2007).

The *State of Washington* is also amongst those that are concerned and are ready to act. According to Washington's "*Leading the way on Climate Change*" policy brief, in February 2007, the Governor issued the Climate Change Challenge Executive Order, which established realistic, achievable goals for greenhouse gas reductions, created a goal of reducing expenditures on imported fuel by 20% by 2020 and it also intends to triple existing jobs in clean-energy fields by 2020. The State has created its Climate Advisory Team to make recommendations for actions and strategies needed to achieve these goals. In May 2007 the goals about emissions and job creating were enacted and a performance standard for power plants to reduce GHG emissions was established. In a new proposed legislation that ensures that the goals about emissions reduction and clean-energy economy are met, includes the following:

- establishes a program for limiting and reducing greenhouse gas emissions;
- designs a regional market-based system to help meet those emissions limits;
- requires large greenhouse gas emitters, such as industrial sites and vehicle fleet operators, to report their emissions;
- creates a workforce development and training program to grow living wage, clean-energy jobs.

As a result of all its actions, Washington is recognized nationally as a leader in environmental policy, and as one of the top five states to do business in the United States.

After having seen some of the current voluntary actions that try to tackle global warming in the United States, we can conclude that there is a large number of initiatives, especially in the Northeast and in the West. However, only time can tell whether these initiatives will be efficient (since most of them are very recent and haven't started fully operating) and will really result in significantly smaller amounts of GHGs emitted into the atmosphere. In the meantime, we can only hope that the Federal Government will join forces with the states, counties and cities, and by enacting a law for obligatory GHG reduction, it will embrace all of these efforts into one, national, "*united battle*" against climate change.

III. VOLUNTARY VERSUS REGULATORY

As we have seen in the preceding parts of the paper, the European Union follows a mandatory approach in tackling climate change, whereas in the United States, the lack of CO₂ regulation has led to the emergence of several voluntary agreements. The difference in these perceptions also manifests itself in the way climate exchanges operate, where the main activity is trading with greenhouse gas emissions. In this part of the paper, two such exchanges will be examined and compared. The main example for a voluntarily operating emissions trading system is provided by the Chicago Climate Exchange in the USA and its sister exchange, the European Climate Exchange will represent the regulatory approach, where the operation is primarily for compliance reasons. (As it has been stated earlier, there are several climate exchanges all across Europe, however, the reason for choosing the ECX is because it is Europe's premier marketplace for carbon emissions.) The evaluation will be done according to the following viewpoints:

- the creation,
- the legal frame,
- the objective and main goal of the systems,
- participation,
- technical details,
- advantages, disadvantages.

After having examined the two systems according to these points, an evaluation of environmental effectiveness will also be done, and conclusions will be drawn.

Creation

CCX is “*the world's first and North America's only active voluntary, legally binding integrated trading system to reduce emissions of all six major greenhouse gases (GHGs), with offset projects worldwide*” (CCX, Undated a). CCX started its trading operation in December 2003 with 13 Charter Members (such as: American Electric Power, City of Chicago, DuPont, Ford Motor Co., or Motorola). By becoming Members of CCX, these organizations were among the first in the United States to make legally binding commitments to reduce all six greenhouse gases, “*in the world's first multi-national multi-sector market for reducing and trading greenhouse gases*” (CCX, Undated a). CCX launched the European Climate Exchange (ECX) in 2005, now “*the leading exchange operating in the European Union Emissions Trading Scheme.*” This was the first year of the first compliance period of the EU ETS as well.

The legal frame

The Chicago Climate Exchange and the European Climate Exchange are sister exchanges and have both been part of the Climate Exchange Plc group of companies since 2006. The Climate Exchange Plc (CLE) is a publicly traded company listed on the AIM market of the London Stock Exchange and is valued at over \$1.5 billion. The Members of CCX voluntarily decide to reduce their GHG emissions, for which CCX provides them with an end-to-end carbon market infrastructure, as it is a unique combination of a cap-and-trade system, an offset mechanism and a dedicated exchange (OECD/IEA, 2005). The reduction commitments made by CCX Members are legally binding. ECX operates under the EU ETS umbrella (which is a cap-and-trade system as well) and members of ECX must comply with their EU ETS/Kyoto targets. ECX provides the EU ETS with advanced, low-cost and financially guaranteed tools.

The objective and main goal of the systems

The EU has long been acting as a leader in fighting climate change, and this provision of leadership henceforward remains an important aim. The tasks of compliance with the Kyoto goals have encouraged the EU to establish its Emissions Trading Scheme, the goals of which can be achieved –among others– with the help of climate exchanges. The European Climate Exchange is Europe’s premier such marketplace, where carbon dioxide emissions can be traded. The main difference between the London-based ECX and the Chicago-based CCX is that ECX Carbon Financial Instruments (CFIs) are based on these above mentioned compliance allowances, and companies that purchase these allowances, do it under a regulatory pressure. Consequently, the main goal and objective of ECX is to provide the EU ETS with advanced, low-cost, and financially guaranteed tools (ECX, Undated).

The CFIs of CCX are based on voluntary allowances. It is primarily due to the fact that the USA, not having ratified the Kyoto Protocol, is not bound to accomplish any internationally set abatement goal, moreover, there is no federal regulation that would stipulate or encourage such actions. Therefore the main objective of CCX is to facilitate the transaction of GHG allowances for firms that decide to voluntarily take action to reduce their emissions and it also creates offset opportunities with price transparency and environmental integrity. CCX aims to build the framework and infrastructure needed for a cost-efficient way to manage GHG emissions through the experience and education of participants and the public. Furthermore, CCX aims to facilitate capacity-building in both public and private sectors to facilitate GHG mitigation and helps inform the public debate on managing the risks of global climate change (CCX, Undated a).

Participation

CCX counts over 400 Members today from all sectors. Among the members we can find large corporations, financial institutions, counties, municipalities, states and universities as well. Those who are participating in CCX can be considered as leaders in greenhouse gas management and they represent all sectors of the global economy. The reasons for entering a voluntary trading scheme like CCX are many. The motives range from doing the right thing to becoming green in the eyes of the public and by doing so, gaining credibility and PR benefits. But in the case of American companies, it is also important to mention that many of them join the action in a fear of future federal CO₂ regulations, because in this way, they can gain the necessary experience in advance to easily adapt to a compliance regime once it’s implemented.

ECX has more than 90 Members, but several hundred clients can access the market daily via banks and brokers. The difference in participation between the two exchanges could stem from the fact that ECX was launched two years later than CCX and that in Europe, there are several other climate exchanges as well. Nonetheless, ECX is the most liquid, pan-European platform for carbon emissions trading, which attracts over 83% of the exchange-traded volume in the market. This is what we can observe on the pie diagram (*Figure 1*), where we can see the share of other significant climate exchanges as well.

Technical details

Emission reduction commitment

In North America, CCX is the only system through which reductions made are legally binding, and where an independent, third party verification is provided by the Financial Industry Regulatory Authority (FINRA, formerly NASD). In Phase I (2003-2006), Members were committed to reduce emissions a minimum of 1% per year, for a total reduction of 4% below Baseline (which is the 1998-2001 annual average emissions).

In Phase II (2007-2010), CCX Members commit to a reduction schedule that requires year 2010 emission reductions of 6% below Baseline at minimum. The Reduction Schedule for Members of Phase I (2003-2006) and Phase II (2007-2010) can be observed on the chart below (CCX, Undated a). Phase III is currently in the stage of planning.

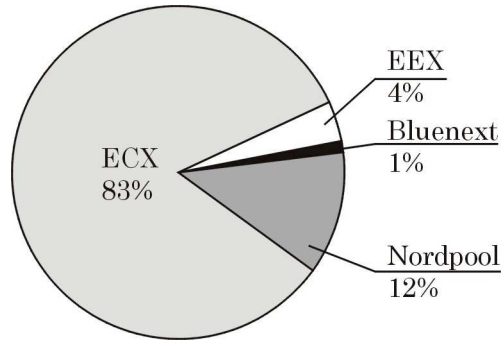


Figure 1
EUA Volume Exchanges
(February 2008)¹

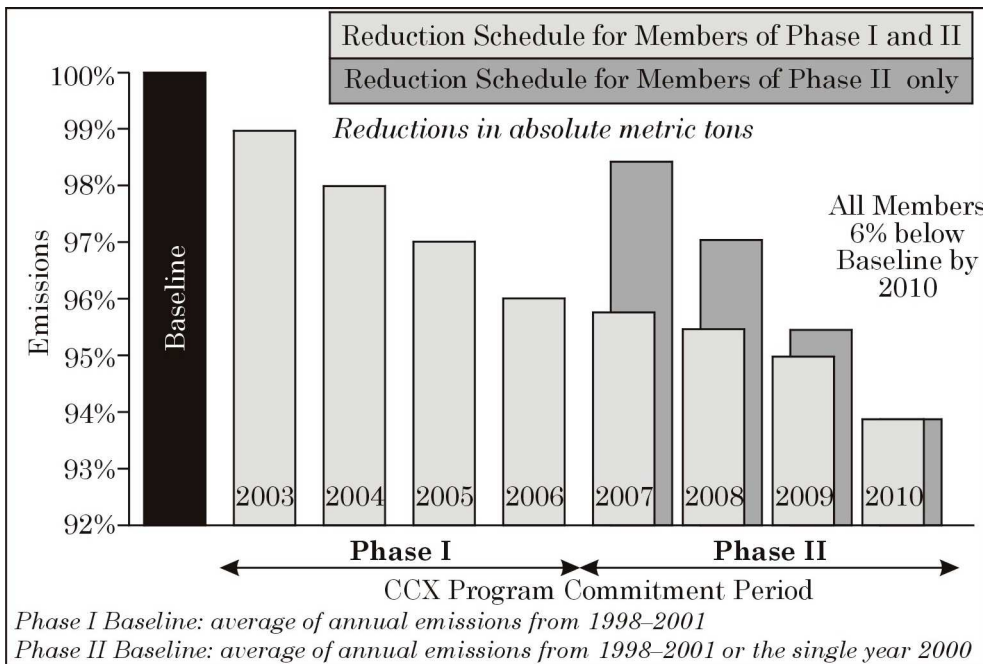


Figure 2
Reduction Schedule for Members of Phase I and Phase II²

¹ Source: ECX.

² Source: CCX.

On *Table 4* we can see the annual reduction commitment from 2003 until 2010 for Members that were participating in the first two Phases and for those participating in only Phase II.

Table 4
The annual reduction commitment for Members from 2003 until 2010

Year	CCX Members of Phase I and Phase II	CCX Members of Phase II Only
2003	1% below Baseline	--
2004	2% below Baseline	--
2005	3% below Baseline	--
2006	4% below Baseline	--
2007	4.25% below Baseline	1.5% below Baseline
2008	4.5% below Baseline	3% below Baseline
2009	5% below Baseline	4.5% below Baseline
2010	6% below Baseline	6% below Baseline

The emission reduction commitment for ECX Members depends on how it is determined by the specific country's National Allocation Plan, where the company belongs to. As it has been stated earlier in the paper, under the Kyoto umbrella, the EU is committed to reduce its overall emissions 8% by 2012, which can be shared by the EU Member States in accordance with the EU's Burden Sharing Agreement.

Product range – what is being traded?

The Chicago Climate Exchange covers six greenhouse gases: carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulphur hexafluoride (SF₆), while on ECX, the main GHG is CO₂ (the reason for that is that the EU ETS covers only CO₂), although it is due to be expanded to other GHGs as well in the future. The main product on CCX is the Carbon Financial Instrument (CFI). Each CFI contract represents 100 metric tons of CO₂ equivalent (CO_{2e}).

The underlying commodities traded on ECX are EU allowances (EUAs) as issued under the EU ETS. Approximately a total of 2.3 billion EUAs have been granted yearly to the 12,000 energy-intensive installations covered by the EU ETS Directive. Recently, ECX has added the Certified Emission Reduction units (CERs) to its product range, which can be generated from CDM projects.

Trading system

CCX is a cap and trade system whose Members make a voluntary, but legally binding emission reduction commitment. *“Members are allocated annual emission allowances in accordance with their emissions Baseline and the CCX Emission Reduction Schedule. Members who reduce beyond their targets have surplus allowances to sell or bank; those who do not meet the targets comply by purchasing*

CCX Carbon Financial Instrument (CFI) contracts” (CCX, Undated a). One CFI contract represents 100 metric tons of CO₂ equivalent and it is comprised of Exchange Allowances and Exchange Offsets. In accordance with the CCX Emission Reduction Schedule and the Members’ emissions Baseline, members are issued Exchange Allowances, and Exchange Offsets are generated by qualifying offset projects (CCX, Undated b).

ECX is based on a cap and trade system as well. In the framework of the EU ETS each country is allocated a certain amount of allowance, which is the so called ‘cap’. Member countries shall not emit above their given ‘cap’, yet if they do, they are to buy European Union Allowances (EUAs) from countries that have an excess in allowances. One EUA corresponds to one ton of CO₂.

Price

There is a great difference in the prices of CFIs on the two platforms. In Europe, trading with greenhouse gas emission allowances has become a standard activity (as there are several exchanges where it is now possible to trade with GHG allowances), and the products of ECX act as the benchmark for prices around the world (ZWICK, 2008). Therefore prices in Europe are considerably higher than those in the United States. Let us have a look at the ECX CFI Emissions Index (prices reported on 21 April 2008):

- Dec 08: € 25.13
- Dec 09: € 25.85
- Dec 10: € 26.70
- Dec 11: € 27.39

On ECX, CFIs are trading for about \$36 per ton of CO_{2e}, while the prices on CCX are less than \$6 per ton (with a trading range of over \$1) as of April 2008. This significant price difference flows from the fact that ECX CFIs and CCX CFIs are completely different instruments (compliance vs. voluntary), and it is unlikely that they will converge in price in the near future.

According to the Economic Times, CCX’s low bids are due to the low trade volume, the lack of competition due to the participation of only a few large power companies, and the fact that the exchange is voluntary therefore it has no enforcement authority. Also, the prices of voluntary CFIs don’t fluctuate as much as those of the compliance CFIs on ECX, where negotiators have an influence on the prices, depending on which way talks go. Nonetheless, voluntary allowances do offer plenty of trading opportunities. The prices of voluntary allowances are impacted by the public’s confidence in the integrity of allowances, as well as the price of new technologies and it is also important whether the allowances purchased now can be sold into a compliance regime later on (ZWICK, 2008).

Trading volume

The difference in trading volumes is massive on the two platforms. The trading volume on CCX totaled 8.3 million metric tons of CO₂ in March 2008, which made it the second largest volume month in the history of CCX. We can observe the trading activity in March 2008 on the data of *Table 5*. The figures represent all trades posted to the CCX trading platform.

Table 5
CCX Trading activity in March 2008¹

March 2008	Volume (metric tons)		Closing prices (\$ per metric ton)	
	Mar. '08	Program to date	Feb. 29 '08	March 31 '08
2003 Vintage	837,000	5,925,500	\$4.50	\$5.80
2004 Vintage	1,106,200	7,157,200	\$4.45	\$5.85
2005 Vintage	1,185,700	8,520,400	\$4.45	\$5.85
2006 Vintage	1,207,200	10,281,200	\$4.45	\$5.80
2007 Vintage	1,194,100	9,145,300	\$4.50	\$5.85
2008 Vintage	779,500	4,547,200	\$4.50	\$5.85
2009 Vintage	1,033,600	5,139,100	\$4.50	\$5.85
2010 Vintage	951,300	5,906,400	\$4.50	\$5.85
Total	8,294,600	56,622,300		

However, on ECX, 120 million tons of EUAs were traded in futures and options contracts in March 2008. This is over fourteen times as much as the volume on CCX. Average daily volume in the same month was 414,730 metric tonnes on CCX and 6.3 million tonnes on ECX. CERs have also experienced a healthy and successful launch (March 14, 2008) on ECX, since the average daily traded volume was 858,000 metric tonnes of CO₂ in the first ten days. We can see the striking difference in trading volumes, although it clearly stems from the fact that ECX operates for compliance reasons while CCX is completely voluntary in nature.

Growth

Since the beginning, the members of CCX have already cut their emissions by more than 23.5 million metric tons of CO₂ worldwide (SANDOR, 2008). CCX is dynamically growing; the trading volume of the first quarter of 2008 increased 180% relative to the first quarter of 2007. But despite the vast expansion – e.g. the total trading volume of 11,850,300 tons of carbon dioxide in the first half of 2007 surpassed the total 10,272,400 tons recorded in all of 2006 (MAGEE, 2007) – the prices are still well below those of Europe's. Nonetheless, CCX is still in its infancy, and is expected to hold great potential for the future. The ongoing and quick expansion may also mean that a global GHG market can soon become reality, where CCX can play an important role. The chart below (*Figure 3*) shows the growth of CCX; the prices and volumes of CFIs changed over time up to this day: Dec 12 2003-Apr 21 2008.

¹ Source: CCX.

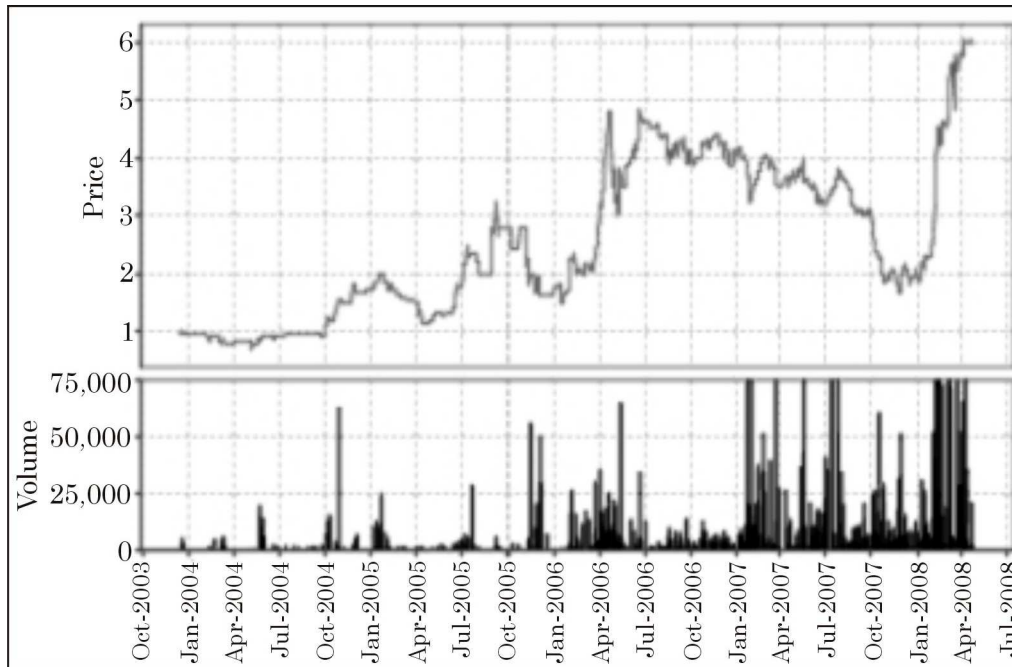


Figure 3
CCX Carbon Financial Instrument (CFI) Contracts Daily Report¹
(Price and volume reported in metric tons CO₂)

The market for EUA and CER futures and options contracts on ECX is also steadily and constantly growing with a 61% year-over-year increase in EUA trading volume from March 2007 (CCX Market Report March, 2008). Since the beginning in April 2005, close to 1.3 billion tonnes of CO₂ was traded with the EUA futures contract for a value of €24 billion. The CER futures have only been available on the market since 14 March 2008, but it has already experienced a healthy trading volume. On the chart below (*Figure 4*), we can see the monthly values of ECX EUAs since April 2005 until February 2008.

All in all, the European Climate Exchange is a dynamic marketplace for carbon exchanges, and it may well become the core of a global carbon market in the future, as it is already acting as the benchmark for prices across the world (ZWICK, 2008). CCX has also been experiencing steady growth in volumes, and is expected to become more and more momentous in American and international carbon trading, especially with the fact that the growing rate of CCX is three times bigger than that of ECX. However, the voluntary nature of it can be observed in the rate of participation, the trading volumes or the prices of CFIs.

¹ Source: CCX.

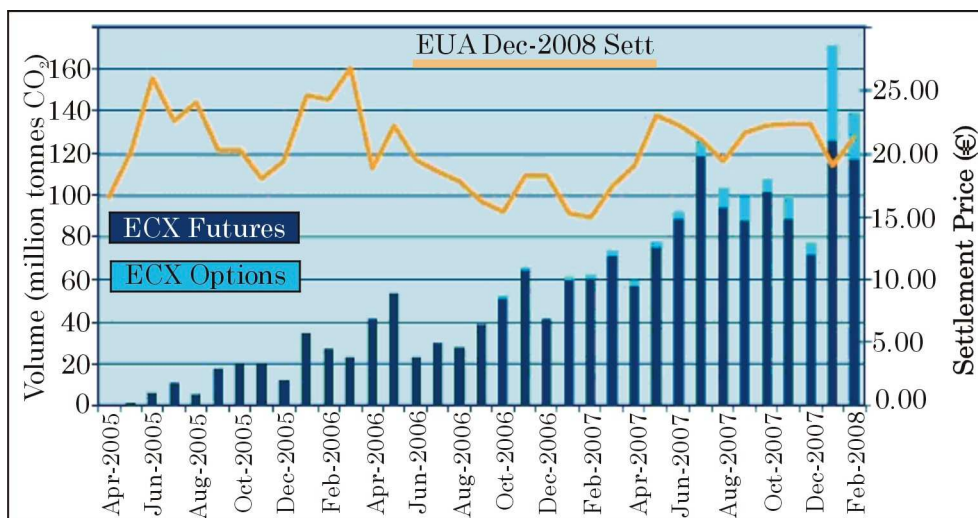


Figure 4
ECX CFI Contracts Monthly Volume¹

Offset projects

In the framework of the EU ETS, offset mechanisms such as the Joint Implementation and Clean Development Mechanism can be used by companies to a certain extent. CCX also has a whole variety of offset models in fields such as: forestry, agriculture, renewable fuels, and fuel efficiency and makes it possible for rural areas to bring environmental projects to the market. The agricultural offset program has been particularly successful with many participating farmers and through such programs more than one million acres of conservation tillage and grassland (across the Midwest) have been registered, verified and sold through the exchange. The forestry programs (some currently registered in Costa Rica and Brazil) comprise of standardized formulas for reforestation, afforestation as well as avoided deforestation.

Advantages

From the point of view of the participating firms, the main feature is the main advantage of the Chicago Climate Exchange, namely, that it's a voluntary GHG trading system. If a firm decides to enter CCX and gives it loud publicity, it can win green credibility in the eyes of the public and can shape a good relationship with the public authorities as well as the media. All in all, entering CCX can be an excellent way to enhance a company's reputation. Another important advantage is that the company can gain experience in emissions trading and also in the internal management of emissions reduction. Since the pressure is continuously growing on lawmakers in the United States, a federal CO₂ reduction mandate is likely to be realized in the not-so-far future, especially with the new president in sight. Therefore by entering the Exchange, firms can prepare themselves for a potential regulatory system. In addition, some of them might even be asked to get involved in the crea-

¹ Source: ECX.

tion of such a system, as it happened with BP in Great Britain (HOFFMAN, 2005). So there is a possibility to have an influence on future regulations. By entering the Exchange, most companies will find that reducing emissions can indeed reduce energy costs as well as getting new sources of capital. It can also bring new business opportunities for the firm, for example by gaining competitive advantage in its sector. Carbon trading is dynamically growing in the world; therefore those that decide to take action now can later on become the leaders in their sectors. Besides, prices of CCX CFIs don't fluctuate as much as those of the compliance CFIs.

The advantages of ECX stem from its compliance nature. Since firms must meet their targets specified by the NAPs under the EU ETS umbrella, they might as well facilitate their task by joining ECX, which is the most liquid market in Europe. That alone is a great advantage for a firm. Another benefit of ECX is that because of the regulatory system, the prices are quite high, and being the premier platform in Europe, it is the ECX that acts as the benchmark for carbon prices all over the world. Being part of such a fruitful market is a definite advantage, especially, that if a global carbon market is realized, ECX is expected to become the core of it.

Disadvantages

One of the disadvantages to CCX is that the rate of the participation of big companies is still relatively low, which is due to the voluntary nature of the Exchange. As a consequence of the low participation, the traded volume and the prices of CFIs are quite low as well, although CCX has shown a significant growth year by year and is expected to continue growing.

When it comes to the disadvantages of ECX, we can mention the regulatory pressure that lies heavy on firms. Having to do something with a potential punishment in sight always brings a feeling of force, instead of being able to decide freely on the methods of emission reduction with the most cost-efficient approach. Nevertheless, it is true that if a firm is obliged to reduce its emissions by a specific percentage, it is more likely to comply with its targets than if it was voluntarily making reductions. Another disadvantage of the compliance-natured ECX is that the prices of EUAs are highly influenced by negotiators. Depending on which way talks go, the prices can change very suddenly.

Now let us see these findings summarized in the *Table 6*.

Table 6
Comparison of CCX and ECX

	CCX	ECX
Creation	December 2003	April 2005
Legal frame	Part of the Climate Exchange Plc Creates an end-to-end carbon market infrastructure with legally binding commitments	Part of the Climate Exchange Plc Operates under EU ETS umbrella
Main objective	Facilitates the trade of GHGs for volunteering firms	Helps compliance with EU ETS targets
Participation	Approx. 400 Members	Approx. 90 Members

Table 6 (continued)
Comparison of CCX and ECX

	CCX	ECX
Emission reduction commitments	6% below Baseline by 2010	EU overall reduction commitment: 8% below baseline by 2012
GHGs covered	Carbon dioxide (CO ₂), methane (CH ₄), nitrous oxide (N ₂ O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulphur hexafluoride (SF ₆)	Carbon dioxide CO ₂
Product range	CFI	EUA, CER
Trading system	Cap and trade	Cap and trade
Price	~ \$5.80 (April 2008)	~ \$36 (April 2008)
Trading volume	8.3 million tons (March 2008)	120 million tons (March 2008)
Growth	+ 180%	+ 61%
Offset projects	Offset models worldwide in fields such as: forestry, agriculture, renewable fuels, and fuel efficiency	JI and CDM
Advantages	<ul style="list-style-type: none"> • Gaining green credibility • Gain experience in carbon trading • Good relationship with authorities, media and public • Cost reductions • New business opportunities 	<ul style="list-style-type: none"> • Facilitates the compliance with EU ETS targets • Most liquid market in Europe • Benchmark for prices in the world • Might become the core of global carbon trading
Disadvantages	<ul style="list-style-type: none"> • Low participation by big firms • Low trading volumes • Low prices 	<ul style="list-style-type: none"> • Regulatory pressure • Sudden price changes influenced by negotiators

Environmental effectiveness

Phase I of CCX started in 2003 and lasted until 2006. Throughout these four years, 39 out of the 40 audited Members were in compliance with the CCX program requirements. The average emissions were 9.175% below objectives (CCX 2006 Program-wide True-Up Summary Report, 2007). This suggests that the voluntary nature of CCX doesn't have a negative effect on the reduction performance of the Members, as otherwise would be expected in the case of a voluntary program (Price, 2005). The reason for this can be that the commitments made by the Members of CCX are legally binding.

ECX started its operation in 2005, which was the first year of Phase I of the EU ETS. ECX can be considered as a 'tool' for the EU ETS. Under the EU ETS, each Member State is committed to reduce its emissions in accordance with the EU's Burden Sharing Agreement. In Phase I, the caps of the EU ETS were considered generous and most countries met their caps by far; for example France, Germany, Latvia, Poland or Lithuania were among these countries (EU press release IP/O7/459, 2007). However, there were countries that couldn't meet their targets (for example Ireland, Spain or Austria). But on the whole, successful compliance was dominant in the first Phase, therefore we can say that the EU ETS so far seems to be an environmentally effective way to reduce GHG emissions. Of course, the system has only been operating for a few years, and this little time might not be enough to evaluate its effectiveness.

All in all, some more time would be needed for us to be able to clearly tell whether a voluntary or a compliance program can bring more effective results in the long run. What can be stated with certainty though is that if an abatement target is legally binding, it is more likely to fulfill its commitment.

V. CONCLUSIONS

The goal of this paper has been to present the environmental regulatory differences in the United States and Europe and to make an attempt to see whether voluntary approaches can be as effective as mandatory ones. We have found that although at an early stage of operation, a mandatory approach is more likely to bring positive results, in a longer term, voluntary programs can become just as effective yet a more flexible way to reduce GHG emissions with many other positive impacts.

In the first part of the paper, the two mainstream regulatory styles were demonstrated; the voluntary and the mandatory approaches, each of which are represented by two economical powers, the United States and the European Union. Not having ratified the Kyoto Protocol and the lack of federal GHG reduction mandates have led to the emergence of several (regional) voluntary programs in the United States, whereas the EU, playing the role of an international leader in fighting climate change, follows the mandatory regulation style. It established its Emissions Trading Scheme (EU ETS) which facilitates the compliance with Kyoto targets, although it is independent and will continue operating beyond Kyoto as well. In international GHG reductions, emissions trading has become a very important tool. To compare the mandatory and the voluntary regulatory approaches, the paper chose two healthily operating climate exchanges that are among the best platforms for trading GHGs to demonstrate the differences.

The Chicago Climate Exchange and the European Climate Exchange are sister exchanges and are both part of the Climate Exchange Plc group. The Members of CCX voluntarily decide to reduce their GHG emissions, for which CCX provides them with an end-to-end carbon market infrastructure, as it is a unique combination of a cap-and-trade system, an offset mechanism and a dedicated exchange. The reduction commitments made by CCX Members are legally binding, this is why its effectiveness is tangible. ECX operates under the EU ETS umbrella (which is a cap-and-trade system as well) and members of ECX must comply with their EU ETS/Kyoto targets. ECX provides the EU ETS with advanced, low-cost and financially guaranteed tools. Members of ECX can also comply with their targets with the help of offset mechanisms, the CDM and JI projects. The emission reduction commitment is similar in the

two systems: it is overall 8% below Baseline by 2012 in the EU ETS (which might be different for the installations of ECX Members in accordance with EU's Burden Sharing Agreement) and it is 6% below Baseline by 2010 for CCX Members.

Based on the comparison of CCX and ECX, we can conclude that although at the moment, ECX is more liquid with higher prices and trading volumes, the rapid growth of CCX is remarkable and obviously shows us that it will become more and more significant. Voluntary programs across the world are becoming more and more meaningful. The reason why the general opinion is mixed about the effectiveness of these programs can stem from the fact that it's only been in the last few years that more serious VAs have been created, and most of them are still in their infancy, therefore we cannot see their effectiveness in the long run. However, CCX is a great example for a well functioning yet 'young' VA where the positive environmental impact is observable. It is likely to become the most significant emissions reduction platform in the United States in the not-so-far future, and if the USA enacts federal mandates for GHG reduction (which will probably happen eventually with the new President in sight) CCX might actually become the core of the system. We suggest that voluntary approaches indeed can be as effective as mandatory ones, it is just a matter of time.

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