

UNIVERSITY OF LJUBLJANA
FACULTY OF ECONOMICS

MASTER'S THESIS

**DEVELOPMENT OF EMISSION RIGHTS AND THEIR
ACCOUNTING**

Ljubljana, September 2010

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DECLARATION

I, Vesna Romič, hereby certify to be the author of this Master's thesis, that was written under mentorship of dr. Sergeja Slapničar and in compliance with the Act of Author's and Related Rights – Para 1, Article 21, I herewith agree this thesis to be published on the website pages of the Faculty of Economics, University of Ljubljana Slovenia.

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INTRODUCTION

The emerging political consensus on climate change has pushed the green agenda from the debating chamber into the board room. In fact, a raft of economic measures at the national and international level has ensured that both public and private companies have become increasingly alert to the financial consequences of climate change and the measures being employed to manage it.

The European Union Emissions Trading Scheme has emerged as one of the most significant measures to date to tackle climate change since its commencement on 1 January 2005 (Point Carbon, 2008, p. 4). Overnight it created a pan-European market worth tens of billions of euros and created new challenges and opportunities for those companies within the scope of the scheme and the regulators overseeing it. By bringing the value of carbon dioxide emissions on to the balance sheet it also created a clear connection between emissions and corporate value. The message is clear: emissions are no longer for free.

As markets for carbon dioxide and other emissions emerge and develop in the European Union and around the world, the need to communicate clearly and unambiguously to stakeholders about the effect of these initiatives on past and future performance has gained importance. Furthermore, the studies show that “good” environmental performance along with extensive quantifiable environmental disclosures is associated with “good” economic performance (Al-Tuwaijri, Christensen & Hughes, 2004, p. 1; Aerts & Cormier, 2008, p. 8).

Despite the fact that climate change remains a hot topic and instruments aimed at reducing greenhouse gas emissions are emerging and developing at an increasing pace, accounting for greenhouse gas emissions still remains a problem. In the absence of clear direction and guidance from the accounting standard setters, treatment of these issues remains loose and full of challenges.

While the first efforts of the accounting authorities to find a common ground to account for, measure and present the financial implications of emission rights took place almost a decade ago, progress has been slow. Formative efforts on the part of standard setters have proven unsuccessful. The International Financial Reporting Interpretations Committee (IFRIC) initially took on this task, and issued IFRIC 3, Emission Rights, in December 2004. Unfortunately this guidance came under considerable pressure from both the business community and European politicians. They objected to the consequences of applying this interpretation to financial statements and this led to its withdrawal by the International Accounting Standards Board within a year of its issuance.

After the unsuccessful implementation of IFRIC 3 the accounting regulators realised that accounting for emission rights is significantly more complex than initially anticipated. Any

attempt at a comprehensive solution should be consistent with fundamental accounting principles and with the framework for preparation and presentation of financial statements (MacKenzie, 2008, p. 9). Also the implications of these new guidelines for some of the existing accounting standards need to be considered. In the case of IAS/IFRS the existing standards that require special consideration are:

- IAS 20 – Accounting for Government Grants,
- IAS 37 – Provisions, Contingent Liabilities and Contingent Assets,
- IAS 38 – Intangible Assets.

As solving the problem of accounting for emission rights in an isolated manner had proven unsuccessful, more recently both leading international accounting authorities – the International Accounting Standards Board (IASB) and the Financial Accounting Standards Board (FASB) – have joined forces and are cooperating and coordinating their activities towards establishing appropriate accounting treatment for emissions allowances.

Critical problems faced by the standard setters as they seek to deal with emission rights are in particular (Cook, 2008, p. 2):

- A previously costless activity has become costly:
Emission reduction schemes are designed to give a cost to previously costless activity, in order to motivate producers to regard emissions as an input cost that must be monitored and controlled like any other.
- Governments mitigate the cost ...
A certain amount of emission allowances are granted by governments for free.
- ... by means of marketable allowances.
But what has been granted for free is marketable.

Emission allowances are obtained for zero cost yet they represent assets in their own right. This is demonstrated by their ability to be sold for cash and even to be transferred between different emission trading schemes. On the other hand emissions produced represent a liability which behaves quite independently from the allowances held by the emitting entity. This is a direct consequence of the fact that allowances are tradable. The emitting entity might choose to sell all granted allowances and replace them at a later stage, hence taking a view on the direction of price movements of these allowances and creating an appropriate market position.

The emission rights saga is well worth studying because it clearly illustrates the challenges faced by the accounting authorities as they explore the frontiers of accounting. It appears

that accounting, like other sciences, for example medicine, can only advance through an examination of its failures. Only a thorough understanding of the roots of failure can lead to a deeper appreciation of the problems involved and the discipline itself with all its limitations and possibilities.

The goal of this thesis is to present and explore the boundaries of accounting faced by the standard setters as they try to develop accounting solutions for new, complex instruments. Furthermore, the aim is to provide an overview of the accounting authorities' joint efforts to solve the problem. This thesis seeks to highlight the implications of the current status quo. This includes the impact of alternative accounting treatments on financial statements and consequently their impact on corporate value; an assessment of the quality of information provided in the financial statements of individual participants and the comparability of financial statements across participants in emissions trading schemes.

Apart from the accounting perspective the purpose of the thesis is also: to present a historical background of the emission allowances and their development in Europe and around the world; to provide an overview of existing emission rights schemes and mechanisms; and to provide an insight into markets with emission rights, including market analysis, market trends and market outlook.

The fundamental basis for research when approaching the dilemma of accounting for emission rights is the International Financial Reporting Standards (IFRS) and the IFRS Framework for the Preparation and Presentation of Financial Statements (IASB, 2009a). In addition all accounting problems are viewed from the perspective of United States Generally Accepted Accounting Principles (US GAAP) (FASB, 2009). As the accounting for emission rights is an ongoing project most of the latest developments are presented and summarised based on internet sources, e.g. project reports and project updates from IASB as well as FASB.

Transition from theory to practice takes place on two levels. First an analysis of professional literature is conducted and the findings of scientific research are summarised. In the next step an empirical analysis of the financial statements of 21 companies quoted on European stock exchanges is conducted. These companies prepare their financial statements based on IAS/IFRS and are considered representative of the industries which are part of the European Union Emission Trading Scheme. The empirical analysis focuses on disclosures of accounting for emission rights in financial statements of selected companies for financial years 2007, 2008 and 2009. Different accounting approaches are explained, compared and summarised by company, by industry and by financial year. Finally, the empirical results are linked to theoretical solutions suggested by accounting authorities and provided in professional literature.

This thesis is divided into six chapters. The introduction is followed by a discussion of the development of emission rights. Understanding emission rights schemes and mechanisms that are currently in place is crucial to appreciating the complexity of accounting problems related to the subject. An overview of the carbon markets and worldwide developments are also provided in chapter one. Chapter two summarises the historic developments of the accounting for emission rights.

Chapter three presents and analyses accounting dilemmas behind the failure of the first accounting initiatives and which still represent the essence of the problem. When presenting and analysing these accounting dilemmas the fundamental structure of accounting standards is followed: recognition, measurement, presentation and disclosure.

Current initiatives and joint efforts of IASB and FASB to provide a solution for accounting of emission rights are summarised in chapter four. Failure of standard setters to provide an official accounting solution has led to a current status quo which consists of several theoretical and practical approaches to account for emission rights. Chapter five provides descriptions of most commonly used accounting approaches along with an example. The concept, methods of work and the results of the empirical analysis are presented in chapter six. The thesis is concluded with an overview of findings, conclusions and possible solutions.

1 DEVELOPMENT OF EMISSION RIGHTS

1.1 Background

UNFCCC reports (UNFCCC, 2010b) that the average temperature of the earth's surface has risen by 0.74 degrees Celsius since the late 1800s. It is expected to increase by another 1.8° C to 4° C by the year 2100 should the necessary action not be taken. Even if the increase is at the lower end of the predicted range, it will be the largest increase within one century in the last 10,000 years.

The principal reason for increasing global temperatures is a century and a half of industrialisation: the burning of ever-greater quantities of oil, gasoline and coal, the cutting down of forests, and the practice of certain farming methods (UNFCCC, 2010b). These activities have increased the amount of "greenhouse gases" (GHG) in the atmosphere. Such gasses occur naturally and are crucial for life on earth. But increasing amounts of these gasses are pushing the global temperature to artificially high levels and are altering the climate.

At the Rio Conference in 1992 (organised by the United Nations), there was a broad international recognition of the need for a common effort in order to mitigate climate change (UNFCCC, 2002c, p. 17). This resulted in the first international legally binding

agreement aimed at curbing greenhouse gas emissions – the United Nations Framework Convention on Climate Change (UNFCCC). The UNFCCC recognises different levels of responsibility among countries towards acting on climate change. According to the UNFCCC, industrialised countries (so-called Annex I countries) have the main responsibility to mitigate climate change (UNFCCC, 2006, p. 8). For many developing countries (so-called non-Annex I countries), reducing poverty is their overriding aim (UNFCCC, 2006, p. 9).

Concrete targets for reducing GHG emissions were established in the Kyoto Protocol in 1997. Because the Kyoto Protocol affects virtually all major sectors of the economy, it is considered to be the most far-reaching agreement on environment and sustainable development ever adopted (UNFCCC, 2002b, p. 18).

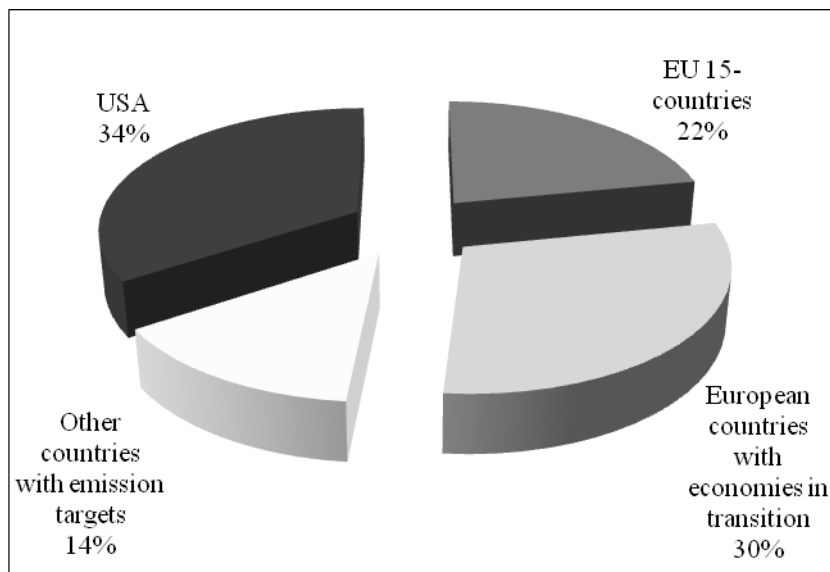
Among the participants in the Kyoto protocol we distinguish in the first place between Annex I and non-Annex I countries. Each Annex I country that has ratified the Kyoto Protocol is obliged to reach a domestic target for carbon dioxide (CO₂) equivalent emissions, on average of 5.2 % below 1990 emission levels, by the first commitment period of 2008 to 2012. Annex I parties emitted around 64 % of total global GHGs in 1990. Non-Annex I countries (primarily developing countries) do not have binding targets under the Kyoto Protocol, but must ratify the Protocol in order to be hosting emission reduction projects under the flexible mechanisms (see below for more details). Currently, 191 states plus the European Union (EU), have ratified the Kyoto Protocol (UNFCCC, 2010c).

On Point Carbon's web site (Point Carbon, 2010b) participants to the Kyoto protocol are more precisely grouped as follows:

- EU-15 Countries
(Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden, United Kingdom). All EU members are Annex I countries, and the EU-15 has taken on a common commitment to reduce their average GHG emissions by 8 % in the first Kyoto commitment period (2008–2012). Emission reductions within EU-15 are shared differently among member states. EU-15 emitted around 23 % of the global greenhouse gases in 1990.
- European countries with economies in transition
(Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Poland, Romania, Russian Federation, Slovakia, Slovenia, Ukraine). Countries in this group all have emission caps in place. Members of this group are all EU countries, with the exception of Russia, Ukraine and Croatia. These countries emitted roughly 31 % of the global GHG in 1990.

- Other countries with emission targets (Canada, Australia, Japan, Monaco, Iceland, New Zealand, Norway, Switzerland, Liechtenstein). Countries in this group have all ratified the Kyoto Protocol, they have compliance targets, but are not part of the EU and are not economies in transition. Australia was the last country to ratify the Protocol, as recently as December 2007. Greenhouse gas emissions from these countries amounted to 15 % of global emissions in 1990.
- Annex I countries that have not ratified the Kyoto Protocol. Among the Annex I countries that signed the Kyoto Protocol in 1997, only the USA has not ratified it. The USA emitted 36.4 % of the total world's GHGs in 1997.
- Non-Annex I countries. The non-Annex I countries do not have emission caps and are potential host countries of the flexible mechanisms under the Kyoto Protocol. For example China and India belong to this group of countries.

Figure 1. Global GHG emissions produced in 1990 as a percentage contribution per groups of countries



Source: Point Carbon, Carbon Market Overview, 2010, p. 5.

1.2 Controlling Emissions – Flexible Mechanisms under the Kyoto Protocol

The emission reduction targets established in the Kyoto Protocol can be met (UNFCCC, 2007a, p. 28):

- By reducing domestic greenhouse gas emissions – this can be achieved through domestic/regional emissions trading schemes and other policy measures.

- By utilising the flexible mechanisms allowed under the Kyoto Protocol – Clean Development Mechanisms and Joint Implementation.

1.2.1 International Emissions Trading

Emissions trading, as set out in Article 17 of the Kyoto Protocol (UNFCCC, 1998, p. 15), allows countries that have emission units to spare – emissions permitted to them but not “used” – to sell this excess capacity to countries that emitted emissions in excess of their targets.

Thus, a new commodity was created in the form of emission allowances. Since carbon dioxide is the principal greenhouse gas, people speak simply of trading in carbon. Carbon is now tracked and traded like any other commodity. This is referred to as the “carbon market”.

1.2.2 Clean Development Mechanism

The Clean Development Mechanism (CDM), defined in Article 12 of the Kyoto protocol (UNFCCC, 1998, p. 11), allows a country with an emission-reduction or emission-limitation commitment under the Kyoto Protocol (Annex I country) to implement an emission-reduction project in developing countries with no emission reduction targets (non-Annex I countries) (UNFCCC, 2002b, p. 31-32). Such projects can earn carbon credits named Certified Emission Reductions (CERs).

Examples of CDM projects are: wind farms, solar panel installations and industrial energy efficiency programmes, as well as schemes to capture methane from pig farms (Harvey, 2008a, p. 1).

This mechanism stimulates sustainable development and emission reductions, while giving industrialised countries some flexibility in how they meet their emission reduction or limitation targets (Wolf, 2008, p. 4).

1.2.3 Joint Implementation

Joint Implementation (JI) mechanism, defined in Article 6 of the Kyoto Protocol (UNFCCC, 1998, p. 6), allows a country with an emission reduction or limitation commitment under the Kyoto Protocol (Annex I country) to earn Emission Reduction Units (ERUs) from an emission-reduction or emission removal project in another Annex I country.

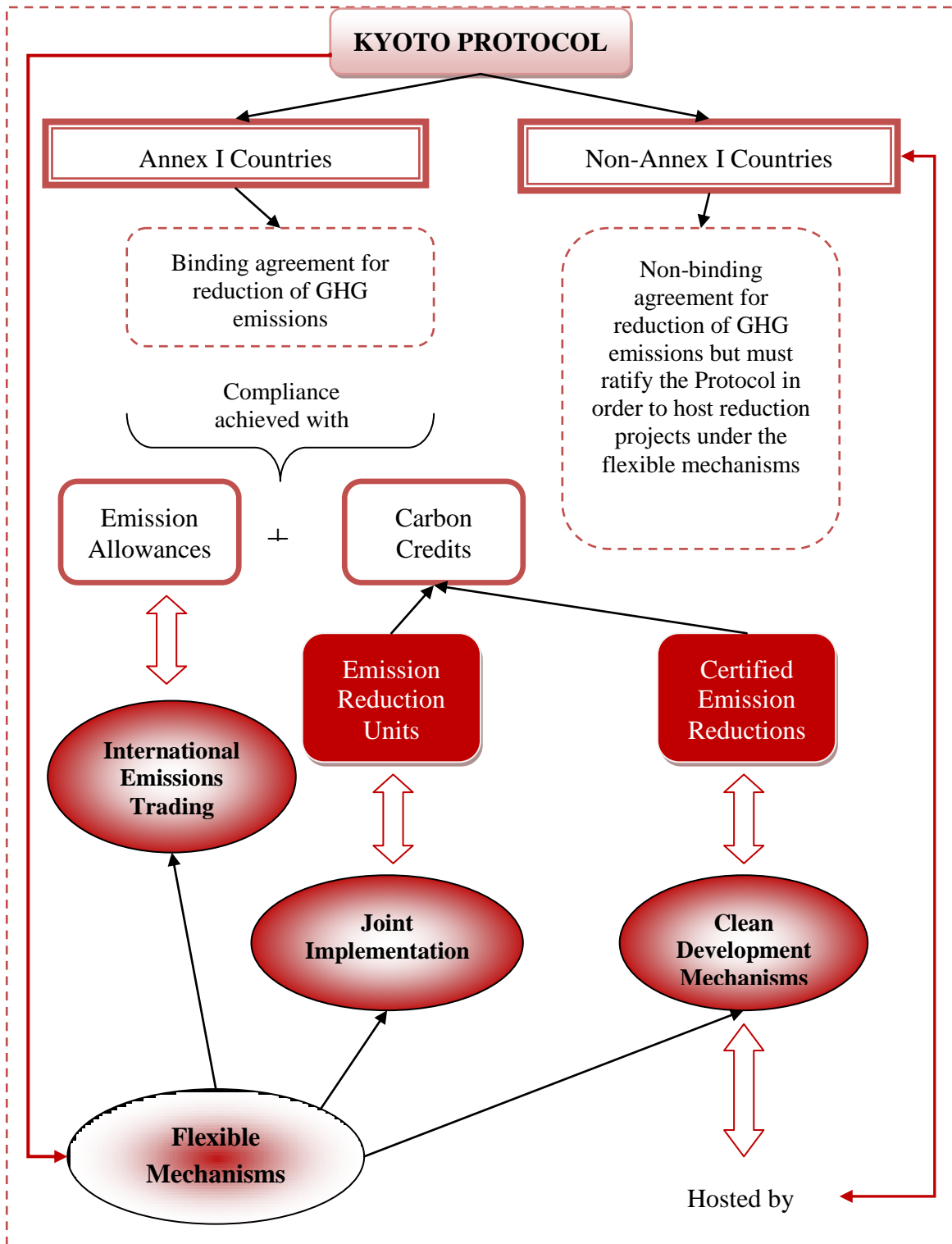
JI offers parties a flexible and cost-efficient means of fulfilling a part of their Kyoto commitments, while the host party benefits from foreign investment and technology transfer.

In other words, with the CDM and JI the Kyoto Protocol provides entities with added flexibility in fulfilling part of their emission reduction obligation by allowing them to remit project-based certificates. Once a project is approved, validated, registered, and verified, certificates (carbon credits) are issued that may be traded or remitted in lieu of standard scheme allowances.

Both CERs and ERUs accruing from JI projects can be used for compliance with the Kyoto Protocol in the first commitment period, 2008-2012 (Braun, 2008, p. 8).

In Figure 2 a schematic overview of flexible mechanisms under the Kyoto Protocol is given.

Figure 2. Schematic overview of flexible mechanisms under the Kyoto Protocol



Source: Own summary from information obtained in "The Kyoto Protocol Mechanisms" (UNFCCC, 2007b).

1.3 Emissions Trading Schemes

The GHG effect can be limited by using a set of economic instruments and/or by implementing governmental rules and restrictions. Emissions trading schemes represent a market-based tool and in recent years they have expanded rapidly at the state, national, and international levels. As explained earlier emissions trading is also one of the mechanisms used to meet the Kyoto reduction targets.

Economic instruments which can be used to control emissions can be broadly divided into those that set a price for the goods or service, leaving the quantity demanded to adjust accordingly, and those that set a total quantity, leaving the price to be determined by market forces (Cook, 2008, p. 2).

In case of emissions an example of a price instrument is a carbon tax – the cost of activity is borne in proportion to the level of emissions emitted. An example of a quantitative instrument is a system under which government issues a predetermined total amount of licences to emit. Two main quantitative instruments in use for controlling emissions are “base line and credit” and “cap and trade” (Cook, 2008, p. 2). An overview of the both trading systems is given below, summarised from Cook (2008, p. 2-3).

1.3.1 Base Line and Credit

In a base line and credit scheme, each source participating in the scheme is assigned a specific emissions limit for a period, based on some assessment of a normal rate of emissions. For each entity a base line is set below which no charge for emissions will be made. After the relevant period has ended, each source's actual emissions are compared to its limit. If a source has emitted less than its limit, it receives tradable credits in the amount of the difference. Sources that are over their limit must purchase these credits and remit them to the scheme administrator to cover their excess emissions.

A weakness of this system is that allowances that are traded might be insufficient to sustain a market. Furthermore, the government may lay itself open to charges of unfair determination of the base lines for individual entities.

1.3.2 Cap and Trade

Cap-and-trade schemes are a common emission allowance approach. In a cap-and-trade scheme, a government (or government agency) typically issues tradable rights (allowances) to emit to participating entities. Participants may buy and sell allowances with others, and liquid markets have developed to facilitate this trading activity. At the end of a compliance period, participants are required to deliver allowances equal to their actual emissions, and

they may be required to pay a fine or suffer other penalties for emissions in excess of remitted allowances (Wright, 2007, p. 1).

Since the allowances are allocated from the beginning of a period, an entity may choose to sell more allowances than its savings for the period are expected to be, hence betting on the favourable market movements and its ability to repurchase allowances at a later stage at a more advantageous price. The cap-and-trade scheme places greater reliance on the market mechanism than the base line and credit method.

1.4 Overview of the Carbon Markets

Carbon markets have proven to be one of the most important and successful means of reducing GHG emissions. They have not only attracted the attention of the industries affected by the emission reduction targets but have also become an important part of the global financial market. Along with a gradual rise in global temperatures and increased media attention to global warming and climate change, the volumes and monetary value of traded carbon have grown tremendously over the years. The global carbon market has grown ten-fold in five years from a 10 billion dollar business in 2005 (Point Carbon, 2006, p. 1) to a more than 100 billion dollar business in 2009 (The World Bank Environment Department, 2010, p. 1).

Who are the entities involved in carbon markets? Apart from the compliance players (e.g. industries, utilities) and project developers (e.g. CDM and JI) the markets are also attracting participation from financial intermediaries (e.g. banks, funds) and speculators (e.g. hedge funds, proprietary traders) who play an increasingly active role.

Emission trading schemes represent a market-based tool to limit the GHG effect. The various international, national and regional markets are motivated by the requirements of the Kyoto Protocol and national or local legislation and in some cases by voluntary commitments.

Table 1 below provides an overview of the current status of existing and planned emission trading markets (as of 30 April, 2010).

Table 1. Overview of the carbon markets at international, national and regional Level

International		
Jurisdiction	Market	Start date
27 EU Member States	EU ETS	1 January 2005
Between Kyoto Protocol Annex 1 Parties	JI	1 January 2000
Between Kyoto Protocol Annex 1 Party and a developing country	CDM	1 January 2006
National		
Jurisdiction	Market	Start date
Australia	Australia Carbon Pollution Reduction Scheme	To be determined
Canada	Canadian Federal	Earliest 2011
Japan	Japan ETS (voluntary)	1 October 2008
New Zealand	New Zealand ETS	1 January 2008
Switzerland	Swiss Federal ETS	1 January 2008
United Kingdom	CRC Energy Efficiency Scheme	1 April 2010
United States of America	US Federal	Earliest 2012
Regional		
Jurisdiction	Market	Start date
Alberta, Canada	Alberta ETS	1 July 2007
10 Northeast USA States	RGGI (Regional Greenhouse Gas Initiative)	1 January 2009
Florida, USA	HB 7135 Florida	Earliest in 2010
New South Wales, Australia	New South Wales GHG Abatement Scheme	1 January 2003
7 States and 4 Provinces in the USA and Canada	Western Climate Initiative	1 January 2012
California, USA	AB 32 California	1 January 2012
British Columbia, Canada	British Columbia	1 January 2012

Source: Own summary from information obtained in "The Global Carbon Markets: Dive in or stay out? Opportunities for the financial services industry" (Moryka, 2010, p. 7).

1.4.1 European Union Emissions Trading Scheme

The largest multi-national emissions trading scheme is the European Union Emissions Trading Scheme (EU ETS). In the Kyoto protocol, the European Union committed to reduce its greenhouse gas emissions between 2008 and 2012 by 8 % compared to 1990 levels (UNFCCC, 1998, p. 20). In order to achieve this goal, the EU countries decided to introduce trans-European emission trading system, the EU ETS. It is the first comparable multinational emission trading system worldwide. Moreover, the EU ETS is supposed to be a concept for an emission trading system open to companies outside of Europe by creating a secondary market where the initially allocated allowances can be traded either over an exchange or bilaterally over the counter (Braun, 2008, p. 8).

European Union emission allowances (EUA) currently apply only for carbon dioxide (CO₂) emissions of the major energy and industry installations in the EU. Each EUA grants the installation the right to emit one tonne of CO₂ during a commitment period. Other gases considered responsible for the GHG effect – methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF₆) (UNFCCC, 1998, p. 19) – are not yet included in the EU ETS. It is also well worth noting that a traded emission unit is measured in equivalents to 1 metric ton of CO₂ (mtCO₂e – metric ton of CO₂ equivalent). CO₂ is hence used as the base against which all other greenhouse gases are measured.

At the start of an emissions trading period, each EU member needs to prepare a national allocation plan (BMU, 2010). Usually this plan is created considering the emissions history of the installations affected, the economic outlook and the reduction targets. If a company exceeds the allocated quantity of emissions, it has to make up the shortfall by purchasing emission allowances from another company, a broker or the stock exchange. Conversely a company may sell emission allowances if its emissions are less than the initially allocated amount of emission rights. This system allows emitters to decide for themselves whether buying emission allowances or implementing environmentally friendly measures (e.g. investing in new machines that emit less CO₂) is more economic (Braun, 2008, p. 2). The system requires that the emission allowances issued will be diminished step by step in order to gradually reduce the overall CO₂ emissions and achieve compliance with the Kyoto reduction target.

Phase 1 of the EU ETS began on 1 January 2005 and lasted for the trading period from 2005 to 2007 (Deloitte and Touche LLP, 2007b, p. 2). The main characteristic of this period was an ongoing criticism of the EU for not having stringent enough carbon market regulations. Namely, some countries allocated too many allowances resulting in companies having earned carbon credits without carbon emissions actually being reduced.

Phase 2 of the EU ETS will last from 2008 to 2012 (Deloitte and Touche LLP, 2007b, p. 2). The total quantity of emission allowances has been reduced due to a surplus in the first trading period. One of the crucial events in phase 2 is the expected incorporation of aviation industry into the EU ETS by the beginning of 2012.

Although we are just in the middle of phase 2, the ongoing review process for phase 3 (2013-2020) has already produced a number of concrete suggestions from the European Commission (EC). For example, it is already clear that the cap will be considerably tighter than in phase 2, as the overall emissions in the EU ETS in 2020 are expected to be capped at around 21 % below the 2005 level (Point Carbon, 2008, p. 5). There is also a high probability that the process of distributing the emission allowances will be shifted towards auctioning the emission allowances rather than simply allocating them. Currently the vast majority of the emission allowances is allocated to the installations based on a set of predetermined parameters as mentioned above. This system is expected to change with the auction being the primary mechanism for distributing the emission allowances (Harvey, 2008b, p. 1). In addition in phase 3 of the EU ETS there are plans to introduce trading in other greenhouse gases.

Industries not subject to the EU ETS will have to reduce their emissions as well but in accordance with national targets. A portion of their fuel will be required to come from renewable sources. Notably it is the EC's target that by 2020 20 % of the EU's energy consumption will be derived from renewable sources (Point Carbon, 2008, p. 29).

1.4.2 Analysis of the Structure and Prices of the Global Carbon Market from 2005 until the present

This chapter provides a more detailed analysis of the global carbon market, its successes and its problems.

The analysis is primarily divided in two parts: the carbon market in 2007 (being the last year of phase 1 EU ETS) is analysed first, followed by an analysis of the carbon market in 2009 (the second year of phase 2 EU ETS). Year 2009 is included as the last full calendar year for which the statistical data needed for analysis is available. Analysis of the individual trading periods (as noted above) is rounded up with a comparison of both analysed trading periods. An overview of prospects for phase 3 of the EU ETS is also included.

The second period under analysis, 2009, saw one of the biggest economic slowdowns since the great depression. This unprecedented collapse in economic activity due to the after effects of the financial crisis also resulted in reduction of GHG emissions which are a result of economic activity. This presents a unique challenge in interpreting market data as

it is difficult to isolate and distinguish between inherent carbon market efforts and progress made due to the implementation of these measures and external negative economic factors.

1.4.2.1 Year 2007 – the End of Phase 1 EU ETS

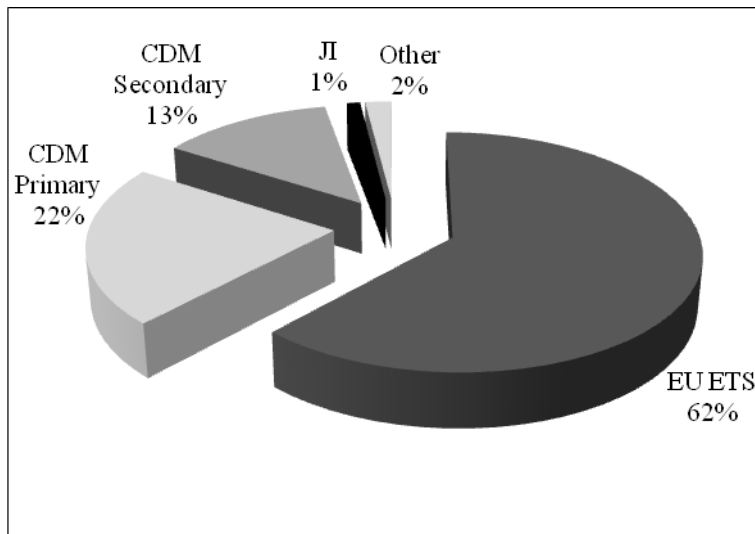
As reported in “Carbon 2008 – Post-2012 is now” (Point Carbon, 2008, p. iii) the year 2007 was a tipping point for the development of the global carbon market, with an increase from 1.6 billion tonnes of carbon traded in 2006 to 2.7 billion tonnes in 2007. The total traded volume increased by 64 %. In value terms, the growth was even steeper in 2007 – the global carbon markets were worth more than 40 billion euros (EUR) in 2007, up by 80 % from 2006.

Point Carbon’s report “Carbon 2008 – Post-2012 is now” (2008, p. 3-4) provides the following interesting market observations:

- The EU ETS was the largest carbon market worldwide, representing 62 % of the global physical volume traded and 70 % of the volume in monetary terms.
- The CDM market came second in terms of volumes and market values. CDM market has in 2007 in total seen 947 million tonnes of CO₂ traded with a value of 12 billion EUR representing an increase of 68 % in volume terms and a staggering 199 % in value terms from 2006.
- Within the CDM, the growth of the secondary Certified Emission Reductions (sCER) market has been the most impressive, starting in the first months of 2007 and growing up to 300 million tonnes of CO₂ over the year. A significant portion of the growth was fuelled by trading in EUA to CER swaps. The secondary CER market represents a purely financial market, whilst the primary CER market has underlying CDM projects.

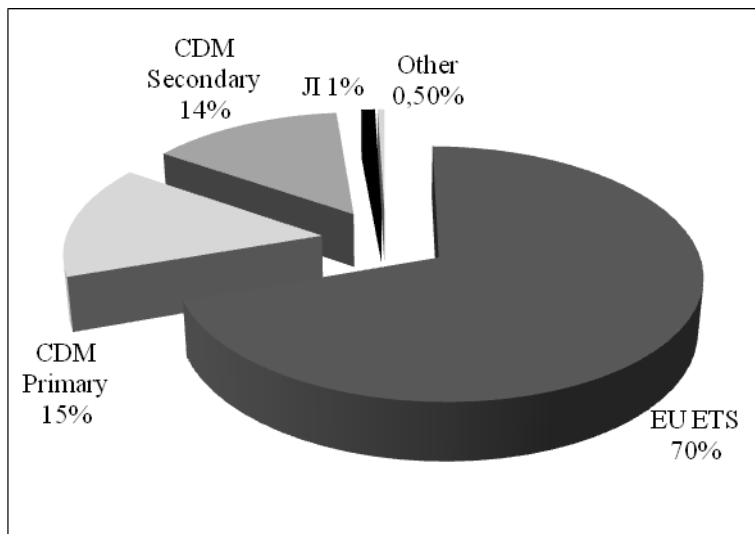
In Figures 3 and 4 below the distribution of 2007 traded volumes (in metric tonnes of CO₂e) and values (in EUR) across the main market segments are presented. The total traded volume in 2007 was 2.7 billion tonnes of CO₂e and the total financial value of the global carbon market was 40 billion EUR.

Figure 3. Distribution of a traded volume (in MT of CO₂e) in 2007



Source: Point Carbon, Carbon 2008 – Post-2012 is now, 2008, p. 4.

Figure 4. Distribution of a traded volume (in EUR) in 2007



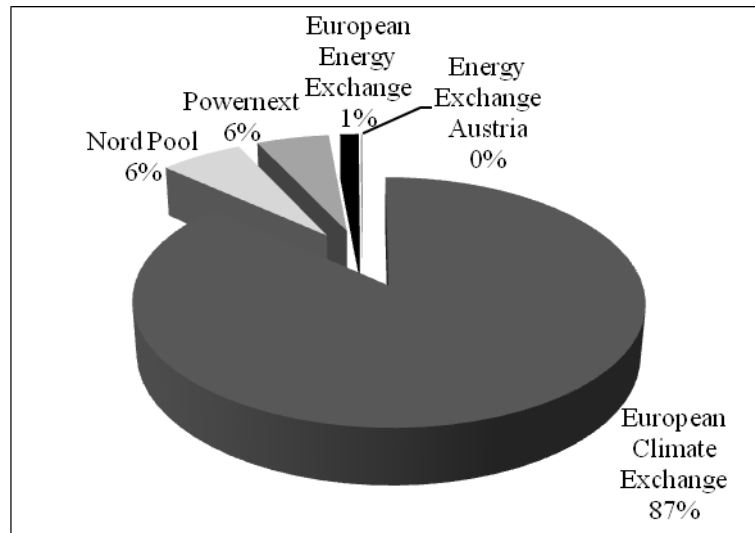
Source: Point Carbon, Carbon 2008 – Post-2012 is now, 2008, p. 4.

In the EU ETS in 2007 a healthy growth in traded volumes in the over-the-counter market (OTC) and on the exchanges could be observed. Point Carbon (2008, p. 6-7) provides the following market analysis:

- Roughly 26 % of the total volume in 2007 was traded on the exchanges.
- London-based European Climate Exchange (ECX) hosted 87 % of the exchange traded volume in 2007, followed by the Oslo-based Nord Pool (6.3 %) and French Powernext with 5.5 %.

- European Energy Exchange (EEX) in Leipzig and the Energy Exchange Austria (EXAA) in Vienna have only seen minor volumes of EUAs traded in 2007.
- Other ways of trading included via a broker using the over-the-counter market and bilaterally on a company to company. Trades between individual companies represented notable volume: 220 million tonnes out of the total 1,650 million tonnes EUAs traded in 2007 were traded on a bilateral basis.

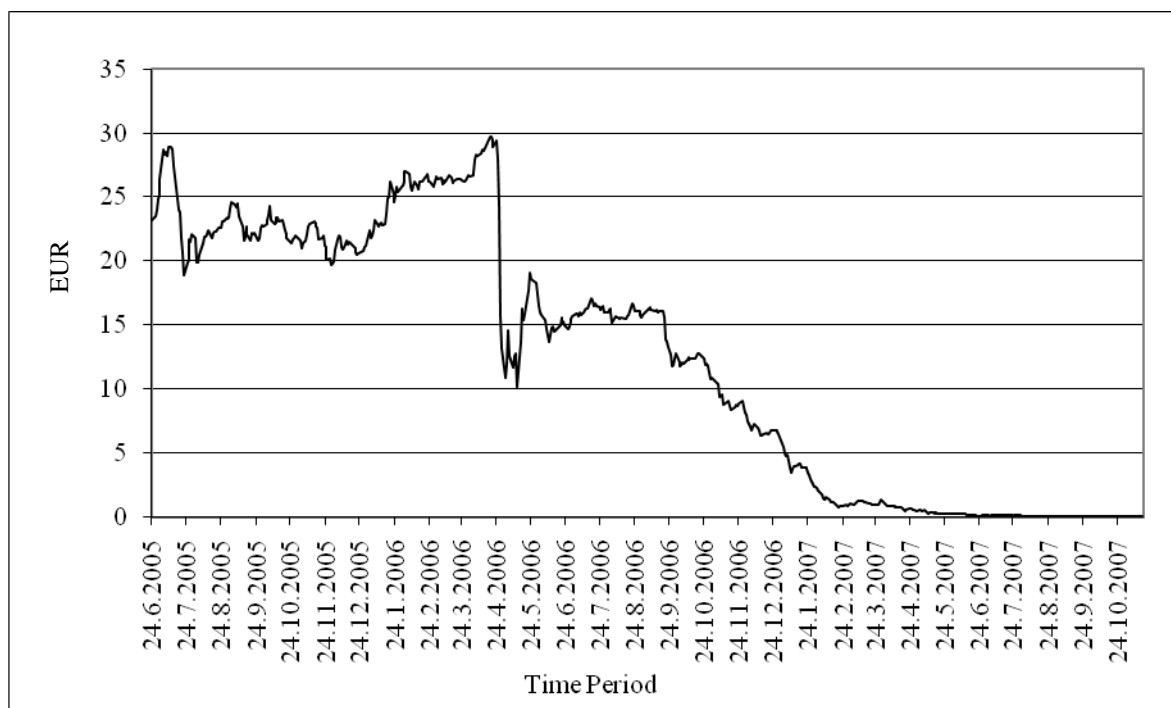
Figure 5. Distribution of exchange traded volume in 2007



Source: Point Carbon, *Carbon 2008 – Post-2012 is now*, 2008, p. 6.

In Figure 6 below the development of a spot price of phase 1 EUA in a period between August 2005 and December 2007 is presented. In the first trading period, the price of EUA started at around 10 EUR in March 2005. Until April 2006 the spot price went up to 31 EUR just to fall again shortly thereafter. The reason for a sharp decline was the announcement that several companies were left with surplus emission allowances (Point Carbon, 2007, p. 10). As it turned out some governments had over-allocated EUAs for phase 1 of the EU ETS (Harvey, 2010, p. 1). This resulted in a large surplus of allowances – a disaster for the EU ETS market. The companies consequently started to massively sell allowances and the price began to steadily drop until spring 2007. Interestingly, when the over-allocation was announced in spring 2006 the price of the EUA did not immediately drop to zero which would indicate that the emission allowances no longer had an economic value (MacKenzie, 2008, p. 11). Instead it took almost a year for the full price erosion. As per year end 2007 the EUA was worth 0.02 EUR (Bloomberg, 2010).

Figure 6. Development of a spot price of the phase 1 EUA in a period between June 2005 and December 2007



Source: Bloomberg New Energy Finance, 2010.

1.4.2.2 Year 2009 – in the Middle of Phase 2 EU ETS

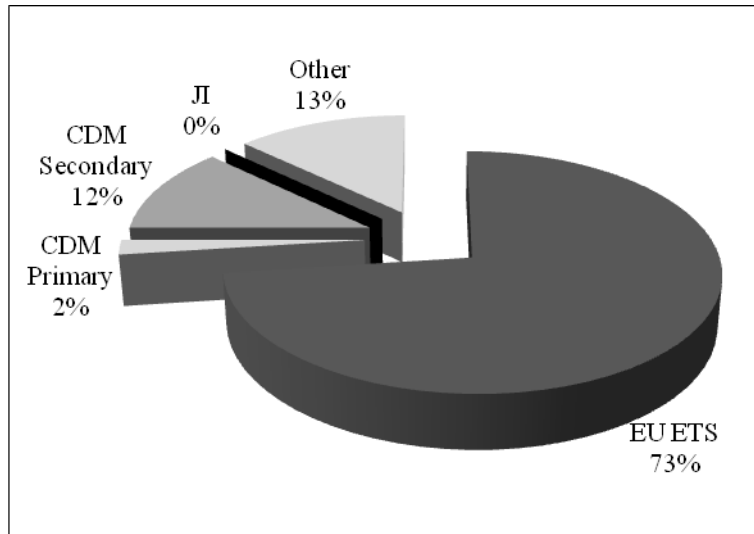
Unchanged from previous years the EU ETS was the largest carbon market worldwide. Ecosystem Marketplace & Bloomberg New Energy Finance (2010, p. iv) provide the following market information:

- In 2009 the EU ETS accounted for 73 % of the global carbon trading transactions in terms of volume and for 82 % in value terms.
- CDM primary and secondary market fell second accounting for 14 % of the total volume and the value.
- Carbon allowances obtained via JI projects were negligible in terms of volume and value.
- The share of other projects is surprisingly high – 13 % share in volume and 4 % in value of a global carbon market. The biggest portion (75 % in terms of volume and roughly 50 % in value terms) can be allocated to the regional RGGI market in the US, which started its activities in January 2009.

In Figures 7 and 8 below the distribution of 2009 traded volumes (in metric tonnes of CO₂e) and values (in EUR) across the main market segments are presented. The total

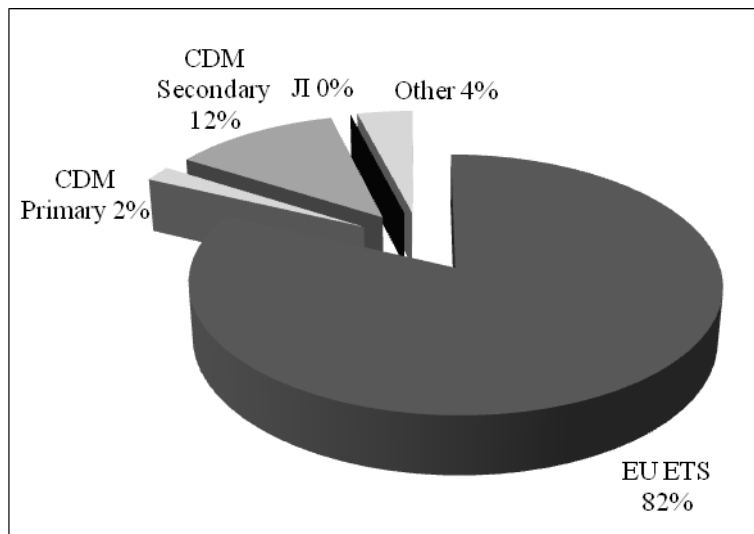
traded volume in 2009 was 8.7 billion tonnes of CO₂e and the total financial value of the global carbon market was 110 billion EUR.

Figure 7. Distribution of a traded volume (in MT of CO₂e) in 2009



Source: Ecosystem Marketplace & Bloomberg New Energy Finance, Building Bridges: State of the Voluntary Carbon Markets 2010, 2010, p. iv.

Figure 8. Distribution of a traded volume (in EUR) in 2009



Source: Ecosystem Marketplace & Bloomberg New Energy Finance, Building Bridges: State of the Voluntary Carbon Markets 2010, 2010, p. iv.

In 2009 the vast majority of the EUAs were traded on an exchange. The European Climate Exchange (ECX) was hosting more than 90 % of all exchange traded transactions in 2009 and in 2008 (BAFU 2009, p. 6). The remainder of the total volume was traded on other exchanges mentioned in the previous chapter. Most of the other products such as CDM's were traded either on OTC broker markets or bilaterally company to company or even company to state organisation (BAFU, 2009, p. 6).

Figure 9 below provides the development of a spot price of phase 2 EUA. It can be observed that shortly after the first issuance of phase 2 EUAs the prices climbed steeply and reached almost 33 EUR at their peak. The price increase was not sustained and in spring 2006 the prices fell significantly due to the previously discussed over-allocation by some of the member states. As a consequence the confidence of market participants in phase 2 EU ETS was diminishing.

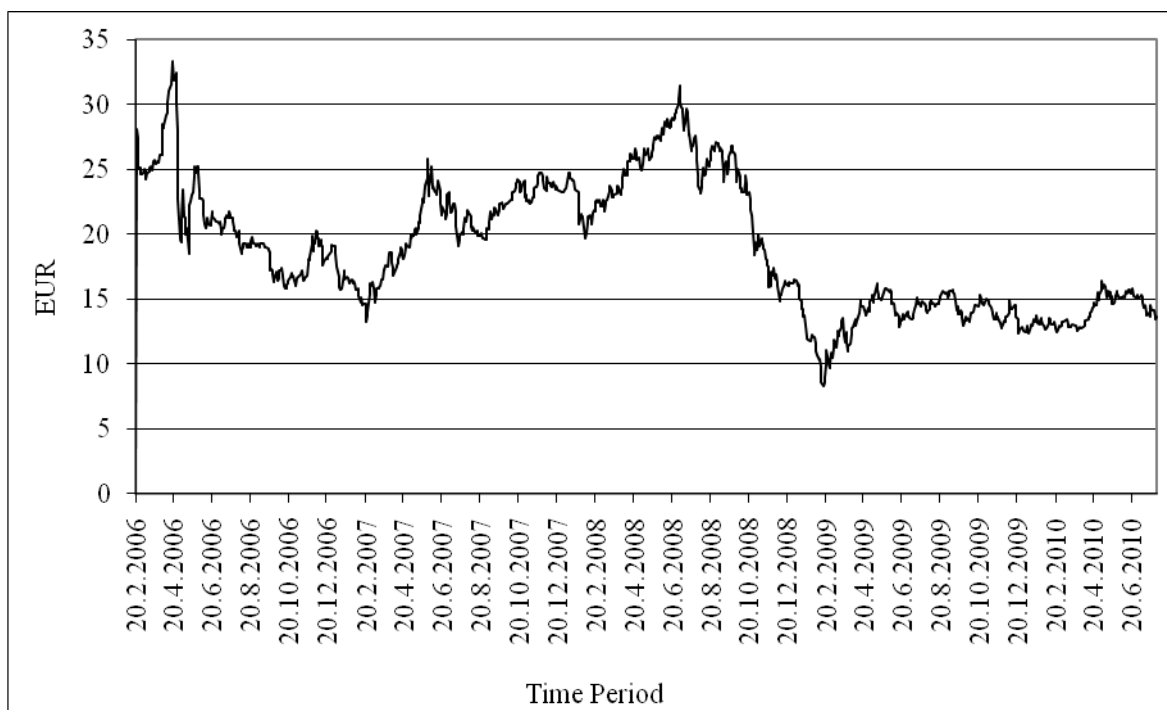
In early 2007 the market was reassured that there was much less risk for over-allocations in phase 2 of the EU ETS and the phase 2 EUA prices started to steadily increase. General market sentiment at the time was bullish. Global economy was showing significant growth potential which indicated a higher need for carbon allowances in the future.

In the second half of 2008 it became increasingly obvious that the banking system crisis that precipitated the collapse of Lehman Brothers was not an isolated event and that the world might be dealing with a prolonged recession. The depressed growth expectations combined with the anticipated technological progress adversely impacted the price of EUAs. In February 2009 the phase 2 EUA was trading at 8 EUR.

Since April 2009 the spot price for one tonne of CO₂ has stabilised and is moving sideways in the range between 13 EUR and 17 EUR showing less volatility than in the past. Some support to the price was also given by the fact that some companies did not sell their phase 2 EUAs due to uncertainties around phase 3 of the EU ETS and post-Kyoto after 2012 (The World Bank Environment Department, 2010, p. 11-12).

One of the most important observations is that the phase 2 EUA spot prices seem to reflect the fundamentals of supply and demand for carbon. Whilst in phase 1 of the EU ETS the price erosion was due to flaws inherent in the system (i.e. the over-allocation of allowances), the price decline in phase 2 was based on fundamentals. Assuming technological progress in reducing carbon emission is not marginal, it is expected that the price of carbon would correlate with the demand for carbon rights, which in turn is ultimately a reflection of the state of global economy.

Figure 9. Development of a spot price of the phase 2 EUA in a period between February 2006 and July 2010



Source: Bloomberg New Energy Finance, 2010.

1.4.2.3 Comparison of Phase 1 (2007 Status) and Phase 2 (2009 Status)

The EU ETS is the largest carbon market and dominates the international trading activities in cap-and-trade markets. Despite the global economic depression the volumes of traded emission rights in the global carbon market have been continually increasing. The dominance of the EU ETS has been helped by two factors. On the political side, unlike other major economies, the European Commission acts relatively independently and is therefore less susceptible to new elections and opposition politics (Braun, 2008, p. 3). On the commercial side there is increasing interest in these markets not only by the industries captured by the scheme but also by the financial community, which sees profit potential in the trading side of the business.

The US RGGI market was launched in January 2009 (Point Carbon, 2009, p. 16) and almost immediately after its launch became an important player in the global carbon market. It would be of no surprise if the RGGI would significantly increase its share over the next few years. It has to be considered that despite the RGGI being a regional market the 10 Eastern US States it encompasses have a considerable size and are very industrialised.

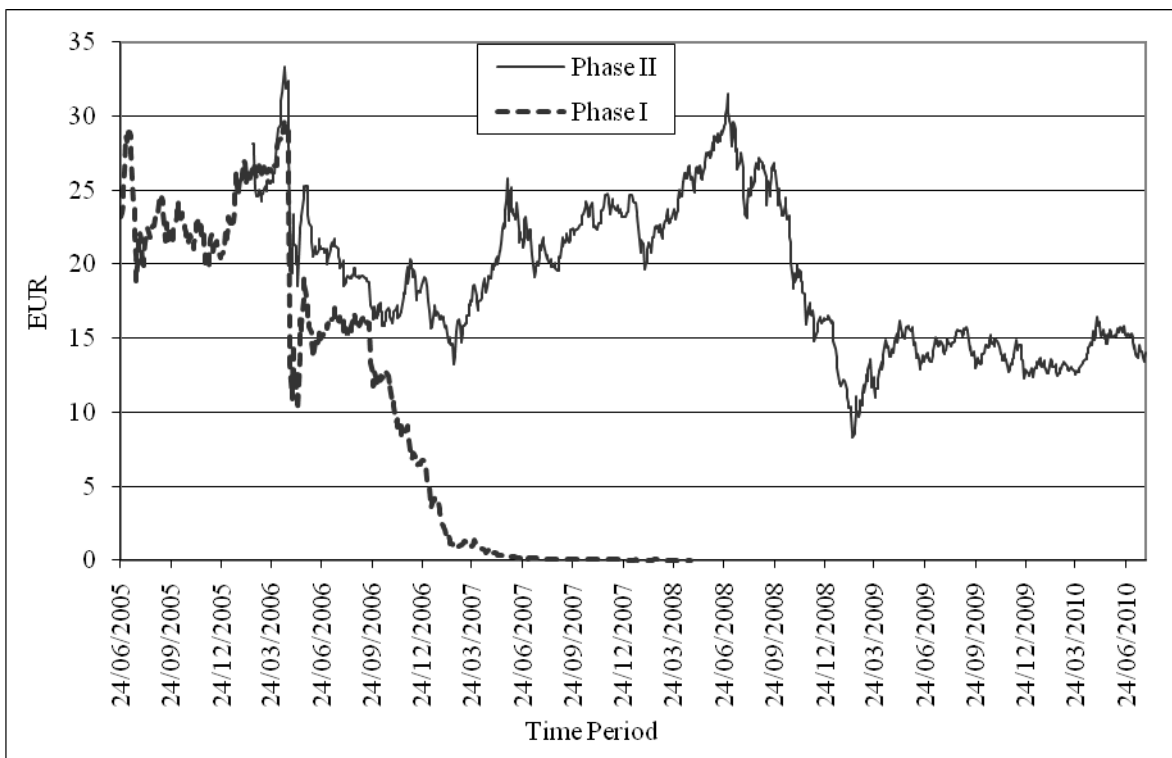
Percentage-wise the portion of CDM in a global carbon market remained stable, volumes accordingly increased. Despite that there is a high chance that the CDM will end up like the JI as its support past 2012 by the US and the EU is questionable. Without a global post-2012 agreement on climate change it is more and more difficult to financially justify new projects which will be able to earn credits in the next two years. Consequently the rate at which new CDM projects are entering the pipeline is slowing (Harvey, 2008a, p. 2). It has to be considered that the CDM is not a reduction mechanism but an offset for an emission somewhere else (Lancaster, 2009, p. 21). In other words companies covered by the EU ETS can use the credits earned with CDM projects to increase the quota of CO₂ they may emit.

Within the EU ETS most volume is traded via the exchanges. London-based European Climate Exchange (ECX), which specialises in emission allowances trading, has by far the highest volumes traded in the period under observation.

Comparing the end of phase 1 and the start of phase 2 of the EU ETS in Figure 10 below it looked like a price of the EUA above 20 EUR would become a reality. As previously discussed the depressed outlook for the global economy pushed the price down to a current range between 13 EUR and 17 EUR. Price forecasts tend to be bullish. The price of the phase 2 EUA at around the 20 EUR level should be sustainable, whereas expectations for phase 3 EUA are above 20 EUR. A majority of the market participants believe that the global price per mtCO_{2e} in 2020 will be around 31 EUR (Point Carbon, 2010a, p. 37).

It is very important to note that despite some volatility events in 2009 the price of EUA has been stable during the year and showed much less volatility than in the past. The events which were expected to have a negative impact on the market were: the “Hungarian fraud” (recycling of already used carbon credits) and hacker attacks to permits registers in Germany (Harvey, 2010, p. 1). In addition there were some serious value added tax (VAT) fraud investigations related to carbon trading by Europol (the former Interpol, the European police) mainly in France and the UK. All three events were expected to destabilise the EU ETS, however they did not have a material impact on the markets. It is becoming increasingly obvious that the EU ETS has gained the trust of the participating companies, financial institutions and investors and became a well-established market.

Figure 10. Development of a spot price of the phase 1 EUA and the phase 2 EUA in a period between June 2005 and July 2010



Source: Bloomberg New Energy Finance, 2010.

1.4.2.4 Phase 3 of the EU ETS

Following the over-allocation of allowances in phase 1 and negative publicity events in phase 2 the EU has decided to centralise the administration and allocation of allowances for phase 3 of the EU ETS (BMU, 2010). The responsibility of the allocation lies with the European Commissioner for the Environment.

On 14 June 2010 the EEX announced that from the end of June 2010 the EUA futures for delivery in 2013 and 2014 will start trading (EEX, 2010a). On 20 July 2010 the EEX reported that on 16 July 2010 the first trade for the phase 3 EUA was done on the market. The volume traded amounted to 25,000 EUAs (EEX, 2010b).

The failure of the UN climate change summit in Copenhagen in December 2009 to agree on an international treaty on carbon emission reductions and the current depressed global economy kept the price of the carbon allowance low. However should the EU insist on its target of a 30 % cut by 2020 and in addition if the move to 100 % auctioning of the EU ETS allowances becomes a reality the price is expected to trend upwards in the medium to long term.

Last but not least it is up to the EU and its member states to persuade other countries that emission trading schemes can be steady and reliable, providing companies with the long-term certainty needed for decision-making in connection with larger GHG reduction investments and giving accounting standard setters the stable basis to develop sound and stable standards for emission rights accounting.

1.4.3 Worldwide developments

While the EU ETS is still the world's largest emissions trading scheme, other local, regional and national carbon markets are developing and expanding at an increasing pace. Carbon markets are expected to develop further and consolidate in these times of increasing attention to the climate change. The following section offers a brief overview of the current carbon-market developments in the world's biggest economies.

1.4.3.1 The United States

In 2007 important progress towards domestic emission trading in the US was made. Two initiatives started: the Regional Greenhouse Gas Initiative (RGGI) and the Western Climate Initiative (WCI). At around the same time a federal cap-and-trade bill sponsored by senators Lieberman and Warner was initiated (PWC, 2008, p. 7). To date the US senate has continually deferred the bill and a new debate on the carbon capping legislation is expected at the earliest in September 2010. It is likely, due to the recent oil spill in the Gulf of Mexico, that the updated bill will include provisions aiming at preventing oil spill disasters. However, it is highly probable that the US senate will not act this year but wait until a new Congress gets sworn in in early 2011.

1.4.3.2 Australia

In April 2010 the Australian government put the carbon trading scheme – similar to the EU ETS – on hold. Australia, being the world's biggest coal exporter, decided to delay the start of its carbon trading scheme until at least 2013 (The World Bank Environment Department, 2010, p. 27). The decision to postpone the launch of the Australian carbon trading scheme was mostly due to the uncertainties of the post-Kyoto agreement.

1.4.3.3 Japan

Japan has been looked upon as a climate change leader among rich nations since the government of the Democratic Party of Japan (DPJ) has been in power. The DPJ is promising the most stringent emission reduction target of any industrialised economy – 25 % below 1990 levels by 2020 (The World Bank Environment Department, 2010, p. 27). Heavy discussions in the Japanese Parliament between the governing party and the opposition in summer 2010 are expected and are likely to result in the delay of the decision

on a national binding cap-and-trade system (The World Bank Environment Department, 2010, p. 28). However on a regional level and to a certain extent on a voluntary basis significant efforts are taken to reduce the GHG emissions. For example, a new emission trading scheme for Tokyo commenced in 2010. The Tokyo emission scheme requires 1,400 energy intensive organisations to meet the binding emission reduction target of 6 % by 2014 and 17 % by 2020 (compared to year 2000) (The World Bank Environment Department, 2010, p. 28-29). Those that fail will be required to purchase emission allowances to cover any excess emissions, with failure to comply resulting in fines as well as “naming and shaming”.

1.4.3.4 China

China has overtaken the US as the world’s largest producer of carbon emissions (Crooks & Romei, 2009, p. 1). It is estimated that China is responsible for more than a fifth of the world’s emissions (Crooks & Romei, 2009, p. 1). China has mostly relied on administrative measurements to meet its carbon targets. The country’s top 1,000 energy consumers had to sign a contract with the central government to improve their energy efficiency. In July 2010 the Chinese National Development and Reform Commission took the decision to implement a carbon trading scheme in China starting in 2011 (CommodityOnline, 2010). Most likely the carbon trade project will enter into a pilot phase starting with carbon intensive companies such as coal-fired power generators.

1.4.3.5 Russia

Russia is not seen as a key player by carbon reduction politics. It is believed that the reduction of carbon emissions below the 1990 level is not a big challenge for the country, whose economy was more reliant on heavy industry during its communist times than it is today.

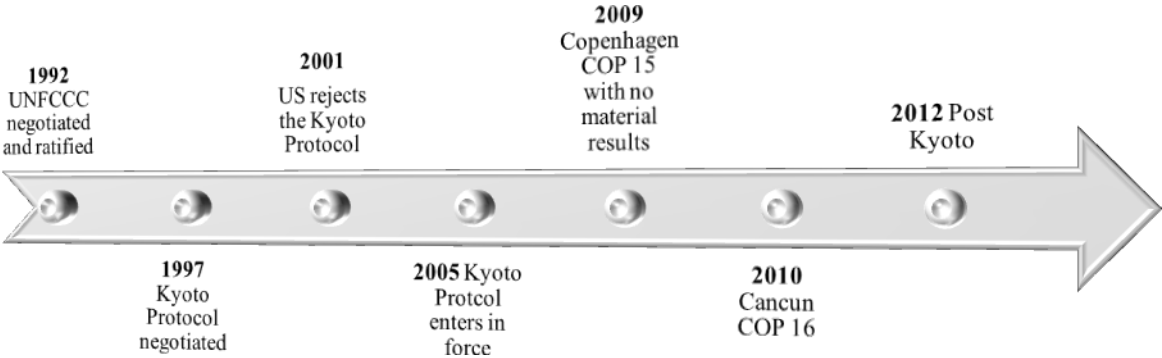
In July 2010 the Russian government gave the green light to their first 15 clean energy JI projects to earn carbon credits under the Kyoto Protocol (Szabo, 2010, p. 1). Russia is home to more than 60 % of current projects in the JI pipeline (Szabo, 2010, p. 1).

1.5 Post-2012 Climate Agreement

The Kyoto Protocol’s first commitment phase will expire in 2012 (Point Carbon, 2010a, p. 14) and it is not very clear what comes after. The world is in desperate need of a truly global agreement on climate change – an agreement that would be binding for all developed and developing countries to take steps to cut their GHG emissions. An agreement like that has never been achieved and although there are more than two years to go until the end of 2012, there is significant uncertainty about what comes after 2012.

This nervousness can be well understood when looking at Figure 11 below which illustrates that climate change negotiations and agreements between countries can take several years. Importantly, the picture also indicates that since 2005 there have been no milestone achievements in climate change negotiations on a global level.

Figure 11. Schematic overview of international milestones in climate change negotiations



Source: Own compilation based on information obtained in "Climate Change 101: International Action" (Pew Center on Global Climate Change, 2009, p. 3)

One thing that most commentators agree on is that the US will have a key role in the future of a global climate agreement. The US is not only the largest economy in the world but has also a leader and signal function to make other large emitters, such as China and India, commit (Pew Center on Global Climate Change, 2009, p. 7). The next two chapters will provide a more detailed review of the outcome of the 15th Conference of the Parties (COP 15) and a near-term outlook for COP 16.

1.5.1 Copenhagen

The expectations of the general public regarding the outcome at the 15th Conference of the Parties (COP 15) in December 2009 in Copenhagen were high. This was due to aggressive lobbying by the press and scientific community to put pressure on participants to reach a successful agreement. In advance of the summit, the UN identified the following necessary elements for a successful agreement (Crooks, Harvey & Ward, 2009, p. 3-4):

- a political agreement with a view to reducing global emissions so as to hold the increase in global temperature below 2 degrees Celsius,
- reduction targets for developed countries,
- commitments from developing countries to take actions to curb their emissions,
- financial aid from developed countries to help the developing countries achieve reduction goals.

While the expectations were high, the results were mostly disappointing. Prior to the conference there were already some serious warning signs. First of all there was no agenda

around the current status of the Kyoto Protocol. Also although more than 6,000 negotiators were expected to attend the summit, the negotiation topics and the agenda seemed very broad. In addition there was a lot of mistrust and fear between the countries which, though not unexpected, hindered the development of a successful agreement (Crooks et al., 2009, p. 4).

After two weeks of heated debate (not to mention two years of discussions after Bali), the Copenhagen COP 15 drew to a close with the issuance of the Copenhagen Accord, a small accomplishment considering the high expectations. The accord takes note of the need to hold temperature increases below 2 degrees Celsius compared to the pre-industrial levels but does not set concrete targets for the reduction of greenhouse gasses (UNFCCC, 2010a, p. 5). Under the agreement, developed countries will cut their GHG emissions substantially by 2020, and developing countries will commit to reductions in the growth of their emissions. Details of the emission cuts are missing from the final Copenhagen accord. Rich countries have also agreed to provide 100 billion USD a year in financial transfers to poorer countries by 2020, and a fund of 30 billion USD for the next three years (UNFCCC, 2010a, p. 7).

Technically speaking the accord met (in broader terms) all the above mentioned objectives set by the UN, meaning that the accord should have been declared a success. But the final accord suffered from a far greater problem, unforeseen by the UN: that it was not legally binding (Crooks et al., 2009, p. 4). The main reason that the accord was not formally adopted by the UN was that a handful of developing countries refused to agree to it. The small group of objectors was led by Venezuela, Bolivia, Nicaragua and Sudan (Crooks et al., 2009, p. 4). It is undisputed that in accordance with the UNFCCC the Conferences of the Parties should act as the highest decision-making authority, however the UN process does require all countries to unanimously agree before any deal can become legally binding (UNFCCC, 2002a, p. 20).

Carbon markets were one of the losers of the Copenhagen summit – carbon markets were mentioned, but not in detail (Crooks et al., 2009, p. 3). Traders were hoping for a strong international agreement which would give the additional confidence and associated boost to carbon markets. There is currently little hope for a UN-controlled emissions trading scheme. In the short term country-level legislation is likely to drive the climate change agenda and emissions trading will be having the biggest impact on business. Such circumstances do not make it easier for international accounting standard setters to find a common ground and to agree on a standardised way of reflecting emissions in the financial statements of companies.

With no reduction goals or incentives to become more carbon efficient, businesses worldwide will likely still be seeking additional clarity about how they can most

effectively move forward in a carbon-constrained world and how a fair and truthful reflection of their efforts to this end can be shown in their financial statements.

1.5.2 Cancun

The COP 16 climate summit will be held in December 2010 in Cancun (UNFCCC, 2010a, p. 41). COP 16 is expected to be less about agreements and climate targets but more about money and where it should come from. At the Copenhagen summit the developed countries made financial commitments to support the adaptation efforts of developing countries. At the Cancun summit it is expected that different aspects of the financial aid are to be discussed.

Designing a financial mechanism that will work for adaptation projects in the developing countries is considered to be critical for the success of the Cancun climate summit.

The COP 17, which should focus much more on binding agreements and climate targets, will be hosted by South Africa in November/December 2011 (UNFCCC, 2010a, p. 41).

In this chapter the idea of the emission rights is introduced – an emission right represents a right to emit greenhouse gasses equivalent to one tonne of carbon dioxide. The fundamental basis for the development of emission rights lies in the emission reduction targets set out in the Kyoto Protocol. Carbon markets have developed in order to facilitate the exchange of emission rights. The global carbon market is developing fast. Consequently, it is not only its role in combating climate change that has become of a paramount importance but also its role in the global financial market.

The European Emissions Trading Scheme is the largest carbon trading scheme in the world. Despite the various problems the EU ETS has faced since its commencement in 2005 it is today considered to be a well-established market, giving its participants the stability and confidence they require.

But the carbon markets need a vision for their future development in order to grow and consolidate further – a vision that world leaders have failed to present until now. The end of 2012 is fast approaching, yet there is still no sign of a post-2012 global climate agreement on the horizon.

The entities affected by the emission limitation targets are not only lacking political guidance on climate change but also guidance on how to account for emission rights. The remainder of this thesis focuses on the accounting problems and challenges associated with emission rights.

2 HISTORIC DEVELOPMENTS OF EMISSION RIGHTS ACCOUNTING

It is important to understand some of the history of emissions trading and the resulting variety of market structures around the world. Different approaches to the regulation of carbon and other greenhouse gas emissions has led to the development of numerous emissions trading schemes which in turn has led to potential differences in approach from an accounting perspective.

In the run up to the launch of the EU Emission Trading Scheme, questions were raised about the appropriate accounting in accordance with IFRS. The IASB noted that a lack of official accounting guidance requires immediate action and concluded that it should develop an interpretation to explain the appropriate application of IFRS to cap-and-trade schemes like the EU ETS (Deloitte and Touche LLP, 2007a, p. 2).

2.1 Draft Interpretation “D1 Emission Rights”

The International Financial Reporting Interpretations Committee (IFRIC), a subsidiary body of the IASB, developed proposals for accounting for cap-and-trade schemes in accordance with IFRS and issued the draft interpretation “D1 Emission Rights” in May 2003 (IAS PLUS, 2010).

While many respondents to D1 welcomed the initiative taken by IFRIC, that is they thought the guidance was needed, very few agreed with the specific proposals in D1 (IASB, 2008a). The main consideration of the respondents was the effect the proposed accounting treatment would have on profit and loss (proposed accounting treatment is explained in detail in chapter 3.2. IFRIC 3).

The IFRIC was troubled by the effects in profit and loss of the mixed measurements of the standards that it was interpreting (i.e. emission allowances under IAS 38 are measured at cost, emission obligations are measured at current value under IAS 37) and the mixed reporting (i.e. changes in the value of allowances measured at fair value in equity, changes in the value of emission obligations in profit and loss) (IASB, 2008a). The IFRIC considered but rejected all alternative interpretations offered by respondents and concluded that D1 was the only interpretation in line with existing IFRS (IASB, 2008a).

The IFRIC was still looking for a way to avoid accounting mismatches which would be created by the implementation of D1. In December 2003, the IFRIC sought the IASB’s permission to develop a possible amendment of IAS 38 (IASB, 2008a). The objective of the amendment was to create a new subset of intangible assets in IAS 38, including emission allowances, which could be measured at fair value through profit and loss (IASB, 2008a). The proposed change to IAS 38 would result in asset (allowance) and liability

(emission obligation) being measured on a consistent basis with all changes in value reported in the same place, i.e. profit and loss.

At that time the IASB also decided to amend IAS 20, which determines the accounting treatment of allowances issued for less than fair value by government (IASB, 2008a). Noting that amendments to IAS 20 and IAS 38 will most probably not be finalised for some time, and concluding that the need for timely guidance to prevent divergent accounting practices outweighed the considerations related to D1, the IFRIC proceeded with issuing IFRIC 3 (Deloitte and Touche LLP, 2007a, p. 2).

2.2 IFRIC 3: Emission Rights

In December 2004, IFRIC issued its final interpretation, IFRIC 3, effective for financial reporting periods beginning on or after 1 March 2005, which dealt with the accounting for an operational “cap and trade” emission rights scheme (IASB, 2008a).

The consensus in the interpretation was that (IFRIC, 2004):

- Allowances (rights to emit pollutant) are intangible assets and should be recognised in the financial statements in accordance with IAS 38, Intangible Assets.
- When allowances are allocated to a participant by government (or government agency) for less than their fair value, the difference between the amount paid (if any) and their fair value is a government grant. Consequently, the accounting treatment should follow the relevant standard, IAS 20, Accounting for Government Grants – meaning that the government grant is recognised as deferred income in the balance sheet.
- During the year, as the participant emits CO₂, a provision (liability) should be recognised for the obligation to deliver allowances at the end of the year to cover participant’s emissions. This provision is accounted for in accordance with IAS 37, Provisions, Contingent Liabilities and Contingent Assets.
- During the year, the participant should re-value the allowances held to reflect changes in their fair value. Similarly, the provisions should be valued at the market value of the allowances needed to settle it. During the commitment period the participant should also amortise the government grant (deferred credit) on a systematic basis to profit and loss.
- Allowances should be derecognised upon sale (if sold into the market) or on their delivery to the government as a settlement of the participant’s obligation to cover emissions.

In relation to the government grants it is well worth noting that the IFRIC decided to preclude participants from using the option in IAS 20 that would have allowed them to recognise the allowances issued by government at nominal amounts (IFRIC, 2004).

2.3 Accounting Considerations and Withdrawal of IFRIC 3

IFRIC 3 encountered strong opposition among market participants. The main criticism was that the relationship of IFRIC 3 to the three relevant standards – IAS 20, 37 and 38 – would create the following accounting mismatches (Deloitte and Touche LLP, 2007a, p. 2):

- Under IAS 38 the changes in the market value of allowances held are recognised in equity.
- But the change in the value of emissions obligation (provision) is in accordance with IAS 37 recognised through profit and loss.
- Furthermore, where a government grant is recognised (this occurs always when the value of allocated allowances is less than their market value) a deferred credit is not a liability under the IFRS framework and cannot be re-measured during the year to reflect changes in the fair value of allowances.

Apart from the obvious valuation and reporting mismatches described above, the implementation of IFRIC 3 would also create some other controversies. For example, an allowance received for free by an industrial company or an allowance bought by an investment bank were both treated in the same way (MacKenzie, 2008, p. 9) – as intangible assets – despite the obvious difference in purpose for holding those allowances by both companies. Furthermore, many market participants were arguing that if a company was anticipating the amount of emissions to be X, and if this company then received X free allowances, and it did actually emit only the anticipated amount X, then its profit and loss should at no point be affected because after all the company was emitting within its allowed limits (MacKenzie, 2008, p. 10). Thus, the idea was that a net loss (or net gain) should be reported in profit and loss only when the company produced more (or fewer) emissions than the allowances assigned to the company or if the company actively traded its allowances in the market.

Controversies surrounding IFRIC 3 did however have a “common ground” – corporations like to avoid undue volatility in their income statement. This is because of the widespread perception that investors prefer stable financial results and avoid companies which exhibit wild fluctuations in reported results. IFRIC 3 threatened to produce increased volatility in the financial statements that critics considered artificial (MacKenzie, 2008, p. 9).

On issuance of IFRIC 3, the European Financial Reporting Advisory Group (EFRAG) issued negative endorsement advice, which is summarised by Deloitte and Touche LLP – (2007a, p. 3) as follows: “EFRAG recommended that the European Commission not endorse IFRIC 3 for use in Europe as it did not meet all of the requirements of the Regulation (EC) no 1606/2002 of the European Parliament and of the Council on the application of international accounting standards because:

- it is contrary to the ‘true and fair principle’ set out in Article 16(3) of the Council Directive 83/349/EEC and Article 2(3) of Council Directive 78/660/EEC; and
- it does not meet the criteria of understandability, relevance, reliability and comparability required of the financial information needed for making economic decisions and assessing the stewardship of management.”

As a consequence the IASB withdrew IFRIC 3 with immediate effect at its meeting in June 2005 (IASB, 2008a). The accounting problem of emission rights proved to be much more complex than initially anticipated. While the IASB was working on amendments to IAS 20, the IFRIC was also already drafting proposals for a change in IAS 38. The IASB also had plans to amend IAS 37. Consequently, a decision was taken that the project for emission rights accounting requires a wider scope and can only be approached systematically and parallel to the implementation of changes to other relevant IASs.

3 DILEMMAS OF ACCOUNTING FOR EMISSION RIGHTS

This thesis centres on the fact that there is no official guidance on how to account for emission rights. For entities that are subject to the emission rights regime and who prepare their financial statements in accordance with IFRS, IFRIC 3 (withdrawn) continues to provide a valid source of guidance. Despite the IFRIC 3 not being part of the IASB GAAP it is fully in line with all relevant IASs and is within the scope of the current IFRS framework.

While the IASB attempted to tackle the problem of accounting for emission rights by issuing IFRIC 3, FASB has never formally addressed this topic. In the United States the only official accounting guidelines for emission allowances are contained in the Federal Regulatory Commission’s (FERC) Uniform System of Accounts (Elfrink & Ellison, 2009, p. 2). FERC regulates interstate transmission of utilities and provides guidelines for accounting and financial reporting of its jurisdictional companies (Elfrink & Ellison, 2009, p. 2). Although FERC’s impact on accounting for emission allowances is limited to the utilities industry it is still the only guidance available to companies reporting under US GAAP.

The issues associated with emission rights accounting have not disappeared as fast as IFRIC 3 did. Numerous issues and challenges remain. What follows is a more detailed explanation of the dilemmas associated with accounting for emission rights. The problem of emission rights accounting is viewed from the perspective of both currently available accounting guidelines in practice – IFRIC 3 and guidelines in FERC’s Uniform System of Accounts. Furthermore, when presenting and analysing accounting dilemmas the fundamental structure of accounting standards is followed: recognition, measurement, presentation and disclosure.

The basic idea of the possible accounting treatments described below is taken from the article “Accounting for Emission Allowances: An Issue in Need of Standards” (Elfrink & Ellison, 2009); however, all accounting dilemmas are further developed and explored and are as such taken to a higher complexity level. All arguments in the below discussion are supported by the accounting treatments as defined in IFRS and US GAAP.

This chapter is further divided into three parts following the initial classification of the three items under discussion: emission allowance (asset); obligation deriving from the fact that entities produce emissions and that the allowed amount of emissions is capped (liability); and forward emission contracts.

3.1 Asset

Emission allowances give a holder the right to produce a certain amount of emissions, i.e. one tonne of CO₂ or CO₂ equivalent per credit. Allowances can be obtained in different ways:

- through an allocation from a regulatory body at no cost or at a cost that is usually less than fair value,
- purchased from a regulatory body in an auction process,
- purchased on the exchange or bilaterally from another market participant.

Regardless of the method by which the allowance is acquired and irrespective of the general accounting principles used, the one principle consistently followed in practice is that allowances held are assets. However, diversity and differences in opinion arise in respect of type of asset, initial measurement and subsequent valuation of the asset.

Companies subject to emission reduction schemes classify emission allowances as either intangible assets or inventory.

Both US GAAP and IFRS have similar definitions of inventory, which are generically assets that are either (as defined in ASC 330 and IAS 2):

- consumed in the process of production (i.e. raw materials, for example wood),
- in the process of production (i.e. semi-finished goods, for example table legs), or
- ready for sale in the ordinary course of business (i.e. finished goods, for example tables).

The main argument for the inventory classification of emission allowances is that they are a key cost in the production process. Consequently the emission allowances should be

operationally treated as any other production input and should therefore be treated in a consistent manner from the accounting perspective.

An additional argument, supporting the view above, is that emission allowances have to be considered a production input because they give the company a legal right to produce and should therefore be classified as inventory (Berner, 2007, p. 80).

Allowances held by the company for trading purposes are ready for sale in the ordinary course of business and should therefore be classified as inventory as well. This argumentation comes from a different angle and is specifically applicable to companies that hold emission allowances with the intention of making profit from short-term price movements in the market. Interestingly under the inventory approach the companies active in production and trading have the opportunity to present the emission allowances held in the same caption on the face of the balance sheet irrespective of their purpose.

The inventory approach is supported by FERC's Uniform System of Accounts because its guidance on the accounting treatment of acid rain emissions can be translated to provide accounting solutions for emissions in general (Elfrink & Ellison, 2009, p. 3). Additionally, the Security and Exchange Commission (SEC) in the US commented that they would not object to the inventory treatment of emission allowances if applied consistently over time (Fornaro, Winkelman & Glodstein, 2009, p. 2).

Intangible assets are identifiable non-financial assets that lack physical substance (as defined in ASC 350-10-20 and IAS 38). Intuitively and from a purely definitional perspective, emission allowances would appear to align more closely to intangibles than inventory. However, some traditional accounting practices for intangibles do not represent a precise fit for the allowances. For example, if the cost method is applied, intangibles with finite life would typically under both GAAPs need to be amortised over the period based on a unit-of-production method or, as defined in IAS 38.97, should reflect the pattern in which the asset's future economic benefits are expected to be consumed by the entity. Usually a unit-of-production method is operationally more difficult to identify; as a consequence a straight line amortisation (an alternative approach, as defined in the standards) is the most common accounting method in practice. In the case of allowances the amortisation method does not make sense because the allowances are not used until the end of the compliance period when they are relinquished to the regulatory body to satisfy the company's obligation. The intangible asset model was supported by IFRIC 3. It should be again pointed out that the IASB has noted that, despite the withdrawal of IFRIC 3, all accounting concepts in IFRIC 3 were valid interpretations of the IFRS in place at that time. Additionally, the most recent comments from both the IASB and the FASB confirm that the eventual official accounting solution for emission rights is going in the direction of recognising emission allowances as intangible assets (see chapter five, below, for current accounting standard setters' initiatives).

As illustrated both classifications have a valid basis and are widely used. Therefore there is no reason to expect convergence in accounting practice of any kind without official guidance from the standard setters.

The initial measurement of emission allowances is another topic subject to debate. The controversy is largely due to the fact that the allowances are often freely allocated by governments (or at least at a value less than fair value). The two possible models for initial measurement are either measurement at cost or at fair value.

Irrespective of the model of the initial classification of allowances (classified as inventory or intangible asset) conceptually assets acquired through purchase are recorded at cost. Many entities have on their balance sheets allowances which were allocated to them at no cost and allowances which they have purchased through the market or earned through a flexible mechanism project (e.g. CDM). There are some operational accounting complexities involved with the cost method. Namely it can happen that an entity has in its inventory allowances needed for different “vintages”¹ and different regulatory environments. Additionally, some allowances may be able to be transferred between different vintages and/or regulatory markets (often at predetermined conversion ratios). As a consequence some decisions may need to be made with respect to which inventory pool is carried at what cost and using which accounting method. Measurement at cost is the prescribed method in FERC’s Uniform System of Accounts (Fornaro et al., 2009, p. 2).

There are not many instances where the entities receive an asset of verifiable value for free. So despite the general accounting guidance that both purchased inventory and intangibles should be measured at cost, there is valid doubt as to whether the allowances can be classified as “purchased”. IFRIC 3 supported a fair value approach (although with simultaneous recognition of an offsetting government grant). In practice it would be expected that the fair value method would be most frequently used by entities reporting under IFRS, but it is most likely not a common practice under US GAAP. This is because IFRS provides guidance on how to record the offset to the asset’s fair value – recorded as a government grant under IAS 20. The fair value of a government grant is recorded as deferred income and is systematically allocated to income over the compliance period. It is worth noting that IAS 20 allows measurement of a government grant at a nominal amount (often zero) as an alternative to a fair value approach.

US GAAP on the contrary does not provide any guidance. If an entity reporting under US GAAP would receive an allowance at zero cost on 30 December and would record it in its balance sheet at fair value, then without simultaneously recording an offsetting amount of a government grant the entity would on 31 December report a day one profit in the size of a

¹ Allowances may have specified vintages, which dictate the primary compliance period in which they may be used.

full market value of the allowances held. In order to avoid exposing their profit and loss accounts to the volatility of price movements of the allowances held the entities reporting under US GAAP presumably prefer cost method. Companies subject to the FERC's Uniform System of Accounts are required to record the allowances received from EPA (Environmental Protection Agency) at zero cost (Fornaro et al., 2009, p. 2). However for the companies not subject to the FERC system it is important to understand that US GAAP does allow the use of other accounting literature (including IFRS) when there is no applicable guidance within the US GAAP hierarchy (as defined in ASC 105-10-05), so there may be some merit to using an IAS 20 Government Grant framework in the US. Experience however shows that US regulators are in general reluctant to accept financial statements of its jurisdictional companies which are based on accounting treatments defined in accounting literature other than US GAAP.

When choosing the method of initial recognition the entities must consider how they have historically used the allowances, their prospective intent, and the accounting ramifications of each accounting model. Ultimately, the entities should choose an accounting method which will provide the reader of financial statements with the best possible "true and fair" view of the allowances held.

Considering the "true and fair" view of the allowances held it could happen that an entity might decide to treat different groups of allowances differently in its financial statements based on the business intent. For example, a fully diversified utility that purchases and uses allowances for its power generation business unit and buys and sells allowances in its trading operations could perhaps decide to treat allowances held for compliance purposes as intangibles and those held for trading as inventory. Additionally, IAS 38 explicitly states that intangible assets held for sale in the ordinary course of business are to be recorded as inventory in accordance with IAS 2. Hence an entity reporting under IFRS that classified allowances held for use as intangibles would be required to record any allowances held for trading as inventory.

Questions have been raised as to whether emission allowances could be treated as financial instruments. Arguments for this are based on the fact that emission allowances lack physical substance and are traded in the market. The entities that hold emission allowances for purely speculative purposes (such as brokers and traders) have a valid point when considering an alternative accounting treatment (alternative to inventory or intangibles) of allowances held – that is to treat allowances as financial instruments. In this case fair value measurement of allowances held would be required (as defined in IAS 39 and ASC 815 and 820).

The broad definition of a financial instrument is: any contract that gives rise to a financial asset of one entity and a financial liability or equity instrument of another entity (Deloitte Touche Tohmatsu, 2009, p. 686). To treat emission allowances as financial instruments

does not appear appropriate as emission allowances do not meet the definition of a financial instrument. However, certain contracts to buy or sell non-financial items are specifically scoped in on the basis that they behave and are used in a similar way to financial instruments (Deloitte Touche Tohmatsu, 2009, p. 702). Contracts to buy and sell non-financial assets that can be settled net and were entered into and continue to be held for the sole purpose of trading and profit maximisation are within the scope of the standards related to financial instruments under both IAS and US GAAP.

While the net settlement definitions may vary, the standards typically distinguish between the following two circumstances of net settlement:

- net settlement will (i.e. it is based on contractual agreement) or is expected to happen (i.e. it is expected based on past practice or it is the intention based on the business model) or
- the non-financial asset (i.e. the emission allowance) is readily convertible to cash. This is usually the case when a non-financial asset is traded at an exchange, e.g. the EUA is traded at the ECX.

Obviously the initial classification and the initial measurement of emission allowances will have further impact on the frequency and mechanics of subsequent carrying value adjustments (subsequent valuation).

If the emission allowances are initially classified as intangible assets the following two subsequent valuation approaches are possible:

Cost model. Under the cost model the allowances are carried at their initial recognition amount and are subsequently:

- reduced by any accumulated amortisation and
- tested for impairment (Deloitte Touche Tohmatsu, 2009, p. 387).

The amortisation method preferred by the standard setters is, as discussed above, the unit-of-production method.

Revaluation model. IAS 38 allows companies to elect the revaluation approach for a class of intangible assets. The key requirement is that the intangible assets are traded on an active market (Deloitte Touche Tohmatsu, 2009, p. 388). For most of the classes of intangible assets there is no active market; however there is an active market in case of emission allowances which gives the companies a genuine choice to mark-to-market their emission allowances. It is important to note that any positive revaluation is accounted through equity while a negative revaluation is generally recognised through profit and loss

statement (or in equity to the extent that it neutralises previously recognised mark-to-market gains) (Deloitte Touche Tohmatsu, 2009, p. 391-392). Under US GAAP the revaluation approach is not permitted.

If the emission allowances are initially classified as inventory they must be valued at lower of cost or market (as defined in ASC 330 and IAS 2). Alternatively, if the entity qualifies as a commodity trader the measurement criteria of the inventory standard are exempt and the emission allowances have to be measured at fair value (Deloitte Touche Tohmatsu, 2009, p. 492).

Last but not the least a choice of initial recognition will determine disclosure requirements and cash flow statement classification of both purchases and sales of emissions.

3.2 Liability

As entities actually emit carbon, they incur a future obligation to deliver an offsetting amount of allowances to a regulator or incur penalties. This obligation meets the definition of liability under both IFRS and US GAAP and needs to be recorded and periodically measured. Contrary to an asset where already the initial classification of emission allowances is a problem, the initial classification of liability to deliver allowances in the size of actually emitted emissions appears to be straight-forward. Various challenges appear with respect to the measurement process.

There are several possible approaches to value the liability:

- best estimate of the present obligation,
- fair value of the present obligation,
- best estimate of the compliance period obligation,
- fair value of the compliance period obligation.

Under the best estimate of the present obligation method an entity should have at any point of time recognised a liability for the total to-date physically emitted carbon. The cost assigned to that liability should be based on management's best estimate of how it will satisfy the obligation. In particular, the best estimate would consider the cost basis of any allowances currently held (assuming that those allowances would be actually used to satisfy the obligation) and the current market spot price of any additional allowances that would need to be purchased. If a company has any other arrangements to acquire additional allowances then an actual agreed purchase price rather than a spot market price should be used for valuation.

The fair value of the present obligation requires, similar to above, recording of a liability that is equal to the total volume of emitted carbon at a certain point of time within the compliance period, but the obligation is valued at a spot market price of carbon units. This methodology was prescribed in IFRIC 3. In this approach the obligation is completely separated from any allowances held. In other words the fair value approach recognises and supports the discrete nature of the obligation to deliver allowances, i.e. the obligation exists only due to past emissions and is not linked to the amount or nature of the allowances currently held.

An alternative methodology to the previous two approaches suggests that the liability would be an estimate of the total anticipated physical emissions throughout a compliance period which exceed currently held allowances. At each reporting date an entity reports an accrual which is an estimated proportion of the total expected deficit. Estimation of accrual is based on actual emission activity in the period to reporting date relative to the estimated total emission activity in the compliance period. Accrued liability as described above is recognised in addition to the liability recorded for the present obligation under the first methodology.

Analogously the fair value of the compliance period obligation method suggests that an entity would estimate the amount of total obligation for the compliance period, value this obligation at fair value (i.e. at a spot market price) and accrue the portion which is attributable to the amount of actual emissions produced to date relative to the estimated total amount.

In relation to the fair value measurement of anticipated future liability (relevant to the methods 3 and 4 above) a question arises as to which market price is to be used for valuation. Spot price or forward price? In order to accurately value a future liability ideally a future price should be used, i.e. a current forward price for a future period when the liability is expected to be settled. With the current status of carbon markets, availability and above all validity of the forward price curve is questionable (mainly due to market illiquidity). This leaves the entities with the second best solution, that is to value their future liability at the spot market price, hence implying a flat forward curve.

Above described methodologies all provide valid guidance for the entities on how to account for their future obligations to relinquish emission allowances to a regulating authority at the end of compliance period. However, they still can create substantial discrepancies in the financial statements of the emitting entities. For example, under the first method an entity will most probably recognise little obligation in the early compliance period and then much higher obligations towards the end of the compliance period (after all the low cost basis allowances have been used in previous accruals for obligation). While the third and fourth methodologies seem to be able to solve this problem, they involve a significant number of approximations and estimates in order to accurately

forecast total emissions over the compliance period. The estimate itself is subject to the quality of the entity's monitoring, analysing and forecasting procedures and is as such vulnerable to fluctuations in valuation (Desjardins & Schuh, 2008, p. 3). Consequently, the financial statements could exhibit significant fluctuations in the estimated value of the liability.

After the entities have made their accounting policy decisions around allowances and obligations, the next decision that needs to be made is whether the asset (allowances) and liability (obligation) should be presented as "net" or "gross".

In general accounting standards suggest that the presentation of assets and liabilities should reflect the company's future cash flows, meaning that netting should be applied where the right of offset exists and the intent is to net. The argument for netting is that in fact the entities subject to emission reduction schemes in general intend to deliver their allowances to the regulatory body in order to fulfil their obligation.

The first argument against netting is that in general the netting principles mentioned above are applicable when both parties owe each other determinable amounts. That does not appear to be the case in cap-and-trade markets as the regulator is not a debtor to the allowance holder. Additionally, netting most commonly occurs in situations where the asset and liability are of a similar nature (e.g. accounts payable/receivable, derivative financial instruments) which again does not appear to be the case in this scenario (inventory/intangibles and the emission obligation). Finally, gross presentation also appears appropriate as the two items seem to be independent and not clearly linked. The asset (allowance held) can be used, sold, exchanged for another asset irrespective of whether or not the entity has a current (or future) obligation to deliver allowances. Similarly, despite the existence of a current (or future) obligation to deliver allowances in the size of past emissions, the regulator has no control over which allowances will be used to satisfy the obligation and if they will be delivered at all.

In the absence of a formal standard for emission rights accounting there are also no required disclosures of emissions trading programmes or emission allowances within financial statements. In general an entity must disclose all material facts in order to provide an investor with a true and fair view of the entity's performance and operations. Recent regulatory and legal changes suggest that the risks and opportunities many organisations face in connection with climate change will eventually fall into the category of material information and would as such require disclosure in their financial statements (PWC, 2008, p. 17).

3.3 Forward Emission Contract

Some markets (for example the ECX) have developed forward instruments on emission allowances. These instruments can be financially settled or result in physical delivery of an allowance. They can be options (exchange traded or OTC), forward contracts or futures (standardised forward contracts). As emissions markets develop and consolidate it is reasonable to expect that many more forward instruments, in variety and complexity, will be available in the marketplace. Along with the development of forward emission contracts questions are arising as to the appropriate accounting for these types of contracts.

Forward emission contracts resulting in financial settlement are classified as derivative financial instruments. More room for interpretation exists with respect to forward emission contracts which result in actual delivery of the underlying allowances. For the purposes of clarity, this refers to a forward contract which results in the future delivery of an allowance for cash (e.g. in December 2011) and not a transaction to immediately deliver a December 2011 allowance. These transactions may also be derivatives, but further analysis is necessary. Analysis required is subject to applicable accounting standards and to factors external to the contract such as market liquidity, the entity's historical practices and intent.

Before any further accounting considerations related to forward emission contracts are discussed it must be noted that a full analysis of the potential implications of the derivatives accounting rules (under IFRS and US GAAP) is far beyond the scope of this thesis. However, a brief summary is useful.

Forward contracts for emission allowances may qualify for treatment as derivatives within the scope of IAS 39 Financial Instruments: Recognition and Measurement, unless they are used for the fulfilment of the entity's own emissions obligations in which case they qualify for the "own use" exemption. If the entity opts for "own use" exemption under IAS 39 then the forward emission contracts are classified as inventory and are measured at lower of cost or market under IAS 2 Inventories. Companies which use forward emission contracts more actively and enter into both purchases and sales to economically optimise the ultimate cost of emission allowances used to meet their obligations, or for purely speculative purposes, will find that the own use exemption cannot be applied and the derivatives accounting rules under IAS 39 will require fair value accounting treatment.

Under US GAAP the principal question is whether the underlying is "readily convertible to cash" (this discussion assumes there is no market mechanism to facilitate net settlement). To determine if an underlying is readily convertible to cash different factors need to be considered such as the market in question and type of allowance. Questions arise as to whether the market liquidity is sufficient to deem the emission market under consideration as a representative market to be used for fair value valuation of a derivative. In answering these questions the entities could reach different conclusions as carbon markets have

historically encountered periods with very low trading activity. Additionally, it is questionable if the markets for different vintages (compliance periods) of allowances should be considered together or separately in the evaluation of market liquidity.

Furthermore, let us consider an example in which participants in a carbon reduction scheme have a good idea of their future allocations and actual emissions and want to secure sufficient (or sell surplus) allowances at a predetermined price for the 2013 compliance period and hence enter into forward contracts to purchase (or sell) deficient (or surplus) 2013 allowances. Since the regulator has not allocated 2013 allowances yet, there is no current spot market for 2013 allowances even though an active OTC forward market may exist. This seems to be argument enough to support non-derivative treatment for these forward contracts although there is absolutely no reason to believe that in 2013 a spot market for these contracts will not exist. As this analysis is ongoing, when a spot market does develop for 2013 allowances, these contracts could be deemed derivatives, resulting in a current period adjustment for the entire accumulated fair value. However it could still be argued that if a current vintage year's spot market was considered readily convertible to cash, then also all future vintage years will be. Further complications could arise if the market was not liquid for the current vintage year allowance (e.g. 2010) but was liquid for the next year, which is very possible based on past trading patterns of emissions markets.

An analogical concept to own use exemption option under IFRS is the "Normal Purchase and Normal Sale" exception under US GAAP. Important difference in the definition of both concepts is that IFRS is explicit that "physical delivery" is not a condition of the exemption, while the "normal purchase normal sale" exception tends to focus on physical delivery of the underlying. Further accounting considerations would arise if the entity chose to apply "normal purchase normal sale" exception when the allowances had been classified as intangible assets, which by definition "lack physical substance".

If a forward emission contract meets the definition of a derivative under either IFRS or US GAAP, it may be eligible for hedge accounting. Practical difficulties and theoretical complexities of hedge accounting are a more than adequate basis for a further challenging accounting discussion.

The above accounting considerations are just some of the more important considerations related to accounting for emission rights. Some more specific accounting topics may be more relevant to specific entities and specific industries. The potential materiality of these accounting items also necessitates the need to design and implement internal controls around the measurement and estimation process that are sufficient for financial reporting (Desjardins & Schuh, 2008, p. 3).

As previously mentioned, convergence in practice is not likely to occur without additional guidance from standard setters. Additionally, even if these questions will be addressed in

new accounting guidance, emissions markets will continue to develop and grow, regulations will change, and new accounting complexities will arise.

4 CURRENT INITIATIVES OF ACCOUNTING STANDARD SETTERS

4.1 Developments After the Withdrawal of IFRIC 3

After the withdrawal of the IFRIC 3 and after the initial pressure due to the implementation of the EU ETS was gone, the IASB decided to approach the accounting problem of emission rights at a slower pace. The main idea was to primarily investigate and assess the nature of the various emission trading schemes and their accounting implications.

The accounting for emission rights was not on the IASB Agenda until late 2007. Table 2 below provides a chronological timeline with the meeting dates and the key matters discussed.

Table 2. Chronological overview of the meetings conducted by the IASB in relation to accounting for emission rights

Date	Key Matters Discussed	Participants
12 December 2007	The decision was taken to put accounting for emission rights on the agenda	IASB
21 May 2008	Scope of the project Co-operation between IASB and FASB	IASB and FASB
15 October 2008	Educational presentation and session only	IASB and FASB
19 March 2009	Accounting for emission allowances received free of charge	IASB
17 November 2009	Accounting for emission allowances in a voluntary scheme	IASB and FASB
15 December 2009	Accounting for the right to receive allowances in a cap-and-trade scheme before the related allowances have been issued	IASB
20 May 2010	Educational session only, including presentation of a research paper	IASB

Source: IASB, Emissions Trading Schemes: Project milestones, 2010a.

The topics raised in the meetings and their implications are further discussed below.

In the US the FASB decided in February 2007 to put the accounting for emission rights project on its agenda. Previously the FASB had not addressed the accounting for emission rights in a formal manner. While the Emerging Issues Task Force (EITF), an FASB Committee, already in 2003 identified the accounting problems related to the cap-and-trade programmes, it failed to see any urgency about the issue (Elfrink & Ellison, 2009, p. 2). The only accounting guidance available in the US at that time (and currently) was the guidance contained in the FERC Uniform System of Accounts – an industry guidance, which was limited to electricity and other utilities companies.

The reason that the accounting authorities in the US failed to identify the urgent need for official guidance on accounting for emission rights was mainly the lack of political pressure and consequently missing interest by the companies and their shareholders. As the US did not ratify the Kyoto Protocol the topic of curbing GHG emissions, either on a regional or on a national level, was not very high on the political agenda. The economic boom between 2002 and 2007 might have supported the increased economic awareness among the general public (during bad economic times people tend to have other concerns than environmental matters) but did not create additional pressure for companies to put environmental costs into their accounting books as the focus was mostly on revenue growth and acquisitions. In addition the regulatory authorities such as the SEC and the FASB but also the federal government in Washington were giving most of their attention to the implementation and enforcement of the Sarbanes-Oxley law². Still, it could be argued that there were some major emission trading schemes established in other parts of the world, such as the EU ETS and the CDM projects, which should have affected the accounting books of American multinational corporations.

The FASB re-launched the accounting for emission rights topic in February 2007 and only a few months later the IASB decided to put the topic back on its agenda as well.

At the December 2007 meeting (IASB, 2007) the IASB took the decision to reactivate the accounting for emission rights project. Furthermore, the IASB recognised that diversity in accounting practice could be observed. The three most common practices for emission rights accounting were and still are:

- the IFRIC 3 approach,
- the remainder value approach,
- the net liability approach.

Importantly, the IASB also noted that the FASB had a similar project on its agenda. This gave them the opportunity to start a joint project, which became a reality at the next

² The Sarbanes-Oxley law is an SEC regulation which was introduced after the Enron scandal and focuses on corporate governance and internal controls of companies.

meeting in May 2008. Last but not least an important decision was taken to limit the scope to accounting for emission rights trading only and not to extend the project to include other government grants.

At the May 2008 meeting (IASB, 2008b) the scope of the emission rights joint project with the FASB was the focus of the discussion. It was noted that there was no authoritative accounting guidance either in IFRS or in US GAAP, which would address the issue of accounting for emission rights. Furthermore it was acknowledged that there is a wide range of emission trading schemes all of which have in common the aim to reduce damage to the environment. Based on the research conducted by IASB there were three possible scopes identified for the emission rights project:

- Alternative A: Government mandated cap-and-trade schemes only (narrow scope).
- Alternative B: All emission trading schemes and tradable rights (broad scope).
- Alternative C: A scope between the narrow scope and the broad scope.

With little debate the IASB and the FASB concluded that alternative B is the most appropriate scope.

No decisions were taken at the October 2008 IASB and FASB joint meeting (IASB, 2008c). The session was of educational nature only. A paper that explained the mechanisms in emission trading schemes was presented to the board members of the IASB and the FASB.

At the March 2009 IASB meeting (IASB, 2009b) the initial accounting for emission allowances that are received free of charge from a government in a cap-and-trade emission trading scheme (such as the EU ETS) was discussed. The mechanics and implications of the EU ETS and the US Lieberman-Warner bill were discussed in more detail. The members of the IASB concluded that an entity should record a liability in its balance sheet corresponding to the number of allowances received free of charge from the government. The liability should be measured at fair value of the allowances received. The basis for this conclusion was that the IASB believes that each allowance a company receives represents an obligation of the company to produce less or utmost the emission amount that the allowance unit represents. In other words the entity is given a cap by the government representing the maximum free-of-charge emission the company is allowed to produce. Hence with the acceptance of the free-of-charge allowances from the government the entity assumes an obligation. For any effective pollution above the allocated level of allowances the additional allowances need to be purchased on the market or, if the pollution was less, can be sold to the market. This represents the trade element of the scheme. Only at the end of the compliance period for which the allowances have been provided by the government does it become clear whether the actual obligation of the entity is less than initially assumed, i.e. if the liability can be released.

At the November 2009 meeting (IASB, 2009c), which was a joint FASB and IASB meeting, the accounting for emissions under a voluntary cap-and-trade scheme was discussed. It should be noted that in previous meetings only mandatory schemes were analysed. Two contrary views were discussed as to whether and how a liability arises under a voluntary cap-and-trade scheme:

- View 1 was that an entity's actual emissions are the obligating event in a voluntary scheme. An entity does not incur a present obligation, and hence a liability, until it has emitted. Until emissions have occurred, the entity can take action that enables it to avoid delivering allowances (i.e. to produce lesser emissions).
- View 2 was that entering into the membership contract is the event that creates a liability (the obligating event). By signing the membership contract, the obligation to pay allowances is unconditional. This would move the voluntary system more into the direction of a mandatory system.

View 2 was noted to be the preferred view. However no decisions were taken at that meeting.

At the December 2009 meeting (IASB, 2009d) the IASB discussed the accounting for the right to receive allowances in a cap-and-trade scheme before the related allowances have been issued. The question discussed was whether or not an entity should recognise the right to future allocations of allowances as an asset. The focus of the discussion was mainly around to what extent the entity does or does not control the resource (emissions production) of its future instalments (allowances allocated). No conclusions were reached and no decisions were taken at the December 2009 meeting.

Also no decisions were taken at the May 2010 meeting (IASB, 2010b). The meeting was of informative nature only. A research paper on emission trading schemes was presented and pushed back by the IASB for additional chapters and considerations to be included.

4.2 Outlook

In November 2009 the IASB and the FASB agreed to strengthen their efforts towards the completion of their joint projects and to re-assess the priorities of their projects. The joint projects have been organised into three categories which are listed below in order of their importance (KPMG LLP, 2010, p. 8):

- Memorandum of Understanding (MoU) Priority Joint Projects: These projects are believed by the two Boards to significantly improve the standards and to significantly move forward the convergence of IFRS and US GAAP. The MoU priority projects are:

financial instruments, revenue recognition, leases, presentation of other comprehensive income and fair value measurement.

- Other Significant MoU Joint Projects: These represent projects where the timing of the issuance has been delayed due to the re-prioritising efforts of the two Boards. Examples include presentation of financial statements, consolidation and de-recognition disclosures.
- Other Joint Projects: Other joint projects encompass the remainder of the joint projects which are not specifically addressed in the MoU. One of these projects is the accounting for emission rights.

The IASB and the FASB set the milestones for the accounting for emission rights project as outlined in Figure 12 below.

Figure 12. Milestones set by the IASB and the FASB for accounting for emission rights joint project



Source: IASB, Emissions Trading Schemes: Project milestones, 2010a.

It is widely expected that this guidance will be very comprehensive and will address: asset and liability recognition, initial measurement, subsequent measurement including impairment, profit and loss recognition, presentation and disclosure.

From the plans outlined above it can be concluded that the issuance of authoritative guidance on the accounting for emission rights is not high on the agenda of global accounting standard setters, the IASB or the FASB. One of the main reasons for this appears to be the fact that projects related to the financial crisis are considered more urgent and more important in the current depressed economic environment (Singh, 2009, p. 1).

An example of such a project is the need for a uniform global approach to the measurement of fair value. Fair value measurement is widely believed to be one of the main reasons for the instant collapse of some of the biggest financial institutions in 2008. Suddenly there was widespread mistrust when it came to the underlying value of the assets on the banks' balance sheets. It seemed that there was not only excess leverage (basically repackaging and selling an asset several times) but also a lot of room for management estimates when it came to the valuation of non-exchange traded assets. The issuance of accounting standards

related to the reasons of financial crisis also has the full attention and support of the members of the G-20 summit.

Apart from the fact that accounting for emission rights is not a priority project, the significant complexity of the topic means that it will take time to find a global solution. As such the accounting standard setters are facing a variety of challenges as described below.

Fair value considerations. There are serious concerns regarding the fair value measurement of allowances in the absence of liquid markets or in some cases in the absence of any kind of reference markets. The impact of the mark-to-market valuation of any asset on the financial statements of companies is widely debated (for an analysis of practical implications of fair value reporting see Gwilliam and Jackson (2008)). It is a concern commonly shared by companies, analysts, politicians and regulators (see the discussion above). Whilst the EU ETS is becoming a more liquid and hence more representative and reliable market, other environmental mechanisms and emission trading schemes do not yet have or will never have the market depth to provide representative pricing on a daily basis. Moreover the companies are worried that negative mark-to-market valuation of the emission rights would offset their efforts to reduce emissions. Due to the valuation being a function of the amount of emission rights multiplied by the price a rising market price produces negative mark-to-market valuation which could in turn destroy any physical reduction in the amount of emission allowances needed to fulfil company's obligation.

Variety of schemes. Whilst the largest and most dominant emission trading scheme is the EU ETS there are many other schemes (see Table 1 in chapter 2.4, "Overview of the Carbon Markets"), which have to be considered and carefully analysed by the accounting standard setters prior to issuing a new standard (Quast, Shong & Stark, 2010, p. 1-2). This is necessary for the global acceptance of such a standard. In past IASB meetings and joint IASB/FASB meetings fundamental topics such as differences in accounting treatment under a voluntary scheme versus a mandatory scheme were discussed.

Variety of industries. The type of installations and companies affected by the accounting standard encompasses many different industries, which naturally leads to different views on how emission rights should be accounted for. Many of the industries affected are very familiar with the accounting for government grants (for example the steel or cement industry) whilst for other industries the accounting for emission rights represents a new topic (for example companies in the chemical industry). The IASB and the FASB face a challenge to make the accounting treatment right and feasible for all industries affected and for all installations potentially affected in the future.

5 CURRENT ACCOUNTING PRACTICES

In the post IFRIC 3 vacuum the entities reporting under the IFRS remain confused about the appropriate accounting treatment for emission rights. A survey conducted by PricewaterhouseCoopers and the International Emissions Trading Association identified six major accounting treatments and numerous variations used by the 26 firms participating in the study (PWC, 2007, p. 4).

The withdrawal of IFRIC 3 did not however invalidate its application. Despite not being part of IASB GAAP, or part of the EU financial reporting regulatory requirements, it can be observed that in practice IFRIC 3 continues to provide a valid guidance for accountants in the companies that are subject to the emission rights regime (Riley, 2007, p. 2).

As mentioned above many different accounting approaches for emission rights have evolved in practice. Despite their variety they can be grouped into three main approaches:

- the IFRIC 3 approach
- the remainder value approach
- the net liability approach

This chapter provides a brief summary of each of the three main accounting treatments for emission rights as identified in practice. Also included is an illustrative example meaning to give an overview and comparison of practical application of the three methods. It needs to be pointed out that these are accounting treatments most commonly used by the entities reporting under IFRS. The summary is based on the Carbon Jigsaw Briefing: Emission Rights Accounting (ACCA, 2009, p. 9-10).

5.1 IFRIC 3 Approach

IFRIC 3 approach follows IFRIC 3 in its entirety.

IFRIC 3 concluded that emissions allowances, whether issued by government or purchased in the market, are intangible assets to be accounted for in accordance with IAS 38, Intangible Assets. On initial recognition, allowances issued for less than their fair value are measured at fair value, with the difference between the amount paid and fair value reported as a government grant, in accordance with IAS 20, Accounting for Government Grants.

This grant is recognised as deferred income and subsequently recognised in income, on a systematic basis over the compliance period for which the associated allowances are issued, regardless of whether those allowances continue to be held or are sold. An entity

may subsequently choose to measure them under either the cost or revaluation model in accordance with IAS 38.

As the entity actually emits GHGs, a liability is recognised for the obligation to deliver allowances equal to actual emissions. This liability is a provision within the scope of IAS 37, Provisions, Contingent Liabilities and Contingent Assets, and is required to be measured at the best estimate of the expenditure required to settle the present obligation on the balance sheet date. This will usually be the present market value of the amount of allowances required to cover emissions made up until the balance sheet date.

5.2 Remainder Value Approach

Remainder value approach follows IFRIC 3, but the provision is based on the cost of allowances already held. The intangible asset is initially recognised at fair value, together with a government grant in line with IFRIC 3.

Unlike the IFRIC 3 approach, the provision is recognised on the following basis:

- To the extent that the entity holds a sufficient amount of allowances, the provision is recognised based on the carrying value of those allowances (i.e., the cost to the entity of extinguishing their obligation).
- To the extent that the entity does not hold a sufficient amount of allowances, the provision is recognised based on the market value of emission rights required to cover the shortfall.
- To the extent anticipated that the entity will incur a penalty if it is unable to obtain allowances to meet its obligations under the scheme (note that the obligation to deliver allowances must still be fulfilled) such a penalty is provided for as well.

5.3 Net Liability Approach

Under the net liability approach the allowances granted are held at nominal value only and provision is recognised for any net obligation.

No asset or deferred income is recognised when the allowances are initially received as the grant is recognised at nominal value in accordance with the alternative accounting treatment provided in IAS 20 (nominal amount being zero in this case).

Allowances granted to the entity are used to offset any liability arising as a result of carbon emissions. Hence, as long as the entity holds sufficient allowances to meet its emission obligations no entries are required.

Where the entity has no allowances or there is a shortfall in allowances to meet its emission obligation, a provision is made for the best estimate of the cost to be incurred to meet its emission obligation (i.e. cash cost of the amount of allowances required to cover the shortfall at the prevailing market price on the balance sheet date).

All three approaches will result in the same net charge to the income statement as shown in the illustrative example below.

5.4 Illustrative Example

To illustrate the effect of available accounting methods on the accounts, I present a numerical example:

Group X and Group Y are each granted (at no cost) 100 emission allowances by the government. Each allowance gives the right to emit one tonne of CO₂. The market value of one allowance at the date of grant is EUR 20.

During the period, Group X and Group Y both purchase another 15 allowances at an average cost of EUR 25.

The market value of an allowance at the end of the period is EUR 30.

At year end of year 1:

- Group X has emitted 105 tonnes of CO₂.
- Group Y has emitted 120 tonnes of CO₂.

In spring of year 2:

- Group X will be required to surrender 105 allowances to the government.
- Group Y will be required to surrender 120 allowances to the government.

Year 1:

When the emission rights are granted to Group X. Its accounts reflect:

Group X	IFRIC 3	Remainder Value	Net Liability
Intangible assets	€ 2,000 (rights received at fair value of € 20 each)	€ 2,000 (rights received at fair value of € 20 each)	-
Government grant	€ 2,000 (deferred income in the amount of the fair value of allowances received)	€ 2,000 (deferred income in the amount of the fair value of allowances received)	-

Year end:

Group X has emitted 105 tonnes of CO₂. Its accounts reflect:

Intangible assets	€ 2,375 (the 100 allowances granted initially at their original fair value of € 20 and the 15 purchased allowances at their cost of € 25 each)	€ 2,375 (the 100 allowances granted initially at their original fair value of € 20 and the 15 purchased allowances at their cost of € 25 each)	€ 375 (the 15 purchased allowances carried forward at their cost of € 25 each)
Provision and income statement	€ 3,150 (the 105 allowances it will have to surrender at the balance sheet fair value of € 30 each)	€ 2,125 (the 105 allowances it will have to surrender: the 100 granted at their carrying value of € 20 and a further 5 of the purchased allowances at their carrying value of € 25)	€ 125 (the 5 purchased allowances at their cost of € 25 each)
Income statement	€ 2,000 (being the release of the deferred income in respect of the granted allowances which have been used in the compliance period)	€ 2,000 (being the release of the deferred income in respect of the granted allowances which have been used in the compliance period)	-
Net income statement	€ 1,150 loss	€ 125 loss	€ 125 loss

effect year 1			
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Year 2:

Group X is required to surrender 105 allowances. It will surrender the 100 allowances it received free of charge and 5 of the allowances it purchased. Its accounts reflect:

Liability will be settled by the surrender of the allowances	€ 2,125 (the 100 granted allowances at € 20 and 5 purchased allowances at € 25)	€ 2,125 (the 100 granted allowances at € 20 and 5 purchased allowances at € 25)	€ 125 (the 5 purchased allowances at € 25)
Net income statement effect year 2	€ 1,025 profit (€ 3,150 provision less the settlement cost of € 2,125)	€ 0 (€ 2,125 provision less the settlement cost of € 2,125)	€ 0 (€ 125 provision less the settlement cost of € 125)

Cumulative income statement effect year 1 and year 2

	€ 125 loss	€ 125 loss	€ 125 loss
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Year 1:

When the emission rights are granted to Group Y. Its accounts reflect:

Group Y	IFRIC 3	Remainder Value	Net liability
Intangible assets	€ 2,000 (rights received at fair value of € 20 each)	€ 2,000 (rights received at fair value of € 20 each)	-
Government grant	€ 2,000 (deferred income in the amount of the fair value of allowances received)	€ 2,000 (deferred income in the amount of the fair value of allowances received)	-

Year end:

Group Y has emitted 120 tonnes of CO₂. Its accounts reflect:

Intangible assets	€ 2,375 (the 100 allowances granted initially at their original fair value of € 20 and the 15 purchased allowances at their cost of € 25 each)	€ 2,375 (being the 100 allowances granted initially at their original fair value of € 20 each and the 15 purchased allowances at their cost of € 25)	€ 375 (the 15 purchased allowances carried forward at their cost of € 25 each)
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		each)	
Provision and income statement	€ 3,600 (the 120 allowances it will have to surrender at the balance sheet fair value of € 30 each)	€ 2,525 (the 100 allowances granted at their carrying value of € 20 each, the 15 purchased at their carrying value of € 25 each and a further 5 to be purchased in the market at a price € 30 each)	€ 525 (the 15 purchased allowances at their cost of € 25 each and the shortfall of 5 allowances at their market value of € 30 each)
Income statement	€ 2,000 (being the release of the deferred income in respect of the granted allowances which have been used in the period)	€ 2,000 (being the release of the deferred income in respect of the granted allowances which have been used in the period)	-
Net income statement effect year 1	€ 1,600 loss	€ 525 loss	€ 525 loss

Year 2:

Group Y is required to surrender 120 allowances. It will surrender the 100 allowances it received free of charge and the 15 allowances it purchased. It will have to cover the shortfall of 5 by purchasing allowances in the market.

Liability will be settled by the surrender of the allowances	€ 2,525 (the 100 granted allowances at € 20, 15 allowances purchased at € 25 and the shortfall of 5 allowances at their market value of € 30)	€ 2,525 (the 100 granted allowances at € 20, 15 allowances purchased at € 25 and the shortfall of 5 allowances at their market value of € 30)	€ 525 (the 15 purchased allowances at their cost of € 25 each and the shortfall of 5 allowances at their market value of € 30 each)
Net income statement effect year 2	€ 1,075 (€ 3,600 provision less settlement of € 2,525)	€ 0 (€ 2,525 provision less the settlement cost of € 2,525)	€ 0 (€ 525 provision less the settlement cost of € 525)

Cumulative income statement effect year 1 and year 2

	€ 525 loss	€ 525 loss	€ 525 loss
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6 EMPIRICAL ANALYSIS

The aim of this chapter is to present the purpose, methods of work, results and conclusions of the empirical analysis.

6.1 Purpose of the Empirical Analysis and Methods of Work

The purpose of the empirical analysis was to analyse the accounting treatment and the disclosures related to emission rights in the financial statements of companies subject to the EU ETS.

The sample of companies selected for the empirical analysis was taken from the population with the following characteristics:

- companies subject to the EU ETS
- companies with the emission rights accounting practice disclosed in at least one of the annual reports for the financial years included in the analysis
- companies which prepare their financial statements in accordance with IFRS
- companies listed on a stock exchange
- companies with a global headquarters in Europe

Over 12,000 installations are covered by the EU ETS. These installations include combustion plants, oil refineries, coke ovens, iron and steel plants and factories producing cement, glass, lime, bricks, ceramics, pulp and paper. The total number of companies being affected by the EU directive is significantly smaller. Most of the companies have more than one installation and more than one type of installation which can be located domestically or internationally.

In order to make the analysis representative, it was decided to select a sample of companies from seven most relevant industries. These are as follows:

- Oil-, gas- and refining industry
- Electricity industry
- Chemical-, pharmaceutical- and plastic industry
- Metal producing and working industry
- Paper and pulp industry
- Glass and ceramics industry
- Cement industry

Apart from shared technological background, grouping of the installations into industries is also considered appropriate from an accounting perspective. Established accounting practice within an industry is very important for several reasons. Firstly, established industry practice is of great relevance in the process of developing new accounting standards. Secondly, the interpretation of a new accounting standard is highly influenced by the impact of that standard on the financial statements of the companies within certain industry. Thirdly, established accounting practice within the industry is usually the main reference for the new entrants to the scheme/industry in the absence of an accounting standard or other official guidance.

The analysed sample consists of 21 companies – three companies were selected from each of the seven industries listed above. Companies were selected subjectively, based on size, market presence and international recognition. Those chosen were basically big companies with a wide span of operations located in the EU member states. All companies are quoted on at least one European stock exchange which is internationally recognised. All in all the selected companies can be considered representative of their industry.

The companies' last available annual reports, i.e. the reports for the financial year 2009, were analysed. For the purposes of comparison the annual reports of the two previous periods, financial years 2008 and 2007, were also included in the analysis.

6.2 Results

The results of the analysis are presented in Tables 3 to 9 below. The results are presented by industry, by company and by financial year.

Each table includes the names of the analysed companies, that is the names under which the companies issue their consolidated financial statements. In a row beneath the name of the analysed company their accounting treatment of emission rights during the most recent financial year, i.e. 2009, is presented. If the accounting treatment is unchanged compared to 2008 and 2007 this is stated and the individual accounting considerations are not repeated.

With the exception of two companies the financial year ends with the calendar year on 31 December. For AXPO Holding AG and ThyssenKrupp AG the financial year ends on 30 September.

Table 3. Results of the analysis for oil, gas, and refining industry

OMV Aktien-Gesellschaft (1)
<p>In 2009, 2008 and 2007 the accounting treatment for emission rights was consistently disclosed and applied as follows:</p> <ul style="list-style-type: none"> • Emission certificates granted free of charge by the government or similar authority are not recognised in the balance sheet • A shortfall in emission certificates would be provided for <p>=> Net Liability Approach</p>
ENI SpA (2)
<p>In 2009, 2008 and 2007 the accounting treatment for emission rights was consistently disclosed and applied as follows:</p> <ul style="list-style-type: none"> • Cost associated with emission quotas are reported in relation to the amount of the carbon dioxide emissions that exceeded the amount assigned • Cost related to the purchase of the emission rights are taken to intangible assets net of any negative difference between the amount of emissions and the quotas assigned <p>=> Net Liability Approach</p>
ENEL SpA (3)
<p>In 2009, 2008 and 2007 the accounting treatment for emission rights was consistently disclosed and applied as follows:</p> <ul style="list-style-type: none"> • Charges for CO₂ emissions are essentially attributable to purchases made during the year or provided for to cover the allowance requirement resulting from the difference between amounts produced and those assigned under the national allocation plans <p>=> Net Liability Approach</p>

(1) Sources: OMV Aktiengesellschaft, Annual Reports 2008, 2009 and 2010; (2) Sources: ENI SpA, Annual Reports 2008, 2009 and 2010; (3) Sources: ENEL SpA, Annual Reports 2008, 2009 and 2010.

Table 4. Results of the analysis for electricity industry

AXPO Holding AG (1)
<p>In 2008/09, 2007/08 and 2006/07 the accounting treatment for emission rights was consistently disclosed and applied as follows:</p> <ul style="list-style-type: none"> • Emission rights are initially valued at acquisition cost • Emission rights granted free of charge by the government or similar authority are not recognised in the balance sheet • Provisions are made if a shortfall of emission rights is identified between rights owned and the number of rights to be delivered due to emissions produced. The provision is fair valued at balance sheet date • Surplus emission rights are recognised when realised as an external sale <p>=> Net Liability Approach</p>
E.ON AG (2)
<p>In 2009, 2008 and 2007 the accounting treatment for emission rights was consistently disclosed and applied as follows:</p> <ul style="list-style-type: none"> • Emission rights held for the settlement of obligations are reported as intangible assets and capitalised at cost when issued for the respective reporting period as fulfilment of the notice of allocation from the responsible national authorities, or upon acquisition • A provision is recognised for emissions produced and measured at the carrying amount of the emission rights held, or in the case of a shortfall, at the current fair value of the emission rights needed <p>=> Remainder Value Approach</p>
RWE AG (3)
<p>In 2009, 2008 and 2007 the accounting treatment for emission rights was consistently disclosed and applied as follows:</p> <ul style="list-style-type: none"> • CO₂ emission allowances are accounted for as intangible assets and are both, if purchased or allocated free of charge, stated at cost • A provision is recognised to cover the obligation to the respective authorities; this provision is measured at the book value of the allowances capitalised • If a portion of the obligation is not covered with the available allowances, the provision for this portion is measured using the market price of the allowances on the reporting date <p>=> Net Liability Approach</p>

(1) Sources: AXPO Holding AG, Annual Reports 2007, 2008 and 2009; (2) Sources: E.ON AG, Annual Reports 2008, 2009 and 2010; (3) Sources: RWE AG, Annual Reports 2008, 2009 and 2010.

Table 5. Results of the analysis for chemical, pharmaceutical, and plastic industry

BASF SE (1)
<p>In 2009, 2008 and 2007 the accounting treatment for emission rights was consistently disclosed and applied as follows:</p> <ul style="list-style-type: none"> • Emission rights are recognised in intangible assets • Purchased rights are recorded at acquisition costs; granted free of charge by government at fair value at acquisition date • Provisions were recognised in connection with the allocation of emission certificates <p>=> IFRIC 3 Approach</p>
Borealis AG (2)
<p>In 2009, 2008 and 2007 the accounting treatment for emission rights was consistently disclosed and applied as follows:</p> <ul style="list-style-type: none"> • Emission rights are reported as intangible assets and are measured at cost, if purchased in the market, or at fair value, if received through government grants • A provision for the government grants is recorded • A liability to return emission rights for actual emissions made is recognised as well <p>=> IFRIC 3 Approach</p>
Evonik Industries AG (3)
<p>In 2009, 2008 and 2007 the accounting treatment for emission rights was consistently disclosed and applied as follows:</p> <ul style="list-style-type: none"> • Purchased emissions rights are recognised in inventory and measured at the lower of cost or net realisable value. A token amount is recognised for emission allowances allocated free of charge • Provisions are recognised for the obligation to return emissions allowances, if such allowances are available, at the amount capitalised for the respective number of allowances • If the return obligation exceeds the allowances capitalised, the difference is recognised at the average price for the three months preceding the reporting date <p>=> Net Liability Approach</p>

(1) Sources: BASF SE, Annual Reports 2008, 2009 and 2010; (2) Sources: Borealis AG, Annual Reports 2008, 2009 and 2010; (3) Sources: Evonik Industries AG, Annual Reports 2008, 2009 and 2010.

Table 6. Results of the analysis for metal producing and working industry

Salzgitter AG (1)
<p>In 2009, 2008 and 2007 the accounting treatment for emission rights was consistently disclosed and applied as follows:</p> <ul style="list-style-type: none"> • Emission rights are reported in inventories • Emission rights that were acquired for free are recorded at an acquisition cost of nil • Emission rights acquired against payment are recorded at acquisition cost. Profits are realised in the event of a sale only <p>=> Net Liability Approach</p>
SSAB AB (2)
<p>In 2009, 2008 and 2007 the accounting treatment for emission rights was consistently disclosed and applied as follows:</p> <ul style="list-style-type: none"> • Emission rights are initially valued at acquisition cost. Emission rights are reported as intangible assets with an acquisition value of SEK 0 • Provisions are made if a shortfall in emission rights is identified between rights owned and the number of rights to be delivered due to emissions produced <p style="text-align: center;">=> Net Liability Approach</p>
ThyssenKrupp AG (3)
<p>For the financial years 2006/07 and 2007/08 the company disclosed and accounted for emission rights as follows:</p> <ul style="list-style-type: none"> • The rights are capitalised at cost as an intangible asset • If the emissions are expected to exceed the amount covered by the available allowances, the Group records an obligation for the purchase of additional allowances <p>=> Net Liability Approach</p> <p>For the financial year 2008/09 the accounting for emission rights is not disclosed</p> <p>=> No disclosures</p>

(1) Sources: Salzgitter AG, Annual Reports 2008, 2009 and 2010; (2) Sources: SSAB AB, Annual Reports 2008, 2009 and 2010; (3) Sources: ThyssenKrupp AG, Annual Reports 2007, 2008 and 2009.

Table 7. Results of the analysis for paper and pulp industry

Holmen AB (1)
<p>In 2009, 2008 and 2007 the accounting treatment for emission rights was consistently disclosed and applied as follows:</p> <ul style="list-style-type: none"> • Emission rights are initially recognised at market price and recorded as intangible assets (in financial years 2007 and 2008) or as inventory (in financial year 2009) and as deferred income • During the year the allocation is recognised as income at the same time as an interim liability, corresponding to emissions made, is expensed <p>=> Remainder Value Approach</p>
M-Real Oyj (2)
<p>In 2009, 2008 and 2007 the accounting treatment for emission rights was consistently disclosed and applied as follows:</p> <ul style="list-style-type: none"> • Emission allowances free of charge are initially recognised as intangible assets and the corresponding government grant as advance payment in liabilities based on the fair value at the date of initial recognition • The emissions produced are recognised as cost and as liability together with the corresponding government grant as income both based on the value at the date of initial recognition. So rights consumed that are within the original range have no effect on profit for the period • The costs of purchasing additional rights to cover excess emissions or the sale of unused rights is recorded in the profit and loss statement <p>=> Remainder Value Approach</p>
Stora Enso Oyj (3)
<p>In 2009, 2008 and 2007 the accounting treatment for emission rights was consistently disclosed and applied as follows:</p> <ul style="list-style-type: none"> • Emissions allowances (including government grants) are recorded as intangible assets and measured at fair value at the date of initial recognition • The liability to deliver allowances is recognised based on actual emissions; this liability will be settled using allowance on hand, measured at the carrying amount of those allowances, with any excess emissions being measured at the market value of the allowances at the period end <p>=> Remainder Value Approach</p>

(1) Sources: Holmen AB, Annual Reports 2008, 2009 and 2010; (2) Sources: M-Real Oyj, Annual Reports 2008, 2009 and 2010; (3) Sources: Stora Enso Oyj, Annual Reports 2008, 2009 and 2010.

Table 8. Results of the analysis for glass and ceramics industry

Gerresheimer AG (1)
<p>In 2009, 2008 and 2007 the accounting treatment for emission rights was consistently disclosed and applied as follows:</p> <ul style="list-style-type: none"> • Non-monetary government grants are recorded at nominal value. Emission allowances purchased from third parties are recognised at cost • Obligations from the emission of pollutants are not considered until the actual level of emission exceeds the existing emission allowances granted. The obligation is then recognised at the respective fair value of the emission allowances <p>=> Net Liability Approach</p>
Compagnie de Saint Gobain (2)
<p>In 2009, 2008 and 2007 the accounting treatment for emission rights was consistently disclosed and applied as follows:</p> <ul style="list-style-type: none"> • Emissions allowances granted free of charge have not been recognised as assets in the consolidated accounts, as IFRIC 3 – Emission Rights has been withdrawn • A provision is recorded in the consolidated financial statements to cover any difference between the company’s emissions and the allowances granted <p>=> Net Liability Approach</p>
Villeroy & Boch AG (3)
<p>In 2009, 2008 and 2007 the accounting treatment for emission rights was consistently disclosed and applied as follows:</p> <ul style="list-style-type: none"> • Emission allowances were carried at market value at the balance sheet date. Due to the free of charge distribution of those emission allowances, a deferred income was recognised and will be terminated after consumption • In return the creation of a provision occurs <p>=> Remainder Value Approach</p>

(1) Sources: Gerresheimer AG, Annual Reports 2008, 2009 and 2010; (2) Sources: Compagnie de Saint Gobain, Annual Reports 2008, 2009 and 2010; (3) Sources: Villeroy & Boch AG, Annual Reports 2008, 2009 and 2010.

Table 9. Results of the analysis for cement industry

Heidelberg Cement AG (1)
<p>In 2009, 2008 and 2007 the accounting treatment for emission rights was consistently disclosed and applied as follows:</p> <ul style="list-style-type: none"> • Emission rights are recognised in intangible assets and if granted free of charge are initially measured at a nominal value of zero • Provisions are recognised if a deficit exists <p>=> Net Liability Approach</p>
Holcim Ltd. (2)
<p>In 2009, 2008 and 2007 the accounting treatment for emission rights was consistently disclosed and applied as follows:</p> <ul style="list-style-type: none"> • The initial allocation of emission rights granted is recognised at nominal amount of nil • Where a group company has emissions in excess of the emission rights granted, it will recognise a provision for the shortfall based on the market price at that date <p>=> Net Liability Approach</p>
Lafarge S.A. (3)
<p>In 2009, 2008 and 2007 the accounting treatment for emission rights was consistently disclosed and applied as follows:</p> <ul style="list-style-type: none"> • Emission rights granted by governments are not recorded as they have a cost equal to zero • Provisions are recorded when estimated yearly actual emissions exceed the number of emission rights granted for the period or purchased to cover actual emissions <p>=> Net Liability Approach</p>

(1) Sources: Heidelberg Cement AG, Annual Reports 2008, 2009 and 2010; (2) Sources: Holcim Ltd, Annual Reports 2008, 2009 and 2010; (3) Sources: Lafarge S.A., Annual Reports 2008, 2009 and 2010.

All in all it can be concluded that all companies included in the analysis applied, with no exception (unless undisclosed), one of the following three approaches to account for emission rights:

- the IFRIC 3 approach
- the remainder value approach
- the net liability approach

For ThyssenKrupp AG the full analysis was not possible, the reason being that the disclosures related to the emission rights were not available throughout the three-year period under analysis. Most probably the main reason for this was the immateriality of the emission rights to the financial results as a whole.

In general it is worth noting that disclosures regarding accounting for emission rights do not go into great detail and are often not presented in a separate note or caption. They are also often not precise. This is most likely attributable to:

- Materiality perspectives.
- Lack of official guidance from the standard setters.

For three of the analysed companies it could not be identified on the basis of the financial statements disclosures alone if they apply the former IFRIC 3 approach or the remainder value approach. This issue is further discussed below.

Table 10 below provides information about the distribution of the applied accounting approaches per industry. The figures presented relate to the number of companies applying a specific accounting approach in a specific year. A summary across the years and across the industries shows the following:

- Overall the net liability approach is the most popular with roughly 70 % of all companies applying this accounting method. This comes as little surprise because the net liability approach has the least impact on the financial statements of all the approaches discussed. As long as there is no shortage of allocated allowances compared to emissions produced, no accounting entries are required and only very limited disclosures. However the company still needs to maintain a position sheet to have a permanent control over the allocated allowances.
- Only two companies out of 21 apply the former IFRIC 3 approach. And even for those two there is room for interpretation. As such disclosures are not precise enough but based on the information provided the conclusion was drawn that the IFRIC 3 approach has been applied.
- If we disregard the no disclosure field (related to ThyssenKrupp AG as discussed above) all companies apply the chosen approach consistently over time. This appears reasonable as under IFRS companies are required to consistently apply their accounting policies. According to IAS 8, Accounting Policies, Changes in Accounting Estimates and Errors, the change of the once chosen approach can only be done when applied retrospectively. Alternatively, if an accounting policy has been changed because an accounting standard has been changed or newly introduced by the accounting standard setters then no retrospective application is required. This would be the case if a new standard for emission rights accounting was issued.

Table 10. Overview of the results

Industry/ Approach	IFRIC 3			Remainder Value			Net Liability			No disclosures		
	2009	2008	2007	2009	2008	2007	2009	2008	2007	2009	2008	2007
Oil	0	0	0	0	0	0	3	3	3	0	0	0
Electricity	0	0	0	1	1	1	2	2	2	0	0	0
Chemical	2	2	2	0	0	0	1	1	1	0	0	0
Metal	0	0	0	0	0	0	2	3	3	1	0	0
Paper	0	0	0	3	3	3	0	0	0	0	0	0
Glass	0	0	0	1	1	1	2	2	2	0	0	0
Cement	0	0	0	0	0	0	3	3	3	0	0	0
Total	2	2	2	5	5	5	13	14	14	1	0	0

Within the defined industry groups the following can be observed:

- Within an industry the companies in tendency approach the accounting for emission rights in a similar manner. Most likely there are two reasons for this. The first reason is the existence of industry-established standards and practices. The second reason is that after a first company in the industry successfully publishes its financial statements its peer group follows the example. This can be often observed in practice.
- Oil, gas, and refining industry: All companies apply the net liability approach. Emission rights granted by the government are not recognised in the financial statements. A shortfall in emission rights will result in the recognition of costs on one side and a provision on the other side.
- Electricity industry: The selected companies show different accounting approaches. Whilst AXPO Holding AG and RWE AG apply the net liability approach, E.ON AG follows the remainder value approach.
- Chemical, pharmaceutical, and plastic industry: For BASF SE and Borealis the information provided in the disclosures is not unambiguous and it leaves doubt as to whether either the former IFRIC 3 or the remainder value approach has been applied. Still it seems most likely that the IFRIC 3 approach is applicable. Evonik Industries clearly applies the net liability approach, recognising a so-called token amount (€1) for the allowances granted by the government. Evonik Industries AG also presents its emission rights in inventory as opposed to intangible assets.
- Metal producing and working industry: All selected companies applied the net liability approach. ThyssenKrupp AG did not provide any disclosures in their 2008/2009 financial statements. Salzgitter AG reports their valued emission rights under inventory whilst the other two companies report them under intangible assets.
- Paper and pulp industry: A consistent accounting approach for emission rights following the remainder value approach could be observed.

- Glass and ceramics industry: Gerresheimer AG and Compagnie de Saint Gobain apply the net liability approach. Limited disclosures of Villeroy & Boch AG in respect to the measurement of the provision do not allow a definitive allocation of the accounting treatment. The conclusion drawn from the information provided is that the remainder value approach has been applied.
- Cement industry: Within the cement industry the net liability approach is consistently applied, with no exception.

CONCLUSION

Climate change is one of the biggest problems threatening our way of life and even life itself. Experts warn that without drastic action being taken to curb greenhouse gases, the world is on track to face catastrophic consequences long before the century's end. So the heat is on. Since 1990 there has been a series of attempts to address this problem on a global scale, the latest being the Copenhagen Summit in 2009. Unfortunately the summit was a disappointment, confirming that a global climate change agreement is not happening, at least not in the near term. There are many disagreements over the level of emissions cuts required, the timetable for cuts and how the burden of emissions reductions should be shared among the developed and developing world. There is still hope however, and the attempt to reach a global climate agreement continues. Should this be achieved, and countries move to cut emissions, then businesses will have to change enormously. As world leaders strive to broker a deal on climate change that would succeed the Kyoto Protocol, companies are struggling to give a true and fair report of the implications of the existing climate policies to their stakeholders.

Of the tools introduced to combat climate change, emission trading schemes are one of the largest and most successful. They represent a market-based tool aimed at limiting the greenhouse gas effect. Chapter one presents an overview of the current state of carbon markets and shows that various international, national and regional markets have already developed while others are still developing. The European Union Emissions Trading Scheme is the largest carbon market and dominates the international trading activities in cap-and-trade markets. Despite the financial crisis and some other negative events the EU ETS has managed to gain the trust of the participating companies, financial institutions and investors and has become a well-established market, giving the world a signal that emission trading schemes can be reliable and effective.

While carbon markets have been developed and significant progress has been achieved in applying market-based approaches to control climate change, we are now faced with a different problem, namely how to account for the effects of these efforts on the balance-sheets of various corporations. The extent of the complexity of accounting for emission rights is presented in chapter three. The conclusion reached is that it will be difficult for the standard setters to develop a uniform approach to emission rights accounting under the

current framework and the mixed model standards. Currently both global accounting standard setters, the IASB and the FASB, are jointly approaching the problem of accounting for emission rights; however, the emission rights project is among the lowest priority projects and a final standard is not expected before the end of 2012.

Lack of authoritative guidance has created a kind of “accounting anarchy”. Several empirical analyses have identified a wide variety of accounting treatments currently used in practice. Professional literature on the other hand defines three main accounting treatments for emission rights which have different effects on the different components of financial statements (i.e. balance sheet, profit or loss or cash flow statements). Empirical analysis conducted for the purposes of this thesis has confirmed that there is a variety of accounting treatments for emission rights applied in practice. Despite this multitude of approaches, all identified accounting treatments could in broader terms be classified as one of the three theoretical approaches.

An empirical analysis of the financial statements’ disclosures of 21 companies subject to the EU ETS showed that the disclosures regarding the accounting for emission rights do not go into great detail and are often not presented as a separate note or caption. Also companies prefer accounting treatments which require the least accounting entries and consequently very limited disclosures (i.e. the net liability approach). Under the net liability approach the emission allowances granted by a government is not recognised in the financial statements at all. Only a shortfall in emission allowances will result in the recognition of costs on one side and a provision on the other side. Finally, the analysis revealed that the companies applied the chosen approach consistently over time and that within an industry the companies tend to approach the accounting for emission rights in a similar manner.

The illustrative example in chapter five proved that different accounting practices will ultimately have the same profit and loss impact but will result in different balance sheet presentation and different profit and loss impact within the period under analysis. This could not only have implications on the financial performance reported within a period (i.e. in case of quarterly reporting requirements), but could certainly also influence the company’s decisions on how to manage its operations related to the emissions trading scheme. As such, the potential materiality of these accounting items necessitates the need to design and implement internal controls around the measurement and estimation process that are sufficient for financial reporting.

However, until a set of firm rules is established, the emphasis must be on the preparers of financial statements, and their auditors, to ensure that the approaches adopted in respect of the accounting for the emission rights present a true and fair view of their impact on an entity’s performance and operations. With climate change and carbon reporting moving further up the public and corporate agendas, the importance of transparency and

comparability in this area has never been greater. While a global deal on climate change is highly urgent it is becoming increasingly clear that an “accounting deal” on climate change is also highly desirable.

Climate change will put all businesses at risk. At risk of change. The reality is that the industry is not supportive of any climate change legislation at this time. With the economy teetering on the brink of a double dip recession this would seem like the wrong time to risk change. The industry is arguing that the focus should be on efforts to create economic growth and not risk erecting further barriers to it.

But while posing a threat to certain industries and companies, the efforts to cut emissions will also open up vast new economic opportunities. Global investment in renewable energy and other clean technologies is increasing. Alternative energy companies are the most obvious beneficiaries, however all companies can benefit from reducing their costs by using their energy more efficiently. One of the prerequisites for changing this perception of climate change as risk and replacing it with a new vision of climate change as opportunity for growth is stable, well defined, clearly understood and easily implementable accounting standards for measurement and reporting of costs of pollutants and approaches to address these complex issues. This thesis is an attempt to further that cause through a survey of the existing accounting treatments and a brief inquiry into their advantages, disadvantages and practical applications.

Based on the assumption that there is a high positive correlation between corporate reporting and behaviour it can be concluded that the extent to which corporations across the globe embrace climate change reporting will be critical to the future of the planet. Bearing this in mind it can be said that developing an effective accounting standard for emission rights is perhaps the most important task for the accountancy profession in the near future.

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APPENDICES

TABLE OF APPENDICES

Appendix 1-List of Abbreviations Used	1
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Appendix 1-List of Abbreviations Used

AB	Assembly Bill
ASC	Accounting Standards Codification
CDM	Clean Development Mechanism
CER	Certified Emission Reductions
CH ₄	Methane
CO ₂	Carbon Dioxide
COP	Conference of the Parties
CRC	Carbon Reduction Commitment
DJP	Democratic Party of Japan
€	Euro
EC	European Commission
ECX	European Climate Exchange
EEC	European Economic Community
EEX	European Energy Exchange
EFRAG	European Financial Reporting Advisory Group
EITF	Emerging Issues Task Force
EPA	Environmental Protection Agency
ERU	Emission Reduction Unit
EU	European Union
EUA	European Union Emission Allowance
EU ETS	European Union Emission Trading Scheme
EUR	Euro
EXAA	Energy Exchange Austria
FASB	Financial Accounting Standards Board
GHG	Greenhouse Gas
HB	House Bill
HFC	Hydrofluorocarbon
IAS	International Accounting Standards
IASB	International Accounting Standards Board
JI	Joint Implementation
IFRIC	International Financial Reporting Interpretations Committee
IFRS	International Financial Reporting Standards
MT	Metric Ton

mtCO ₂ e	Equivalent to 1 Metric Ton of CO ₂
N ₂ O	Nitrous Oxide
OTC	Over-the-Counter
PFC	Perfluorocarbon
RGGI	Regional Greenhouse Gas Initiative
sCER	Secondary Certified Emission Reductions
SEC	Security and Exchange Commission
SF ₆	Sulphur Hexafluoride
UK	United Kingdom
UNFCCC	United Nations Framework Convention on Climate Change
US	United States (of America)
US GAAP	United States Generally Accepted Accounting Principles
VAT	Value Added Tax
WCI	Western Climate Initiative