



Accounting for Greenhouse Gases

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Abstract

This paper attempts to study the main accounting perspectives regarding emission allowances with a special focus on the derived problems of accounting divergence due to the lack of specific guidance addressing the accounting issues of this particular area. With that purpose, the study will introduce the fundamental accounting issues concerning GHG emissions. The current state of both international and some national GAAP (IFRS, U.S. and Spanish) related to GHG emissions is discussed below along with the diversity in existing practices. This accounting divergence hinders the ability of shareholders, regulators and creditors to truly understand the firms' financial situation since it undermines the comparability of financial statements. Therefore, the ultimate goal of this report is to show the need for formal accounting guidelines concerning the recognition, measurement and disclosure of emission rights, highlighting the significant impact of emission gases on firms' accounting and financial statements.

JEL classification codes: M41; M48; Q53

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Abbreviations

ACRONYMS	FULL NAMES
ACCA	Association of Chartered Certified Accountants
AEA	American Economic Association
CDM	Clean Development Mechanism
CEA	Carbon Emission Allowances
CER	Certified Emission Reduction
CO2	Carbon dioxide
DECC	Department of Energy and Climate Change
EA	Emission Allowances
EC	European Comision
EFRAG	European Financial Reporting Advisory Group
EITF	Emerging Issues Task Force
EPA US	Environmental Protection Agency
ERC	Emission Reduction Credit
ERU	Emission Reduction Unit
ETS	Emissions Trading System
EU	European Union
EUA	European Union Allowances
EU ETS	European Union Emissions Trading Schemes
FASB	Financial Accounting Standards Board
FERC	Federal Energy Regulatory Commission
GHG	Greenhouse Gas
GAAP	Generally Accepted Accounting Principles
IAS	International Accounting Standard
IASB	International Accounting Standards Board
IASC	International Accounting Standards Committee
ICAC	Instituto de Contabilidad y Auditoria de Cuentas (Spanish Accounting and Audite Institute)
IETA	International Emissions Trading Association (IETA)
IFRS	International Financial Reporting Standards
IFRIC	International Financial Reporting International Committee
JI	Joint Implementation
NAP	National Allocation Plans
OECD	Organization for Economic Cooperation and Development
REC	Renewable Energy Certificate
SEC	Security Exchange Commission
SIC	Standards Interpretations Committee
UN	United Nations
US	United States
US GAAP	United States Generally Accepted Accounting Principles
UK	United Kingdom

“Accounting For Greenhouse Gases”

1. Introduction

As a result of the rising concern over climate change around the world, the Kyoto Protocol was signed in 1997 with the aim of mitigating global warming the reduction of greenhouse gas emissions in the signatory countries (Kashyap, Steenkamp & Rahman, 2011, pp 4). These Greenhouse gas emissions are, among others, one of the pollution business activities that have larger social and environmental impact, reflecting a cost which is widely known as externality. It is well known that one way of efficiently reducing global emissions, pollution levels and forcing companies to bear a larger part of these costs is the creation of cap and trade systems. These facilitate the ability to put a price on gas emissions encouraging them to be cut. Hence, as Aguilar (2011) argues, emission trading systems (ETS) limit the firms' ability to produce GHG emissions to the amount of emissions rights held and incurring costs if this limit is exceeded, either by paying a fine or buying extra credits from other more efficient companies.

As a result of these reasons the European Union (EU) decided on the creation of the so-called European Union Emission Trading System (EU ETS) as the best instrument to achieve this commitment to emissions reduction. The EU Directive on EU ETS transforms GHG emissions into a production cost of participating entities thus, making them scarecer and giving them value, just like another necessary input factor (capital, labour force). Therefore emission allowances have become business rights which bring potential benefits to the firm (Andor & Fazekas ,2008). However, the absence of formal accounting guidelines regarding the ownership, use and trading of emission allowances results in a number of different accounting approaches adopted for market participants which, as many authors agree (Ernst&Young, 2009; Kashyap, Steenkamp & Rahman, 2011), potentially undermines the comparability of financial statements.

A number of key issues arise from this problem. On the one hand, there are several possibilities to classificate emission rights as assets, for example, depending of their intended use by the firm or regardless of the accounting principles and criteria of each country. On the other hand, focusing on the EU ETS may be found a number of accounting treatments for allowances under the existing IFRS. This regulatory framework

provides entities some guidelines to address the asset, liability and possible government grant which arise from emissions trading. However, it appears to be unable to shake off diversity and provide the clear and uniform information required from entities.

This research focuses on the analysis of the fundamental accounting issues regarding GHG emissions from an international perspective. Hence, the purpose of this study is to demonstrate the lack of international standards addressing accounting for emission rights and to address the problems concerning accounting diversity as a result of this absence. This study finds that the variety of accounting policies adopted by firms can impact their financial accounts very differently and make them inconsistent. Thus, the ultimate goal is to show the critical need of formal accounting guidelines concerning the recognition, measurement and disclosure of emission rights. Bearing in mind the growing prominence of emission rights as well as their significant impact on firms' financial statements, the present problems involving their accounting treatment offer an interesting case study for regulators, investors and creditors who need properly estimate firm's results. So, the research will be developed in several stages:

First, in order to contextualize the accounting implications of emissions trading, the present study starts providing a theory framework involving Greenhouse gases, the Kyoto protocol, emission allowances and ETS. So, the paper aims to start providing a reasonable understanding of this arisen environmental problem as well as the potential and the weaknesses of the many key elements which have been created to deal with it.

In the second section, the paper continues giving a brief overview about the benefits of international accounting standards and the initiatives developed by majors accounting setting bodies for supporting the harmonization process and financial comparability. This overview is a helpful item to reach the main target of the study, which is to address the main problems closely linked to the accounting for emission allowances due to the absence of international specific guidance. So, the paper follows by analyzing these key problems and then moves to highline the accounting and reporting effects of GHG emissions on firms' financial statements.

As far as accounting issues are concerned, the study reviews the main problems related to the classification of emission rights as assets due to their wide variety of possible uses. Then, our analysis concentrates on the role of those international and domestic financial accounting bodies who have engaged with climate change. So, the assignment describes the main regulatory efforts concerning the accounting of emission

rights paying special attention to the IFRIC 3 interpretation and the reasons for its main mismatches and consequent weaknesses.

Then, the last section describes the main approaches regarding recognition and valuation of emission allowances into the EU ETS, which rely on a combined interpretation of the existing IFRS provisions. Finally, some conclusions are drawn related to the main aspects of this research.

2. Review Strategy

To develop this study on the fundamental accounting issues of Greenhouse gas emissions I have decided to carry out a detailed review of existing literature by checking and comparing data from various sources and economic journals. The research strategy is to collect sufficient data to address the study's main research questions. On the one hand, some of the books, papers and studies analyzed have been obtained through a list of references that were provided by the tutor of this work. These documents have been found using electronic databases or through the library catalogue to find the books available in the university library.

On the other hand, the data collection method uses several strategies focusing primarily on economics literature and on electronic resources. The first step consisted of seeking information through the databases available online in the library website of the University Jaume I. Primarily the information has been identified through specialized journals, economics articles, books and working papers via 'Econlit'. This journal website contains a search engine to search the specific issue by subject. Some of the key search terms that were used are 'accounting for greenhouse gases or emission rights', 'cap and trade systems', 'international accounting standards', 'accounting harmonization' and 'Kyoto Protocol' among others. Secondly, some of the analyzed literature has been found through the app Google academics by introducing the adequate key terms in the search tool.

According to the reliability criteria, I have analyzed critically the available material to ensure that it is based on verifiable data and is trustworthy. Once verified that the texts can be safely used as a resources, distinct methods have been adopted to appropriately assess the large amount of information provided by the different sources. In the first place

I started reading the abstract as well as the conclusion to find out if a concrete article would be relevant to my work. Then I skimmed the text to identify the principal ideas and useful sections of the paper. The next step was to scan the text to extract the specific necessary information from the useful sections. The ultimate step was to read intensively to make notes on the key points.

In the first place, the literature review is developed in order to create a conceptual framework to define the fundamental items related to the topic (Kyoto protocol, carbon emissions, cap and trade systems or emission rights, among others). This theoretical conceptualization aims to allow a subsequent greater understanding of the study. In this part the data sources were several working papers and websites of regional and international organizations and institutions such as the United Nations (UN), the Department of Energy and Climate Change (DECC), or the European Commission (EC).

Next, the method is to visit the websites of the main setters of accounting standards to obtain reliable data about their efforts towards the harmonization process as well as their attempts to provide guidance for accounting emission rights. Furthermore, a review of different journal articles and papers dealing with the issue has been carried out. In the next phase, the literature review is conducted by assessing how firms are able to choose alternatives of emission allowances as assets, showing the different arguments suggested for each possible classification due to the continued lack of an authoritative common standard. Afterwards, relevant literature on accounting standards is revised in order to underline significant regulatory efforts provided by the main accounting standards setters to account for gas emissions.

The research's accounting practices section was developed by undertaking a literature review of secondary sources on the main accounting approaches carried out in the EU ETS by firms, in order to truly understand the carbon emissions impact on their financial statements. I focused on several accounting practices concerning the recognition, measurement and disclosure of emission allowances. The literature mainly emphasizes accounting treatments derived from the IFRIC 3 application on a voluntary basis under the existing IFRS framework and the allowance consideration as an intangible asset. In this section several researches have been found that provide survey results involving accounting choices of EU ETS participants, which show the main accounting treatments of allowances under this scheme. In this line, all the studies come to the same conclusion:

emitters are using a diversity of accounting policies and there is no homogeneous treatment for allowances.

3. Greenhouse Gases and the Kyoto Protocol

Climate change is at present one of the most important environmental problems in the world and as Shah (2013) has indicated, it is caused primarily by the increase in greenhouse gases (GHG) such as Carbon Dioxide (CO₂). Greenhouse gases are air pollutants in a gaseous state which act by absorbing thermal radiation from the earth's surface and warming the atmosphere by trapping the heat in it (EIA, 2004). However, it should be established from the very outset that, according to the EPA (2007) greenhouse effects are naturally occurring over time and are even necessary to support life on earth.

However, it can be asserted that the main reason for the problem of climate change is human activity, principally the burning of fossil fuels for energy, since they are responsible for the increase of air pollution and for the high concentration of greenhouse gases in the atmosphere (Kashyap, Steenkamp & Rahman, 2011). Therefore, the key to global warming is that GHGs is responsible for spreading the greenhouse effect, possibly leading the planet to dangerous climate change. As Tol (2009) stated "Weather affects agriculture, energy use, health and many aspects of nature". Consequently, climate change might be critically destructive to ecosystems and global economies.

In response to global concern to constrain average temperatures, due to the increase in global warming, the Kyoto Protocol was signed by 175 countries on 11 December 1997 coming into force on 16 February 2005 (United Nations, 2012). Its ultimate goal is to limit climate change and reduce greenhouse gas emissions around the world.¹ From the point of view of climate change, it is irrelevant where emissions are reduced, since the effects of climate change occur globally and solutions must also be implemented globally. Under the Protocol, countries establish their own methods to curb emissions and achieve their targets (Domestic Measures). In addition, according to Kashyap, Steenkamp & Rahman review (2011), the Protocol also sets out three innovative market-based mechanisms (Flexibility Mechanisms) to motivate green investment and GHG emissions reduction in a

¹ In this regard, the Kyoto protocol establishes goals to cut emissions for 37 developed countries which must reduce their overall emissions by an average of 5,2% below 1990 levels to the first commitment period (to 2008 from 2012) (United Nations, 2012).

cost-effective way: international emissions trading systems (ETS), joint implementation (JI) and the clean development mechanism (CDM). These three instruments have been defined by the United Nations Framework convention on Climate Change as follows (United Nations, 2012):

1. *The Joint Implementation mechanism (JI)* provides Annex I or industrialized countries² with the opportunity to easily reach their Kyoto targets by investing in projects to reduce GHG in other developed economies. In this way, the investing country gets additional emission credits by means of Emission Reductions Units (ERUs), that they can use to fulfill their Kyoto obligations. On the other hand, the host country benefits from investments in clean technologies in its territory. These mechanisms are designed for use mainly in Eastern Europe and the Maghreb.
2. Another flexibility measure introduced by Kyoto treaty is the *Clean Development Mechanism (CDM)* which allows industrialized countries to buy carbon credits for financing emission-reduction projects in developing countries. The target is to promote their sustainable development and prevent the increase of global warming. As a result, the investment companies obtain emission credits as Certified Emission Reductions (CERs) that allow them to comply with their commitments under the protocol .

Both mechanisms allow investing countries to increase their flexibility to achieve their Kyoto targets because one CER or ERU represents an emissions reduction equivalent to one tonne of dioxide. As can be seen, the main difference between both Kyoto mechanisms is that JI project takes place only between developed countries with an emission-limitation target and CDM are realized in developing countries which have not adopted legally GHG reduction duties and where emission cuts are usually cheaper.

3. The ultimate measure of the Kyoto protocol is *Emissions Trading Schemes (ETS)*. Countries whose emissions are below their reduction target levels (assigned amounts) can sell their surplus " allowances " to countries that exceed. So, ETSs are markets that have been created to sell and purchase emissions allowances (EA) and they are one of the most relevant measures of the policy response to Global Climate Change since they offer firms great incentives for carbon reductions

² Go to https://unfccc.int/parties_and_observers/parties/annex_i/items/2774.php to see the list of Annex I countries under the Kyoto protocol.

(Kashyap, Steenkamp & Rahman, 2011). Moreover, as Souchik (2012) presumes, cap and trade regulations maintain entities more accountable for their negative impacts on the environment by forcing them to internalize the costs of pollution since they have to pay to pollute over their limits.

Nowadays, ETS are being extended at both national and international levels and they resulting in a direct impact on corporate performance and accounting practice. The operation of this relevant measure will be explained in more detail in the following section.

As we can see, all these flexibility mechanisms turn greenhouse gases into marketable products, and even they seem to be innocuous, this may not be true. They allow industrialized countries and their companies to buy the right to pollute and not to have to meet the minimum commitment under the Kyoto Protocol, consolidating the existing inequality between developed and developing countries, regarding the use of the atmosphere and natural resources flexibility mechanisms. All low price credits will be held in hands of developed countries and when the time arrives for developing countries to reduce their own emissions, they will only be able to access the more expensive options.

4. Carbon Emission Allowances and Emission Trading Systems.

Carbon Emission Allowances (CEA) or Emissions Allowances (EA) may be defined as a new commodity which have been created as a form of emission reduction (United Nations, 2012). The Law 13/2010 of 6 July defines them as *“licenses or rights to emit an equivalent ton of carbon dioxide from an installation during a certain period of time”*. However, as some views have argued (Giner, 2007, p.177) these emission rights should not be considered as permissions to produce emissions. In actual fact it would be more accurate to say that allowances are payment units used by companies in order to meet the obligations arising from pollution. Thus, there are two views regarding allowances; they may be considered as a right or as a method of payment to fulfill the obligation.

Emission rights appear with one of the three protocol's measures: the emission trading schemes and cap and trade systems. However, the other protocol mechanisms (JI and CDM) also use different Kyoto certificates (ERU and CER) which, in several cases, have been recognized as equivalent of CEA in the ETS.

In line with the goals of the Kyoto protocol, Emissions trading Schemes (EST) under the Cap and Trade systems (as the European Emissions Trading Scheme) allow the effective control and reduction of pollution degree and GHG emissions by setting limits on total corporations' emissions for a period of time. To do this, a government entity fixes a cap by issuing only a certain amount of tradable emission allowances to achieve the wished pollution level. The government will gradually reduce the available EAs each period in order to reach desired level of GHG reduction (Elfrink & Ellison, 2009).

Initially, allowances may be freely allocated from a regulatory body (at no cost or at a cost that is less than fair value) or they also may be sold to specific entities through auctions. Then, entities may obtain extra permits through a purchase from other market participants. In this regard, emission allowances may be classified into two main groups: granted (allocated) emissions allowances and purchased emissions allowances. Each credit gives firms the right to achieve a certain volume of emissions during the ordinary course of business and total volume of credits cannot exceed the cap, so total firm's emissions are limited by that amount (Mookdee, 2013). Firms that pollute more than their rights must buy allowances from those who pollute less. So, ETS let the entities reduce pollution and increase profit, by selling their unneeded rights in the market, or pay an additional price and increase expenses, if they wish to increase emissions above their limit (Kashyap, Steenkamp & Rahman, 2011).

When the compliance period is finished, participants have to deliver CEA according to their emissions, so if these are higher than their allowances polluters must pay a fine. After the regulatory period, emitters can save their unused emission rights to be used in the future or they can trade them in the market and make a profit (Souchik, 2012). In this way, ETS gives companies a direct financial incentive to curtail their GHG emissions through trading, as the buyer has to pay a charge for polluting, while the seller obtains a reward for having reduced emissions by more than was needed (European Union, 2009; Deloitte, 2007).

According to Bebbington & Larrinaga (2008) there are significant financial implications from carbon accounting and reporting for those organizations who are part of cap and trade systems. One of the most striking aspects of emission trading markets may be the impact on the industrial sector and on the prices of goods and services to consumers. It is due to losses and profits resulting from the use and trade of the EA which alter prices and has an impact on the company's competitiveness in the primary market. But as Souchik

(2012) states, economic activities derived from trading systems, can also have a large-scale impact on corporate decisions, modifying financial performance and the net worth of companies. So, they are able to change long-term company activity. For example a firm may increase their investment in technology in order not to pollute which may be more attractive than paying for having pollute.

A range of multinational, national and regional emission trading schemes have been and are now being developed by countries around the world, helping to reduce global GHG emissions more cost-effectively, while in other regions, governments are in the process of setting legislations in order to achieve this goal. However, it is interesting to focus on the European Union Emission Trading System (EU ETS) which is by far the largest and most established scheme in the international carbon market (Kashyap, Steenkamp & Rahman, 2011) . From an accounting perspective, it results in different GHG accounting practices among the different carbon-emitting entities involved.

The EU emissions trading system (EU ETS) became operational in 2005 as a means to help the European Union (EU) member states to achieve their global emission reduction goal of 8% below 1990 levels. The scheme aims to achieve this EU target in a cost effective-way with the purpose of avoiding dangerous climate change. Then, in March 2007, this reduction's commitment was reinforced to achieve a reduction level at least 20% below 1990 levels³ (Bebbington & Larrinaga, 2008).

As the British Department of Energy and Climate Change published (DECC, 2012), the scheme was established by the 2003/87/EC Directive (2003) of the European Parliament and of the Council (EC Directive 2003/87/EC, 2003)⁴ and it comprises three trading phases or "commitment periods". The first ran from January 2005 to December

³ The EC Directive 2009/29/EC (2009) aims to start up a set of measures to fulfill the commitment assumed by the European Council in March of 2007: to reduce for 2020 the global gas emissions of the Community at least 20% below 1990 levels, and a 30% whenever other developed countries would make comparable reductions and the more developing advanced countries are committed to contribute in function of their responsibilities and capacities.

⁴ Between November of 2008 and April of 2009 were approved two directives which review 2003/87/CE to reform the European emission trading and widening their scope of application. For one, the 2008/101/CE (2008) directive included aviation sector emissions in the Community scheme. Meanwhile, the directive 2009/29/EC (2009) reviews Community scheme to harmonize the system, to get more benefits, to avoid distortions in the internal market and to facilitate the linking of trading. Further, it aims to increase the predictability and expand the scope to new sectors and gases.

2007, the second from January 2008 to December 2012, at the same time that the first commitment period of the Kyoto Protocol, and the third period started in January 2013 until December 2020. Furthermore, these commitment periods are subdivided into “compliance periods” in line with the calendar year (from 1 January until 31 December). At the end of the first commitment period in phase I, the allowances not delivered became invalid, but later in phase II unused rights may be passed on to the next period, which is known as banking (Souchik ,2012, p.479).

In order to start the third phase, the 2003/87/EC Directive was modified by the EC Directive 2009/29/EC that introduces a new EU-wide cap on emissions, which will be reduced over time. So, with the aim to achieve effectively the EC target to at least 20% reduction in gas emission below 1990 levels, the directive established a total reduction of allocated allowances of 21% below their 2005 verified emission levels by 2020 (Directive 2009/29/EC, 2009). Moreover, considerable changes are expected in phase III of the EU ETS (2013–2020) that will have implications for financial reporting: the majority of allowances will be auctioned rather than granted by the government, harmonization rules for the remaining allocations will be introduced and new sector and gases integrated (Lovell et al. 2010, p.5). The European Commission (2006) maintains that the scheme provides industries a cost-effective form to cut their own emissions with the ultimate purpose to allow the EU to reach their reduction target at a cost of below 0.1% of GDP. Moreover the scheme also promotes great investments and clean technology to developing countries, helping them to hit sustainable development. In 2013, the EU ETS covers more than 11.000 heavy- energy consuming factories, power plants and commercial aviation, in all 28 EU member states plus Iceland, Norway and Liechtenstein.

Under this scheme, that works on the "cap and trade" principle as in the USA, the governments of the EU Member States elaborate National Allocation Plans (NAPs) that distribute a precise number of European Union Allowances (EUAs) to each industry. Therefore, they fix an emission target, setting caps on the total amount of GHG that can be emitted by installations (Mookdee, 2013).

Firstly, the EUAs are allocated for free or auctioned off to carbon-emitting entities, and at the end of the calendar year, these entities must surrender sufficient EUAs to cover their annual emissions to the national registry. So, firms that have succeeded in cutting emissions can carry their surplus permits over to future years (banking) and can also sell them to others in the market (trade). On the other hand, firms that have not sufficient EUAs

to match their emissions must buy additional rights in the secondary market if they wish to pollute beyond their limit.

The *CDM* and the *JI* are Kyoto mechanisms that allow developed countries to invest in emission-saving projects in both developing and developed countries in order to obtain credits known as CERs and ERUs which enable companies to fulfill their commitments more easily. According to the DECC (2012), the 2004/101/EC Directive of the European Parliament and of the Council recognizes CERs and ERUs as equivalent to EU emission allowances, except for those generated by nuclear installations, land use and forestry activities. Therefore, it enables JI and CDM investors to use their Kyoto certificates in the EU ETS to cover their GHG emissions with the aim of reaching lower compliance costs.

5. Accounting Divergence, IFRS Benefits and Regulatory Efforts Towards Accounting Armonization

International accounting diversity and the need for financial report harmonization has acquired a high importance with the increase of capital markets' globalization and world-wide demand for equity capital. The main issues involving the emissions of Greenhouse gases bring us a notable insight from the complexity of classifying and standardizing the new problems and impacts arising from climate change. So, this promotes greater consideration of the main regulatory efforts of many agencies to harmonise accounting practices across countries.

Despite the above mentioned efforts, it can be said that there is no specific international standard or consistent guidance addressing the accounting of emission rights. This lack results in a number of different accounting approaches adopted by market participants, which as many authors have already argued, undermines the comparability of financial statements. In this regard, international accounting standards have demonstrated their ability to avoid accounting diversity and protect the stakeholder's interests (Rülh, 2011, p.80). Given these concerns, it is widely assumed that accounting harmonization is the best method to eliminate the clear diversity in emission rights accounting as a common standard regarding emission allowances would allow all emitting firms to account for this particular asset in the same way.

The accounting harmonization process attempts to form a common set of high-quality accounting standards that can be commonly used by all countries around the world, for both domestic and cross-border financial reporting (FASB, 2012b; Tarca, 2012; Rülh, 2011). So, according to Casado (2010) accounting convergence seeks to guarantee compliance with the fundamental principles of financial reporting: to protect the interests of investors and other stakeholders by giving them reliable information and ensuring the comparability of financial reporting across countries.

The harmonization and convergence efforts developed have led to the publication of International Financial Reporting Standards (IFRS) and there is a large amount of accounting literature that outlines the benefits from their application (see Figure 1).

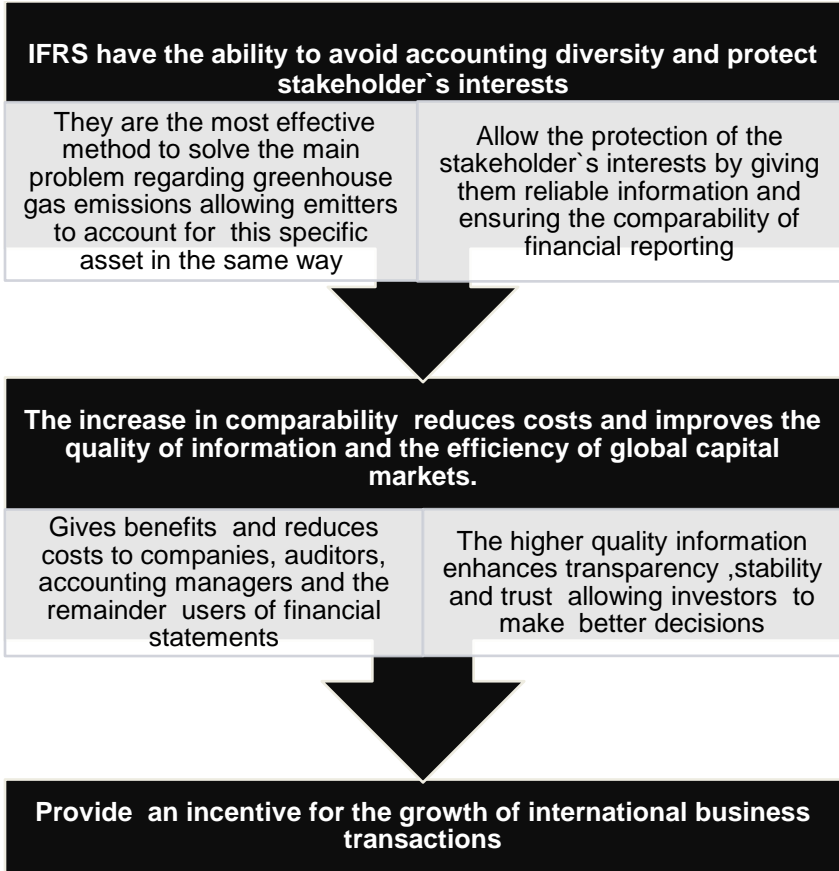


Figure 1. The benefits of International Accounting Standards

In this way, Rülh (2011, p.80) points out that their existence is essential because they allow- the improvement of the consistency and comparability between accounting practices across countries. As she claims, if each country has their own local accounting standards, shareholders and other market participants would require a high knowledge of them to

truly understand the firms' financial situation. Moreover, investors may have difficulty in evaluating potential investments and make successful decisions, if accounting rules differ from country to country and there is a lack of comparability of their financial statements. According to the Financial Accounting Standard Body (FASB) (2012), another argument in support of IFRS benefits is that the increased comparability tends to result in a benefit for companies, auditors and remainder users of financial statements since it might both reduce costs and increase the effectiveness of global capital markets.

As Tarca (2012, p.1) argues "When the standards are applied rigorously and consistently, capital market participants will have higher quality information and can make better decisions". The quality of information is crucial as it contributes to enhance transparency, stability and to create trust because it allows appreciation of the risks and volatility that tend to illustrate market economy (IFRS, 2013; Rülh, 2011, p.81).

Therefore, the ultimate goal of harmonization towards IFRS is to reduce costs for multinational corporations who take part in capital markets and to enable investors to make easy comparisons between firms making proficient potential investments.

In this regard, many international, regional and both public and private organizations have developed initiatives to international convergence, but these efforts are unlikely to shake off accounting diversity. Focusing on the collaborative efforts towards international accounting comparability, the activities carried out by the International Accounting Standards Board (IASB), the Financial Accounting Standards Board (FASB) and the European Financial Reporting Advisory Group (EFRAG) can be emphasized.

The primary international standards-setting body was created in 1973 as the International Accounting Standards Committee (IASC) and in 2001 it was restructured into IASB (FASB, 2012). The IASB is currently operating under the oversight of IFRS Foundation. It is an independent standard-setting board responsible for the elaboration and publication of International Accounting Standards (Deloitte, n.d) ⁵.

These standards consist of:

- ✓ International Accounting Standards (IASs). IASs which were issued by the IASC, predecessor of IASB till 2000.

⁵ See <http://www.iasplus.com/en/resources/regional>

- ✓ Standards Interpretations Committee (SICs). SIC were standards interpretations issued by the Standards Interpretations Committee, predecessor of IFRIC till 2002.
- ✓ International Financial Reporting Standards (IFRSs). IFRS are the current global standards issued by the IASB.
- ✓ International Financial Reporting Interpretations Committee (IFRICs). IFRICs are standards interpretations issued by the International Financial Reporting Interpretations Committee⁶.

Since the IASB creation, there has been a progressive adoption of international standards and many countries are currently developing a set of changes in their regulatory systems toward accounting harmonization, especially the United States (US), the EU and others such as Japan and China. So, in 2013 more than 120 countries require or allow entities IASB standards or a local adaptation of them (IFRS, 2013; Rühl, 2011).

Another significant body related to international standards is the FASB; In this regard, it is relevant the convergence progress between United States Generally Accepted Accounting Principles (US GAAP) and IFRS. Since 2002, the FASB and IASB have been working together to improve both standards and make them compatible (FASB, 2012a). As Paul & Burks (2010) mention, the main goal of their agreement is to create a set of high quality standards in order to reduce differences and costs, increase efficiency and allow shareholders to make well informed decisions. On the one hand, the Security Exchange Commission (SEC)⁷ has contributed to accelerate the conversion from US GAAP to IFRS since 2007 when it allowed all US public firms to apply IFRS instead the local standards. On the other hand, this convergence program allows FASB to participate in the IASB's decision making process. Thus, as Sanz Santolaria (1996) states, that fact explains the existence of a large worldwide impact of FASB standards on the accounting practices of

⁶ The IFRS Interpretations Committee (the 'Interpretations Committee') is the interpretative body of the IASB. Both are responsible for the maintenance of IFRS. It has played an important role interpreting the standards dealing with emissions allowances to decrease diversity in accounting practices.

⁷ The SEC is the regulatory agency of the US responsible for enforcing security federal law and ensuring a fair and efficient nation's stock market with the aim to protect investors. See <http://www.sec.gov.ph/aboutsec/history.html>

different countries throughout the use of IFRS. So, he argues that the IASB tends to evolve towards the American system.

Focusing on the EU, the EFRAG also moves towards the convergence and makes efforts to ensure consistency between community directives and IASB international standards. For this reason, since 2005 all country members of the EU have claimed that IAS/IFRS adopted by the EU are required in consolidated accounts for listed companies and Banks. Moreover, international standards can be required for both consolidated or individual financial reports of no listed companies (R (EU) n° 1606/2002/EC of the European Parliament and of the Council, of 19 July 2002).

However, international standards are not directly applied in the EU as they are issued, but they are required to consult the EFRAG who is responsible for ensuring that standards meet the fair view and the understandability, relevance, reliability and comparability criteria. So, EFRAG's recommendation may be an acceptance of standards, recommendations for change or a rejection.

6. The Lack Of Specific International Accounting Guidance for Emission Allowances

The fundamental item of cap and trade schemes and the control of environmental pollution are emissions rights; they are emitted, allocated, used and traded in ETS and they produce an important impact on firms' accounting and financial statements. For that reason, emission allowances must necessarily be measured and reported on firms' accounts so that effects can be monitored by their regulators, shareholders and creditors.

Currently, accounting for emissions allowances is regulated by *IAS 38 (Intangible Assets)*, *IAS 20 (Accounting for Government Grants and Disclosure of Government Assistance)*, *IAS 37 (Provisions, Contingent Liabilities and Contingent Assets)* and *IAS 36 (Impairment of Assets)*. But, although there are some international accounting standards that can be applied to allowances it is a well-known problem that there is no specific international accounting standard regarding recognition and measurement of emission rights and also official guidance is quite inconsistent.

So, companies involved in ETS, who are required to prepare financial statements according to IAS/IFRS standards, can make their suitable accounting methods based on generally available principles, on experts' interpretations or in their own judgment

(Mookdee, 2013). In this sense, the IFRS conceptual framework, according to paragraph 10 of IAS 8 'Accounting Policies, Changes in Accounting Estimates and Errors', indicates (Deloitte, 2010; Lovell et al., 2010) :

"In the absence of a Standard or an Interpretation that specifically applies to a transaction, management must use its judgement in developing and applying an accounting policy that results in information that is relevant and reliable. In making the judgement, management shall consider the applicability of, the following sources in descending order:

(a) The requirements and guidance in Standards and Interpretations dealing with similar and related issues; and

(b) The definitions, recognition criteria and measurement concepts for assets, liabilities, income and expenses in the Framework."

Consequently, a number of different and woolly accounting approaches are being adopted for market participants in order to account for their emissions. First of all, this accounting flexibility and derived diversity threatens the comparability of financial statements, (Ernst&Young, 2009; Fornaro, Winkelmann & Glodstein, 2009; Kashyap, Steenkamp & Rahman, 2011) and may also give rise to volatility and often contradictory effects on recognition of assets, liabilities, incomes and expenses (KPMG, 2008). That point can be illustrated by previous research carried out by Pricewaterhouse and the International Emissions Trading Association (IETA) during 2007 which found six main accounting practices and several variations used by the 26 firms analyzed in the treatment of allowances (Elfrink & Ellison, 2009). On the other hand, as Giner (2007, p.175) indicates, not all of the different accounting policies adopted by ETS participants are consistent with the IASB Framework and other existing IFRS related to the topic.

Therefore, an important and often controversial problem at the heart of ETS is the inconsistency of market participants' financial reporting implying that formal guidelines as to how to recognize, measure and disclose emission allowances, are urgently required. As Kashyap, Steenkamp & Rahman (2011) and Mookdee (2013) suggest, the need for common accounting treatments for EA are principally necessary to allow investors to properly estimate the impact of carbon emission reductions on a firm's financial performance and value, in order to make appropriate investment decisions. But apart from investors, it is essential that the use and trading of EA can be monitored by creditors and all the remainder stakeholders related with the entity, because the alternative accounting

treatments truly impact on profit and loss, financial position as well as profitability and leverage ratios of firms. Incidentally, given the direct and immediate impact of EA on company profits, accounting treatments also affect the interests of the government in connection with the estimation of tax expense. (Giner Inchausti, 2007).

Likewise, besides polluters, there are other market participants who also need EAs accounting standards to support accurate financial reporting. For example, brokers and non polluters trade EAs as investments in the secondary markets; furthermore, companies exist which pretend to reduce pollution carrying out innovative projects to achieve credits that then can be sold to over-polluters.

As Souchik (2012, p.495) points out, another problem concerning the inconsistency of financial reporting of EAs is the loss of opportunity related to market participant's inability to press companies to reduce their emissions. When companies use different accounting methods and do not present transparent information, it is harder for market participants to compare them and to identify those who have purchased EA beyond their cap or paid fines in contrast with those who have successfully achieved larger emission reductions.

In this way, Souchik (2012, p. 500) highlights some possible benefits of an accurate accounting report and the existence of uniform measurement standards. Principally, it creates more accountable firms to the investing public and could pressurize firms to internalize the pollution costs; apart from this, it provides a stimulus for investment in more sustainable production methods to achieve larger emissions reductions and get profits through trading, lower emission expenses or avoiding fines. So, the author textually concludes: *"Requiring companies to accurately account for emissions trading is one of the best ways to ensure true compliance with any cap-and-trade system"*.

Figure 2 shows all the above mentioned problems due to the diversity of accounting practices.

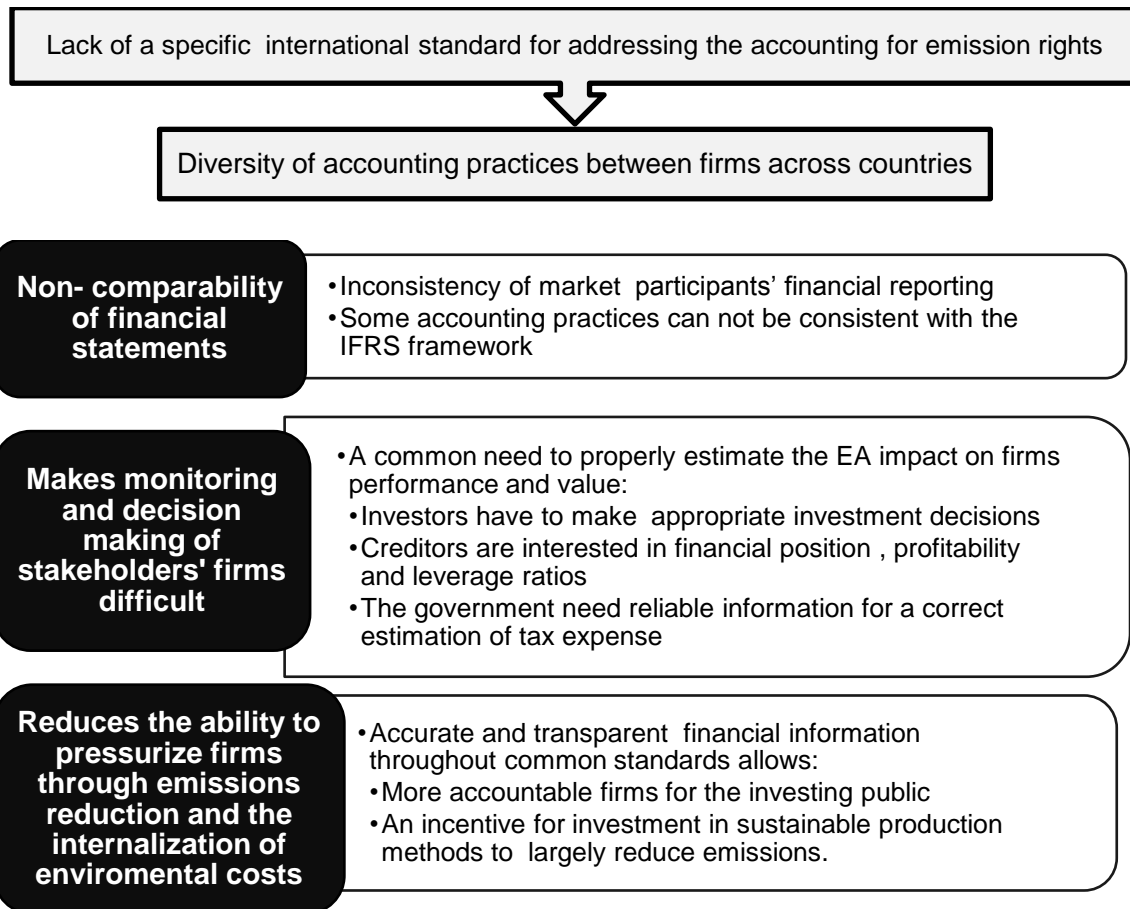


Figure 2: Main problems arising from the absence of specific international guidance for GHG

But, beyond all of those problems an empirical study on accounting policies of 75 UK participants in the EU ETS (Kashyap, Steenkamp & Rahman, 2011) have found that there are a considerable number of companies (76%) which do not report their accounting practices although they disclose some additional information about emission allowances through tables, narratives and graphs. Additionally, some holder entities present accounting information only about the received free allocations and for the sale of these credits, but not when allowances are purchased, surrendered and inventoried.

7. Issues around Classification and Recognition of Emission Allowances

Emission trading schemes have raised the discussion about how to recognize EAs as assets as well as the obligation to surrender allowances as liabilities. Whereas it is broadly asserted that emission rights meet the definition of an asset (they are resources controlled as a result of past events and they are able to provide future economic benefits to the firm), according to Lovell et al. (2010, 2013) they are hard to classify because they have a wide range of applications (as an inventory, a currency, an intangible asset, a financial instrument and so on) so, standard setters and accounting practitioners in the EU ETS are trying to deal with this complexity.

Although the different recognition and measurement practices regarding EA will be detailed later, the possible classification of emission allowances as an asset that entities can carry out is just one significant aspect of the subject that must also be considered.

Emission allowances are mainly acknowledged as a specific class of intangible asset which must be measured at fair value with the following revaluation recognition in the income statement (Ratnatunga, 2007). However, as the EFRAG (2013) considers it can be suggested that the most suitable accounting treatment of allowances have to be determined depending on the business objective of the activity and the expected use of allowances by the company. This approach is known as Business model. Related to it, the firms are able to account this particular type of asset in different ways, depending on whether they are held:

- For sale in the ordinary course of business to get benefits from short-term changes in prices (trading business model) or
- For consuming them in the production process being delivered to the government to fulfill their obligation (production business model).

Therefore, currently companies in the international arena can use the existing IFRS framework and apply different recognition principles to account this asset, depending on its use (Autorité des Normes Comptables, 2012, p.10). In this regard, authors such as Elfrink & Ellison (2009), Ratnatunga (2007) and Deloitte (2007) underline the most common considerations of allowances as assets:

As Intangible assets: In line with the IFRIC 3 approach, all classes of allowances should be treated as intangible assets. Furthermore, granted allowances must be recognized as a government grant on the date of the granting for the difference between

the price of the rights and its fair value and classified as a deferred income in the balance sheet with a subsequent derecognition in profit and loss on a systematic basis, as emissions are made.

As inventory: Allowances are recognized as an inventory and measured at historical cost under Federal Energy Regulatory Commission (FERC) guidelines, when they are held for production activity since they are considered as the required costs to settle the environmental commitments and comply with emissions reduction schemes. However, if they are held for trading purposes, they must be classified as other investments. On the other hand, the Institute of Accounting and Auditing (ICAC, 2013)⁸ supports classifying allowances held for trading as inventories and maintains that they must to be carried at cost.

As financial assets: An argument in support of this approach is that allowances are assets that have no physical substance and can be bought and sold in the market so they can be readily converted to cash. Therefore, when EAs are expected to be traded, they have to be classified as financial assets and measured at fair value with gains and losses recognized directly in income. In this regard, Andor & Fazekas (2008) maintain that EAs should be classified under IFRS 5 Non Current Assets Held for Sale and Discontinued Operations as long as their book value would be intended to be retrieved by a sale rather than by continued use in the company. Even so, as it has been seen, the IFRIC approach treats all types of allowances as intangibles regardless of intended use for productive or trading purposes. Moreover, when rights are held for trading, they are classified as other investments under the FERC approach and as inventories under the Spanish accounting (ICAC, 2013,) but not as financial instruments.

As derivatives: In addition to emission allowances, the participants of cap and trade systems are able to execute forward contracts in order to purchase their rights in the future as a fixed price. According to Haupt & Ismer (2011, p.10), these purchase contracts can be treated as derivatives under the IAS 39 by accounting for them as a cash flow hedge and reporting the changes in their fair value in other comprehensive income.

As Elfrink & Ellison (2009) noted, the expected use of the allowances in the company will determine the impact on the cash flow statement. So under the FERC historical

⁸ The ICAC Resolution on May 2013 establishes that the allowances nature depends on its intended use by the company and treats them as an intangible asset if used for operational purposes and as inventories if used for trading purposes.

approach (under which assets are classified as inventories, except for trading purposes), the granted allowances are recorded at nil so there is no cash flow impact. Meanwhile, purchased rights are valued at cost and their value changes will be recorded in the operating section of the cash flow statement (operating purposes) or in the investing section (trading purposes). On the other hand, under the IFRIC 3 approach the allowances are intangibles so their changes should appear in the investing section.

Nevertheless, some authors and organizations (Autorité des Normes Comptables, 2012, p.8) consider that the different practices to account for EA according to the firms' use, results in considerable inconsistency of financial statements that could be avoided through a common standard which allows a general and homogeneous treatment of this new commodity.

8. Regulatory Efforts Regarding Emissions Allowances Accounting

In response to the absence of specific standards or comprehensive guidelines on accounting for EA, the IASB, the FASB, and other financial accounting standards setting bodies have developed different interpretations and guidelines according to cap and trade systems and how the emission rights must be identified, valued and disclosed.

8.1. The International Accounting Standards Board Effort: Lights and Shadows of the IFRIC 3.

From an international perspective, one of the most relevant regulatory efforts on emission rights accounting has been the IFRIC 3 interpretation "Emission Rights". It was issued by the IASB's Interpretations Committee in December 2004 prior to the coming of the EU ETS with the aim of giving guidance to existing IFRS in view of the divergent practices emerged from EA accounting.

The IFRS Interpretations Committee is the interpretative body of the IASB. The types of issues that the Interpretations Committee is called on to deal with include the identification of divergent practices that have emerged for accounting for particular transactions, cases of doubt about the appropriate accounting treatment for a particular circumstance or concerns expressed by investors about poorly specified disclosure requirements.

The main characteristics of the IFRIC 3 were:

- ✓ A cap and trade scheme, give rise to an (1) *asset* for allowances held, a (2) *government grant* for the permits granted for less than their fair value and a (3) *liability* for the obligation to surrender allowances equal to emissions that have been made.
- ✓ Allowances, whether allocated by government or purchased, are intangible assets that should be initially recognized in accordance with *IAS 38* and they can be initially measured *at acquisition cost* when they are both purchased and auctioned, or at their *market value* when they are allocated free of charge.
- ✓ When allowances are allocated by the government for less than their fair value, they are initially measured at their fair value, with the difference between the payment and their fair value (their market price) as a government grant that must be accounted for according with *IAS 20*.

The grant of allowances is recognized as deferred income in the balance sheet and should be systematically released to income over the compliance period as emissions are made.

- ✓ As a participant produces emissions, it recognizes a provision for its obligation to remit allowances in accordance with *IAS 37*. This provision should be measured at the best estimate of the expenditure needed to settle the obligation (that will usually be the present market value of all rights required to cover the emissions made at the end of the reporting period). The derived expenses are recognized in profit and loss as well as the possible changes in the value of the obligation.
- ✓ If it is likely that allowances may be impaired, they must be measured for impairment according to *IAS 36*.

However, the content of this interpretation was questioned, especially in the EU countries where the EFRAG did not recommend its adoption and issued a negative endorsement advice (Deloitte, 2009). According to Giner Inchausti (2007, p.185), the EFRAG agreed with the individual recognition of the asset and the liability instead of offsetting them, because both elements meet the IASB Framework's definitions and exist independently.

Therefore, according to Bebbington & Larrinaga (2008), the rejection was mainly due to the mismatches from the measurement of assets and liabilities with different valuation

bases and its consequent impact on the income statement. The main criticisms were about the *cost model* which implies a *measurement mismatch* through the valuation of assets (allowances) at cost and liabilities (provisions) at fair value. The EFRAG (2005) suggests that these gaps are vital given the economic interdependency between asset and liability in the scheme: it considers illogical that the liability is measured at a different amount than the allowances which are the only assets that can be held to extinguish it. Regarding the *revaluation model*⁹, there is no measurement mismatch between asset and liability as both are valued at current value, but there is a *location mismatch* which creates great volatility as it implies the recognition of intangible's revaluations directly in equity (in accordance with IAS 38) and the record of liability's changes in profit and loss (according with IAS 37). Meanwhile, EFRAG considered that this mismatch results in artificial income shifts and it suggests that both the gains and the losses should be recognized in the Income Statement to provide a real accounting result (Lovell et al., 2010; Haupt & Ismer, 2011).

Furthermore, Ernst&Young (2009) also consider a *timing mismatch* that emerges because allowances are recorded when they are received, normally at the beginning of the calendar year while liability is recognized along the calendar year as emissions are made.

With those mismatches in mind, the EFRAG believed that the use of IFRIC 3 does not provide useful information because it might often not reflect the economic reality, so it even asserted that IFRIC was contrary to the fair principle. This failure alongside the pressure from the European Commission, led IASB to withdraw the IFRIC 3 in June 2005 (Lovell et al., 2010, p.15)

According to the IASB (2005, p.1), despite the mentioned withdrawal, IASB members considered that IFRIC 3 provided a correct interpretation of existing standards. However, it was because of the imminent start of the EU ETS, they deemed a critical necessity for an interpretation, but then the IFRS was not considered as urgent because trading markets were still limited. So, the Board decided to carry out a more comprehensive assessment of the mismatches from IFRIC application and to improve current standards to eliminate those volatilities. In this regard, in December 2007, the IASB added to its agenda a project

⁹ Under the Revaluation model allowances shall be revaluated in line with their market value at the date of the revaluation less any accumulated impairment losses. It implies recognizing value gains in other comprehensive income (equity) and value losses in profit or loss, except in the event of reversals, in which case the subsequent gain or loss will be registered in the same place that the previous value change. So, the asset has the same measurement than the liability as both are carried them at a revalued amount..

to address key issues regarding EA accounting, which did not set out to result in a new IFRS, but it claims to address the issues by revising the IAS 38, IAS 39 and IAS 20.

Later, the FASB discussed its joint project with the IASB on ETS in its April 2009 meeting wherein they considered an accounting guideline for Cap and Trade Systems as well as project based and renewable energy certificates. Later, in November 2010, both setters decided to defer their joint project, which then was reactivated as an IASB-only research project as part of its agenda consultation 2011 (KPMG, 2010; Deloitte, 2009).

8.2. National Regulatory Efforts: US and Spanish GAAP

8.2.1 US efforts: The Financial Accounting Standards Board and the Federal Energy Regulatory Commission guidelines

Focusing on United States, all listed U.S. firms have to apply Generally Accepted Accounting Principles (GAAP), promulgated by the FASB under the authority of the SEC. In recent years, the increased importance of accounting harmonization has resulted in efforts to align GAAP with the IFRS. However, neither IFRS nor GAAP provides clear guidance on accounting for emission allowances, so companies disclose greenhouse gases on various treatments with a basis between IFRS and US GAAP standards (Souchik, 2012; Fornaro, Winkelman & Goldstein, 2009). In November 2003, the FASB Emerging Issues Task Force (EITF¹⁰) issued the *EITF Issue 03-14, Participants' Accounting for Emissions Allowance under a "Cap and Trade" Program* in order to provide guidance for utilities and other energy companies to account for their emissions. The EITF considered that the asset classification depends on the expected use of rights by the entity so, they may be classified as inventory or intangible assets when they are held for operational purposes but as a financial assets if they are owned in order to trade them. Nevertheless, this guidance was failed and removed early (EITF, 2013).

¹⁰ The EITF was created in 1984 by the FASB with the aim of helping it to improve financial reporting guidelines and to resolve the identified accounting issues throughout public meetings. It must help to comply with the FASB Accounting Standards Codification TM framework and has to elaborate guidelines within this framework to avoid accounting diversity (EITF, 2003).

According to FASB(2014), The FERC¹¹ is currently the single organization which has made efforts for accounting guidance on EA. So, FERC guidelines are the only specific guidance about emission allowances in the US and as it thinks, the major US companies account their EA applying *FERC inventory model*. According to Deloitte (2007) this method involves recording EA as inventory (or as other investments if they are held for trading purposes) on a historical cost approach (it means that rights are measured at their initial cost, usually close to zero) and record the derived expense as emissions are made with a weighted-average cost basis. However, as Ernst and Young (2010) have underlined there are other firms that use alternative accounting approaches, for example, recognizing EA as an intangible asset under the *intangible asset model*.

As Lovell et al. (2010, p.16) explains, US companies that hold their rights for compliance as a key element of their productive activity, do usually use inventory model while those which keep allowances for trading purposes or as a result of investment projects tend to choose intangible asset model.

This accounting practices diversity highlights the inconsistency among US entities' financial reporting and also shows that entities are confused as they do not have specific advice about suitable accounting. The lack of specific accounting rules, brings various disadvantages such as the consequent difficulty of comparing firms' financial statements as well as their performance and value and the possible costs of investing time and resources to choose the most adequate accounting treatment for allowances. However, this flexibility also gives companies the advantage of choosing the simplest accounting practice (Lovell et al, 2010, p.6).

8.2.2 The Spanish perspective: The ICAC Standard

The Accounting Standard Setters of many European countries such as Spain, are required to issue specific guidance concerning the accounting for emission allowances through their national regulations. These guidelines are needed to elaborate firms' individual financial statements as well as consolidated statements for unlisted firms which are subject to national accounting regulations instead of the IFRS. In this regard, some

¹¹ The FERC is a regulator of energy utilities in US. Since 1993 it has required electric public utilities and other energy companies into its jurisdiction to elaborate their accounts in line with the Commission's Uniform System of Accounts (USofA). So, the USofA are today the only emission allowances accounting guidelines within US GAAP (FERC, 2010).

European countries have developed their own local guidelines based on different foreign accounting approaches such as the IFRIC 3 or US perspectives which are often not in line with the requirements of the IFRS framework.

For instance, in the case of Spain, the ICAC issued a resolution in February 2006 (ICAC 2006 GHG) to address the accounting for emission rights which was developed with a wide focus on IFRIC 3 approach. So, as Giner (2007, p.188) points out the treatment of the asset¹² and the grant¹³ are in line with the IFRS principles (IAS 38 and IAS 20). However, the IFRIC 3 and the Spanish approach differ on the accounting for provisions. They agree that the expenses and consequent liability which should be recognized as emissions are made, but according to Lovell et al. (2010), in the Spanish case, it is the measurement of these items which do not agree with the general requirements established in IAS 37 for measuring provisions. This is because Spanish regulation requires the provision to be measured not at fair value of any allowances, but at a mixed value based on the carrying value of the held rights¹⁴ as well as on the market value of the rights that will have to be bought to cover actual emissions, that it is the best estimation of the amount necessary to cover the shortfall in rights.

Table 1 summarizes the main similarities and differences between the IFRIC 3 approach and Spanish guidelines to recognize and measure the essential elements arising from the accounting for greenhouse gases (asset, liability, government grant, expenses and revenues, etc.).

¹² Under the IFRS framework the allowances are intangible assets that can be valued at cost (purchased or auctioned) or at fair value (granted) and in this latter case the value changes are reflected directly in equity and not in the income statement (Giner, 2007).

¹³ The government grant is recognized for the difference between the payment for rights and their fair value, as a deferred income in the balance sheet with a subsequent de-recognition in income on a systematic basis as emissions are made and as expenses are also registered.

¹⁴ The liability is measured firstly at market value of granted rights and secondly by the acquisition cost of additional rights purchased in order to fulfill the verified emissions at year end. Further a provision must include the best estimation of the allowances that have to be purchased to cover the shortfall of verified rights. It is important that as rights are required to be depreciated the liability measurement could be affected for these possible value changes.

Table 1: Main similarities and differences between IFRIC 3 and Spanish resolution of 2006

	IFRIC 3	Spanish regulation (ICAC 2006)
SIMILARITIES		
Initial recognition	Initial measurement of allowances: A. Purchased: as intangible assets at acquisition cost B. Granted: as intangible assets at market value, a government grant is also recognised and allocated as revenues on a systematic basis as emissions are made.	
Timing of Liability recognition	Expenses and subsequent liability recognition as emissions are realized along the commitment period.	
DIFFERENCES		
Liability measurement	At fair value of any type of allowances held, both purchased and allocated	▪ A provision should be recognised at the carrying value of total allowances available to fulfil the obligation
		▪ When held allowances are not enough to settle the provision, the company should also account for the additional allowances required to cover the shortfall at a market value;
		▪ The provision should be increased if possible to incur a potential penalty for no compliance.

Despite the explained ICAC resolution, the body was forced to approve a later resolution on May 2013 due to the changes introduced by the EC Directive 2009/29/EC (2009) on the trading scheme emissions, which suggests a community approach; in particular, national allocation plans are missing and a new method of allocating allowances is established whereby rights become largely allocated by auction rather than free allocation from 2013.

So, with the continuous absence of specific international standards, the new resolution establishes criteria for the recognition of rights, which are based on the business model and the expected use of rights within companies. Therefore, according to the ICAC standard (ICAC, 2013) the sixth standard on intangible assets, under subsection eight assumes that the emission rights allocated or purchased to be used in the production process of the company or those with an undetermined future use, will be classified as *intangible assets*. On the other hand, those rights acquired to be sold are accounted as

inventories meanwhile the accounting for future contracts to receive or deliver rights will be provided in the standard of *financial instruments*.

The resolution specifically focuses on the recognition and valuation principles concerning *allowances as intangible assets*. So, the main criteria are the following:

Asset initial valuation: The allowances are initially valued at their acquisition cost which would be the market value for the allocated rights and the purchase price for the purchased rights. However, for granted allowances allocated free or charge or for less than their fair value an income will be recognized directly in equity with a systematic allocation in profit and loss as expenses are registered for the emissions associated with the granted rights.¹⁵

Asset subsequent measurement: Even though emission rights are intangible assets they will not be amortized. Instead, if allowances are carried at more than their recoverable value (the higher of its fair value less selling costs and its value in use), their impairment losses have to be recognized in the income statement. Further, the allowances cannot be revalued according to the Spanish GAAP. The allowances will be derecognized when they are traded, delivered or expired.

Liability recognition and measurement: They will be recognized as an expense and as a subsequent provision in line with emission made. The provision is justified because it exists as a clear expense, but it has an undetermined amount at the closing date. The provision and the intangible assets will exist since the company has to pay off the obligation by delivering the allowances in the next accounting period. The amount of the expenses and the obligation will be determined considering the carrying value of the rights held. A FIFO valuation for the expenses and the primary liability is applied, which are measured at book value of granted allowances (their market value on the allocation date). Then, the additional obligation is measured at the average costs of extra rights that have been later purchased to cover the firm's emissions. Furthermore, if the emissions exceed all the rights, allocated or purchased, there is a deficit which must be measured as an added expense and liability, according to the best possible estimate of the amount required to cover the shortfall in rights at the balance sheet date (ICAC, 2013). Additionally, the regulation requires the recognition of impairment losses for any allowances owned, both

¹⁵ This treatment differs from the previous ICAC resolution in which granted allowances led not to an income directly recognized in equity but to a government grant recognition with the subsequent systematic derecognition as income as emissions were realized (ICAC 2006).

assigned and purchased. This affects the liability valuation since it is measured at book value of the rights held and expected to be purchased.

Sale of allowances: During the next compliance period, the firm can sell their surplus allowances on the market. This sale will generate losses or profits from intangible assets for the difference between their book value and the amount received less costs to sell which must be recognized in profit and loss statement.

In appendix A, a table comparing the different EA accounting practices for the last two Spanish guidelines shows the main differences related to allocation of allowances by the government, purchase of allowances, possible impairment of allowances, recognition of the liability and expense, recognition of income for the grant, sale of allowances and delivery of them.

Having examined this specific Spanish guidance concerning emission rights, the main consideration is that this national regulation is only applicable to elaborate individual and consolidated annual reports for Spanish unlisted companies. However, Spanish listed companies who operate on EU ETS are subject to the IASB general framework (Fernández Cuesta, Moneva & Larrinaga, 2006). So, the key concern derives from the possibility that listed companies who are required to apply IFRS, can apply local guidelines which, as have already been shown, do not always agree with the principles of IFRS standards.

An illustration of diversity of accounting treatments in this area and the consequences of the diverse accounting practices on the financial statements that have emerged globally can be seen in Fornaro, Winkelmann & Glodstein (2009). They analyze the diverse accounting practices for GHG emissions presently being used and the conflicting financial results taking a hypothetical company as a reference. The analysis highlights the lack of comparability among companies globally and the questionable relevance of financial information provided to users (See Figure 3).

Financial Results for 2010

Partial Income Statement

	U.S. GAAP (FERC)	IFRIC 3	Prevailing Practices in the EU
Revenue	\$ - 0 -	\$ 144,000	\$ - 0 -
Emissions Expense	30,500	224,000	30,500
Net Expense	<u>\$ 30,500</u>	<u>\$ 80,000</u>	<u>\$ 30,500</u>

Partial Balance Sheet

Inventory/Intangible Asset	\$ - 0 -	\$ 174,500	\$ 30,500
Emissions Liability	- 0 -	224,000	30,500
Net Asset (Liability)	<u>\$ - 0 -</u>	<u>\$ (49,500)</u>	<u>\$ - 0 -</u>

Source: Fornaro, Winkelman & Glodstein (2009)

Figure 3: Illustration of global accounting diversity

9. Alternative Accounting Treatments of Emission Rights under the EU ETS

The absence of a specific standard accounting for emission rights has given rise to numerous accounting policies available in practice which rely on a *combined interpretation of existing IFRS provisions*. Firstly, several accounting practices will be shown which have been suggested to eliminate the weaknesses of existing standards with specific attention to the repealed IFRIC 3 mainly due to its measurement mismatch. Then, the paper will focus on the analysis of the different accounting practices that firms carry out into the EU ETS under the allowances consideration as intangible assets.

9.1. Suggested Accounting Treatments to Eliminate Main IFRIC 3 Mismatches of Accounting for Emission Rights.

Given the critical mismatches of the IFRIC 3 and the lack of accounting guidance for the EU ETS transactions, some alternative account treatments have been suggested, aimed at getting a common valuation basis for the asset and the liability (Giner Inchausti, 2007, p.186-187).

1. The main solution is backed by the IFRIC under the revaluation model. It implies to create a specific category of intangible assets whose *revaluation gains were recognized in profit and loss*. However, it would mean obtaining incomes during the

allocation period, because revaluations would affect all the held allowances, while the provision and the consequent expenses would be registered as emissions were made.

2. The second treatment is proposed by the EFRAG also under the revaluation model and implies that the allowances maintained to settle emissions *provisionally recognizes their value changes in equity until emissions were made* when these changes would be *incorporated in profit and loss*. In this way, the provision expenses would be offset and there is no results along the allocation period.
3. The third alternative is in line with the ICAC (ICAC 2006 and 2013) proposal and maintains that under the cost model for the valuation of assets, a solution is to *recognize the obligation at the book value of the allowances* that remain to be used as payment. Therefore, the valuation is mixed as based on the *carrying value of the held rights*, already granted or purchased, and on the *market value of those that still have to be purchased* to cover actual emissions. The problem is that this treatment fails to incorporate the real value of emissions, so externalities are not fully internalized.

So far, several suggested accounting practices have been examined in order to eliminate the main mismatches of the IFRIC 3 interpretation. Keeping this in mind, the paper now moves to consider the main accounting practices into the EU ETS with a basis on the existing IFRS framework.

9.2. Divergence in Accounting Practice under the Scope of the Existing IFRS Framework Related to EA Accounting.

The withdrawal of IFRIC 3 and the subsequent absence of particular guidelines addressing the accounting for emission rights, gave entities participating in an EU ETS, a greater flexibility to choose the appropriate accounting treatment of their allowances. Then, according to Ernst&Young (2009) and Andor & Fazekas (2008), a range of accounting practices may be identified related to the IFRIC 3 application on a voluntary basis, under the scope of the following existing IFRS framework related to the topic:

IAS 20 – *Accounting for Government Grants and Disclosure of Government Assistance*

IAS 36 – *Impairment of Assets*

IAS 37 – *Provisions, Contingent Liabilities and Contingent Assets*

IAS 38 – *Intangible Assets*

IFRS 5 – *Non-current Assets Held for Sale and Discontinued Operations*.

The main accounting practices adopted by larger entities under the EU ETS may be examined as follows:

a) Initial asset recognition

Due to the predominant classification of allowances as intangible assets under IAS 38, some researchs (Ernst&Young 2009; Haupt & Ismer 2011; Dellaportas 2008) has noted that the main approaches can be classified into two groups: the *net liability approach*, which tends to prevail in Europe, and the *government grant approach*. Both approaches recognize either allowances purchased in the market or by auctioning at cost (purchase price). So, the approaches differ in the treatment of granted allowances.

- A. *The net liability approach* recognizes the rights granted by the government at cost or nominal amount (nil) and implies only recognizing a liability once emissions made are larger than the allocated rights still held to settle the obligation. As granted rights are not recorded as assets, they are not included as a part of the liability and expenditure. So, according to the reliability criteria of IFRS framework, it is the main weakness of this method because recognizing the rights at nil, fails to reflect their economic value. Furthermore, as Haupt & Ismer (2011, p.7) pointed out, this approach has the inconvenience of the heterogeneous treatment of allowances because those which are purchased are recorded on the balance sheet while those that are granted are not.
- B. Under *the government grant approach*, granted allowances are recognized initially at their fair value. Additionally, a government grant is also recognized for the difference between the fair value of the allocated rights and the price paid for them, as a deferred income in the balance sheet with a subsequent de-recognition as income on a systematic basis over the compliance period. It is a measurement in line with IFRIC 3 but, regarding liability, companies do not measure their obligation to surrender allowances at fair value, but on a '*cost with the balance at market value*' basis, that is, the liability is measured at the carrying value of those

allowances already granted or purchased , and at the market value of the rights that still have to be purchased to cover actual emissions.

b) Subsequent asset measurement

Haupt & Ismer (2011, p.7-8) found two measurement models for emission allowances that are classified as intangible assets (IAS 38), regardless of the initial treatment of granted allowances at cost or fair value.

- A. *The cost model* implies measuring rights at book value, that is, at the initial cost registered under net liability (nil) or government grant approach (fair value) less any accumulated impairment losses, and not reflecting potential value gains. Although impairment losses must be registered in the profit and loss it is common that they are not reflected because in practice, allowances tend to be tested for impairment as part of a cash generating unit (which only recognizes an impairment if the entire CGU's fair value decreases).
- B. *The revaluation model* requires the allowances revaluation in line with their market value at the date of the revaluation less any accumulated impairment losses. It implies recognizing value gains in other comprehensive income (equity) and value losses in profit or loss, except in the event of reversals, in which case the subsequent gain or loss will be registered in the same place as the previous value change.

c) Liability recognition

In order to comply with their commitments, firms must deliver an amount of emission rights equal to their produced emissions along the compliance period. The obligation to surrender rights must be initially recognized and subsequently measured in their financial statements.

In general, two main accounting practices can be found related to the liability arising from the obligation to deliver allowances. Both rely on either the timing of the recognition and the measurement of the corresponding liability (Haupt & Ismer , 2011, p.9-10).

- A. ***Focusing on the recognition date***, entities have the choice of recognizing the liability when granted allowances are received (on allocation date) or recorded as

the entity realizes gas emissions. The latter option is the main lead followed in practice and it is in line with IAS 37 which states that the liability does not exist until the obligating event (emissions realized) occurs (Deloitte, n.d).

B. ***With respect to the liability measurement*** there are two methods in order to measure the offsetting liability: *the fair value approach* and the *cost of settlement approach*.

1. *The fair value approach* implies the liability measurement at present market value (*fair value*) for all allowances required to be surrendered. It also means that the provision has to be measured regardless of any allowances owned (granted or purchased). The main weakness of this approach is that there are some income gaps under the revaluation model because an increase in the allowances' price results in higher expenses in profit and loss while any revaluation gain of allowances are recognized in other comprehensive income. So, this treatment gives rise to a net loss in the compliance period

2. Under *the cost of settlement approach* the liability is measured at the *carrying value* of any allowances held. The primary expenses and derived obligation are valued according to allocated rights and the rest of the liability will be measured by reference to the amounts recorded for extra rights purchased to cover the emissions. Moreover, if the emissions at the year end exceed those which can be settled with the total amount of allowances held, an additional liability shall be recognized at the best possible estimation of the cost to cover the shortfall in allowances. This projected cost will be usually be determined by the present value of rights. Therefore the liability valuation will depend on the chosen approach to measure allowances.

- i. If *allowances are measured under the net liability approach*, granted rights are valued at nil cost, hence the liability will not be recognized until the emission exceeds the allocated rights held and the entity must purchase added rights, that will usually be valued at market prices.
- ii. On the other hand, *if an entity uses the government grant approach*, the expenses and the corresponding liability are recognized as the entity emits GHG, with reference to the book value of allocated rights (their market price

on allocation date) and also at fair value of the added purchased rights. In this case, it is common that the expenses will be offset by the income allocated in profit and loss for the systematic derecognition of the government grant as emissions are made.

According to Lovell et al. (2010) the analysis of the different accounting practices that firms carry out under the EU ETS lead to two main conclusions:

On the one hand, the variety of practices go to show that none of them are in line with any existing IFRS and most of them results in an income volatility and several mismatches. On the other hand, these current practices are not providing the accurate information that investors and other stakeholders need to assess the firm commitments toward their objectives of emission reductions. What stands out is that an urgent need of common accounting standards exists that allow comparability of financial statements and provide a reasoned treatment of allowances which avoid income volatilities and offer a true and fair view of financial statements .

An overview of the different approaches outlined in this section about how ETS participants particularly account for their EA on the basis of the existing international standards can be seen in Appendix B.

10. Conclusion

The present growing concern of climate change explains the creation of emission trading systems as the most common market mechanism to limit GHG emissions, one of the pollution business activities that causes large social and environmental impact. We must remember that GHGs are responsible for spreading the greenhouse effect, and can potentially lead the planet to dangerous climate change.

In this respect, the cap and trade systems make emission allowances a production cost of participating entities and they acquire value as business rights which are able to bring firms significant benefits. Thus, ETS allows a price to be put on gas emissions and encourages their reduction by emitting and allocating a limited amount of tradable emission rights.

As we can see, these flexibility mechanisms turn greenhouse gases into marketable products, but far from being innocuous, they can have negative impacts. In this way, they

allow industrialized countries to buy extra rights to pollute without having to meet their commitment with the Kyoto Protocol. This strengthens existing inequalities between developed and developing countries regarding the use of the atmosphere and natural resources flexibility mechanisms. All low price credits will be held in the hands of developed countries and when the time arrives for developing countries to reduce their own emissions, they will only have access to more expensive options. Thus, industrialized nations and their entities are able to further increase their emissions allowances by damaging the interest of undeveloped countries in these rights.

The analysis regarding accounting for greenhouse gases provides valuable evidence for the complexity of classifying and standardizing the new problems and the impact arising from climate change which has resulted in a lack of homogeneity. In this regard, international accounting standards have demonstrated their ability to avoid accounting diversity and protect the stakeholder`s interests. For this reason, it is widely assumed that accounting harmonization is the best method to eliminate the clear diversity on accounting for emission rights. The main reason for this assertion is because a common standard regarding emission allowances would allow all emitting firms to account for this particular asset in the same way. These concerns lead to the consideration of the main regulatory efforts to harmonize accounting practices across countries.

However, despite these efforts there is still a lack of accounting guidance for trading schemes and while no specific international guidance or standard is issued by the IASB, companies participating in an ETS as well as all entities that produce GHG emissions, will have the flexibility to choose their appropriate accounting method for emission rights as long as it is compliant with IFRS. Even though there has been a strong trend towards the adoption of the net liability method in Europe, the application of different approaches to date has resulted in divergence in accounting practice which, among many other related problems, undermines the comparability of financial statements between nations and makes the stakeholders' management and decision- making harder.

This paper leads us to conclude that the lack of clear evidence about the specific nature of emission rights as well as the insufficient understanding about this asset, makes it difficult to create a single guideline or accounting standard which can be commonly used by different firms and countries in a effective way. This complexity is mainly explained by the possible classifications of EA depending on the use, as well as on the culture, and derived GAAP existing in each country. These differences between countries make it

difficult for EA to be accounted for by all gas emitters in the same way, thus giving rise to the analyzed diversity problem. This is reflected in the different accounting practices suggested by the main international and regional organisms (IFRS, FERC, ICAC). In addition, this lack of uniformity is also evidenced by the variety of accounting practices of ETS participants regarding EA. These different approaches result from the voluntary application of existing IFRS principles related to the topic.

However, the strong-effect of these assets in firms' financial statements make it necessary to overcome all these existing obstacles to achieve an international standard that clearly underlines appropriate accounting for emission allowances, and which allows a uniform treatment of rights, a lower diversity and an easier comparability by promoting a consistent basis for financial reporting.

Taking into account the significant impact of the accounting method adopted in firm's financial reports, the findings of this research provide useful information to policy makers, accounting standard setting bodies, investors, regulators, lenders and companies willing to participate in the ETS. In addition, these results can also be of interest to educators and researchers who can obtain a good insight into how current accounting for emission is developed. Future research is needed based on a statistical analysis of a representative sample of various entities' annual reports in order to generalize some results about their main accounting practices on emission rights. This future research could be realized on a specific sample of companies participating in UE ETS as well as through a selection of several companies participating in other ETS with the goal to find differences on EA accounting regarding diverse emission schemes across countries. Furthermore a complementary analysis might include surveys in order to clearly understand the reasons why each analyzed entity is conducting its EA accounting in a specific way.

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12. Appendices

Appendix A

Summary comparison of changes in Spanish guidelines for EA accounting as Intangible Assets (Production model) ¹

	ICAC 2006		ICAC 2013	
Allocated allowances	Measured at market price on allocation date. Recognition of a government grant with systematic de-recognition in income as emissions are made.		Measured at market price on allocation date. An Income is recorded directly in equity with systematic de-recognition in income as emissions are made.	
	CREDIT	DEBIT	CREDIT	DEBIT
	Intangible assets (216) “Derechos de emisión de GEI”.	Government Grant (130) “Subvenciones Oficiales de Capital”	Intangible assets (20X) “Derechos de emisión de GEI”.	Income directly in Equity (940) “Ingresos de Subvenciones Oficiales de Capital”
Purchased Allowances	Recognized at acquisition cost (with selling expenses) by the total amount paid or debited.			
	CREDIT	DEBIT	CREDIT	DEBIT
	Intangible assets (216) “Derechos de emisión de GEI”.	Debit account (57X)	Intangible assets (20X) “Derechos de emisión de GEI”.	Debit account (57X)
Impairment	Allowances carried at more than their recoverable value must be recognized as a provision with the derived expense in profit and loss. The provision will be eliminated when its cause disappears or allowances will be surrendered or cancelled.		An impairment loss has to be recognized as an expense in the income statement for allowances carried at more than their recoverable value.	
	Allowances cannot be revalued according to the general principles of Spanish regulation.			
	CREDIT	DEBIT	CREDIT	DEBIT
	Expense in Profit and Loss statement (691) “Dotación a la provisión por depreciación del II3”.	Provision (291) “Provisión por depreciación del II”.	Expense in Profit and Loss statement (670) “Pérdida por deterioro del II”	Impairment loss (290) “Deterioro de valor del II”

Appendix A (continued)

		ICAC 2006		ICAC 2013	
Liability and expense recognition:	Actual emissions	<p>The expenses and the subsequent liability are recognized at the year- end as annual emissions are verified.</p> <p>These two items are valued applying a <i>FIFO valuation</i> for the allocated allowances and then at the <i>average cost</i> of rights purchased. If the verified emissions are higher than the rights held, the liability will be also measured at the best estimation of rights that must be purchased to cover total emissions.</p> <p>The provision as well as the intangible assets will be cancelled when the firm has to settle the obligation by delivering the allowances in the next accounting year.</p>			
		CREDIT		DEBIT	
		Profit and loss expense (658) "Gastos por emisión de GEI"	Liability ² (149) "Provisión por derechos de emisión de GEI"	Profit and loss expense (65X) "Gastos por emisión de GEI"	Liability (529X) "Provisión c/p por derechos de emisión de GEI"
Income recognition: Grant		The government grant has to be systematically de-recognized in profit and loss as emissions associated with the granted allowances are realized and verified.		The income recognized directly in equity will be subsequently recognized as income as emissions are made and expenses associated with granted allowances are recorded.	
		CREDIT		DEBIT	
		Government Grant (130) "Subvenciones Oficiales de Capital"	Income in profit and loss (775) "Subvenciones de capital trasladadas al resultado del ejercicio"	Transfer account (840) "Transferencia de Subvenciones Oficiales de Capital"	Income in profit and loss (746) "Subvenciones, donaciones y legados transferidos al resultado"
		Income Regularization (940) "Ingresos de Subvenciones Oficiales de Capital"	Transfer account (840) "Transferencia de Subvenciones Oficiales de Capital"		

Appendix A (continued)

	ICAC 2006		ICAC 2013	
Sale of allowances	In the next compliance period the entity can sell their surplus allowances on the market. This sale will generate losses or profits from intangible assets for the difference between their book value and the amount received less costs to sell.			
	CREDIT	DEBIT	CREDIT	DEBIT
	Credit account (amount received)	Intangible assets <i>(216) "Derechos de emisión de GEI".</i>	Credit account (amount received)	Intangible assets <i>(20X) "Derechos de emisión de GEI".</i>
	Expense <i>(670) "Pérdidas procedentes del II"</i>	Income <i>(770) "Beneficios procedentes del II"</i>	Expense <i>(670) "Pérdidas procedentes del II"</i>	Income <i>(770) "Beneficios procedentes del II"</i>
Delivery of allowances	In the next compliance period allowances have to be delivered to the government to fulfill the obligation for the emissions realized. It implies derecognizing the provision as well as the allowances.			
	CREDIT	DEBIT	CREDIT	DEBIT
	Liability <i>(149) "Provisión por derechos de emisión de GEI"</i>	Intangible assets <i>(216) "Derechos de emisión de GEI".</i>	Liability <i>(529X) "Provisión c/p por derechos de emisión de GEI"</i>	Intangible assets <i>(20X) "Derechos de emisión de GEI".</i>

1. It should be recalled that the latter 2013 ICAC Resolution assumes a different allowances classification depending on the business model and their intended use by the firms. So, apart from the consideration as intangible assets (production purposes) if rights are used for trading purposes will be accounted for as Inventories and if they are future contracts to buy or sell rights their accounting treatment will be the same as Financial Instruments
2. In the ICAC 2006 resolution the provision is measured at short-term and in the 2013 resolution the provision is at large –term.

Appendix B

Different accounting practices for EA into the EU ETS under the existing IFRS framework.

EMISSION ALLOWANCES			
INITIAL RECOGNITION	NET LIABILITY APPROACH	<i>Free allocated allowances</i>	<i>Purchased allowances</i>
		-Nominal amount (Nil) →So, liability is only recognized once emissions are larger than allocated rights.	-Acquisition cost
	GOVERNMENT GRANT APPROACH	-Fair Value (the present market price at the allocation date). →Liability is recognized regardless of the type of allowances owned	
SUBSEQUENT MEASUREMENT	COST MODEL	<ul style="list-style-type: none"> - Book Value measurement (depending on Net Liability or Government grant approach) less any accumulated impairment losses. - Potential value gains are not reflected. - Recognition of Impairment losses. 	
	REVALUATION MODEL	<ul style="list-style-type: none"> -Allowance revaluation according to market value less any accumulated impairment losses. -Value gains are recognized in equity and value losses in income (except reversals :possible change recognized in the same place as the previous). 	
GOVERNMENT GRANT			
INITIAL RECOGNITION AND SUBSEQUENT MEASUREMENT	ONLY UNDER THE GOVERNMENT GRANT APPROACH (Granted allowances recorded at fair value)	<ul style="list-style-type: none"> - Government grant recognition as a deferred income with a systematic de-recognition in profit and loss over the compliance period as emissions are made. - Recorded amount for the difference between the fair value of the allocated rights and the price paid or them. -Subsequent valuation: only impairment and reversal of a previous impairment 	

Appendix B (continued)

OFFSETTING LIABILITY		
TIMING RECOGNITION	ALLOCATION DATE	-Liability recognition when granted allowances are received (on allocation date).
	AS THE ENTITY EMITS	-Liability is recorded as the entity realizes gases emissions → <i>In line with IAS 37 (liability does not exist until the obligating event occurs).</i>
LIABILITY MEASUREMENT	FAIR VALUE APPROACH	- Liability valuation at <i>present market value (fair value)</i> for all allowances required to be surrendered. → <i>Drawbacks: there are income gaps under the revaluation model since value gains are recorded in OCI and the increase on rights price results in higher expenses.</i>
	COST OF SETTLEMENT APPROACH	The liability is measured <i>at the carrying value</i> of any allowances held <ul style="list-style-type: none"> - Primary expenses and liability measured by allocated rights - The remainder liability measured in line with extra rights purchased to cover the emissions - Additional liability recognized at the best estimate of the expenditure required to cover the shortfall in allowances and settle the obligation.