

Emissions Trading Schemes under IFRS - Towards a “true and fair view”

Carbon Pricing for Low-Carbon Investment Project

Madlen Haupt and Roland Ismer
Climate Policy Initiative/ University of Erlangen-Nürnberg

January 2011

Descriptors

Area of Focus: Carbon Pricing & Incentives

Sector: Industry, Power and Energy

Region: Europe

Keywords: Carbon Pricing, Finance

Contact: Dora Fazekas, dora.fazekas@climatestrategies.org, Ruby Barcklay, ruby@climatepolicyinitiative.org

About CPI

Climate Policy Initiative (CPI) is a policy effectiveness analysis and advisory organization whose mission is to assess, diagnose and support the efforts of key governments around the world to achieve low-carbon growth. CPI is headquartered in San Francisco and has research centers around the world which are affiliated with distinguished research institutions. Research centers include: CPI at Tsinghua, affiliated with the School of Public Policy and Management at Tsinghua University; CPI Berlin, affiliated with the Department for Energy, Transportation and the Environment at DIW Berlin; CPI Rio, affiliated with Pontifical Catholic University of Rio (PUC-Rio); and CPI Venice, affiliated with Fondazione Eni Enrico Mattei (FEEM). CPI is an independent, not-for-profit organization which receives long-term funding from George Soros.

About Climate Strategies

Climate Strategies is an international organisation that convenes networks of leading academic experts around specific climate change policy challenges. From this it offers rigorous, independent research to governments and the full range of stakeholders, in Europe and beyond.

Climate Strategies is grateful for funding from the government of **Australia** and **Switzerland**, Agence de l'environnement et de la maîtrise de l'énergie (ADEME) in **France**, Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) and Ministry of Environment in **Germany**, Ministry of Environment in **Finland**, Ministry of Foreign Affairs (MFA) in **Norway**, Swedish Energy Agency (SEA) in **Sweden**, Department for Environment, Food and Rural Affairs (DEFRA), the Office of Climate Change (OCC), Department of Energy and Climate Change (DECC), Department for International Development (DFID) in the **UK**, The Carbon Trust, Nordic COP15 Group, Corus Steel, Holcim, Ministry of Environment (MOE) in **Japan**, European Climate Foundation (ECF) in The **Netherlands** and the German Marshall Fund of the **United States**.

© Climate Policy Initiative, 2011

All rights reserved

Executive Summary

This research paper seeks to contribute to the latest discussions on the financial reporting for emissions trading schemes. It starts out by giving an overview of the International Financial Reporting Standards (IFRS) accounting policies, which are currently applied by the majority of participants in the EU Emissions Trading Scheme. It then argues that in order to fulfil the aims of financial reporting under IFRS, namely to provide a true and fair view, accounting must depict CO₂ as a cost of production. Therefore, a fair value approach, both with respect to the initial recognition of allocated allowances and the subsequent measurement of allowances, is generally advocated. The paper finishes by highlighting the insufficiencies of the current IFRS accounting rules, which should be addressed in the upcoming new IFRS on emission trading schemes.

1 Financial accounting in a carbon-constrained world

The transformation to a low-carbon economy, which is required by the imperative of mitigating climate change, significantly alters the business environment for carbon emitters (Brewer 2005; Brohé et al. 2009). Emissions trading schemes – such as the European Union Emission Trading Scheme (EU ETS), which represents the largest existing carbon market (World Bank 2010) – have been introduced to create financial incentives for pursuing low-carbon investment and operational choices. Financial accounting, a highly important tool for business and investment decisions, must facilitate the process by creating transparency about the cost of carbon so as to create awareness of potential exposures. Furthermore, it must provide appropriate information to guide the strategic choices of management and investors in firms so they can respond to the risks and opportunities of a low-carbon transformation. This paper assesses whether the most important accounting scheme currently used internationally facilitates such choices and what opportunities for improvement exist.

This paper comes against the background of a long-running debate on how emissions trading schemes should be reflected in the financial statements of participating entities. Prior to the implementation of the EU ETS, a number of contributions examined the accounting implications of the SO₂ trading scheme in the US and of emissions trading schemes in general (FERC 1993; Wambsgans and Sanford 1996; Gibson 1996). Nevertheless, International Financial Reporting Standards (IFRS) have failed – and to the present day still fail – to provide clear, authoritative guidance on the matter. Therefore, the introduction of the EU ETS has revived the debate on how participating entities should adequately capture the implications of the scheme in their financial statements. So far, several studies have analysed the impacts of the EU ETS on financial accounting under IFRS (Giner Inchausti 2007; Bebbington and Larrinaga-González 2008; MacKenzie 2009; Cook 2009). Others have surveyed the accounting approaches currently applied in practice (PwC and IETA 2007; Lovell et al. 2010), and a number of comparative studies have been conducted on the accounting treatment of emissions allowances under several national accounting standard sets (Anttonen et al. 2007; EEA 2008; Patek 2006; Hoffmann and Lüdenbach 2006).

The debate has shown that under current IFRS, it is not possible to both give a true and fair view of the assets controlled by the entity and avoid artificial income shifts. Moreover, companies desire more guidance from standard setters so that comparisons between organisations are made more reliable and accounting is made easier (Lovell et al. 2010). Against this background, the International Accounting Standards Board (IASB) and the US Financial Accounting Standards Board (FASB) are engaged in a joint project on Emissions Trading Schemes. An Exposure Draft for a new standard is due to be published in late 2011. The challenge for the new standard will be to remedy the indicated deficiencies. At the same time, it should fully reflect the growing complexity of the EU ETS as a policy instrument, as the scheme continues to evolve. The shift from free allocations to auctioning of allowances means that participants increasingly engage in hedging activities in order to lower their carbon

risk exposure. Finally, sufficient attention has to be paid to the importance of financial accounting from a climate policy perspective.

This paper seeks to address these challenges and discuss possible remedies. It reviews the International Financial Reporting Standards (IFRS) and the accounting practices used with regard to the EU ETS in order to assess whether they provide appropriate information for management, investors, and other stakeholders as the basis for an effective low-carbon transformation. Moreover, unlike much of the existing literature, this paper does not limit itself to a description of the predominant accounting practice. Instead, its aim is to also explore possible provisions of the upcoming new IFRS on Emission Trading Schemes, which could address the prevalent concerns.

The paper is structured as follows: Section 2 outlines pertinent information on the EU ETS, the relevance of IFRS, and the reason for the absence of authoritative guidance for emissions trading schemes under IFRS. Sections 3 and 4 illustrate the main accounting approaches for emissions allowances and carbon hedging instruments that are currently used by participants in the EU ETS. Section 5 develops criteria for the evaluation of different accounting approaches. Based on these criteria, Section 6 assesses what modifications might result in a true and fair view that avoids artificial income shifts, while simultaneously paying sufficient attention to climate policy concerns. Section 7 offers a comprehensive overview on the conclusions of this study.

2 Background: The EU Emissions Trading Scheme, IFRS and IFRIC 3

The European Union Emissions Trading Scheme

The EU ETS¹ constitutes a statutory cap-and-trade scheme. Based on the EU's CO₂ emissions reduction target under the Kyoto Protocol, the EU ETS places a cap on the total emissions of the installations covered by the scheme. From its inception, the scheme has applied to carbon-intensive industries, such as electricity generation and oil refinement. From 2012 onwards, the aviation industry will also be included.² Installations covered by the scheme are only allowed to emit CO₂ if they surrender a corresponding number of emissions allowances. The obligation has to be fulfilled by 30 April each year for the emissions from the previous year. A double-penalty mechanism seeks to ensure a high level of compliance. Entities which do not remit a sufficient number of allowances have to pay a fine of €100 per tonne of emitted CO₂ for which no allowance was surrendered. The settlement of the fine does not release entities from the obligation to surrender the missing allowances in the following year.

Emissions allowances are tradable, so operators of covered installations and other persons can purchase them on carbon markets. Alternatively, allowances may be obtained from the government either by way of free allocation (by 28 February for each calendar year) or by way of auctions. Initially, most allowances were allocated for free, based on historic emissions of the covered entities (*grandfathering*). More recently, however, most EU Member States have started to issue a significant part of their allowances through auctioning. In the future, the amount of free allocation is set to decrease further. Industries not subject to carbon leakage, i.e. to the risk of relocation to regions with less stringent carbon policies (Droege 2009; Skjærseth and Wettestad 2009), will cease to receive free allocations. For the power sector, full auctioning will be the rule from 2013 onwards. In the period from 2013-2020, it is estimated that more than half of the total amount of emissions allowances will be sold under the auctioning mechanism.³

¹ Established by Directive 2003/87/EC, OJ L 275, 25.10.2003, p. 32.

² Directive 2009/29/EC, OJ L 140, 05.06.2009, pp. 63-87, Annex 1, no. 6.

³ Cf. European Commission (2010).

For administrative purposes, the EU ETS was divided into separate 'commitment periods': Phase I comprised the years 2005-2007, Phase II the years 2008-2012, and Phase III will cover the years 2013-2020. The commitment periods are subdivided into 'compliance periods,' which are equal to the calendar year, i.e. they last from 1 January until 31 December. At the end of the first commitment period (Phase I), any allowances not surrendered by that time became invalid. In contrast, from Phase II onwards, allowances not surrendered by the end of a commitment period may be transferred to the following period (*banking*).

No authoritative guidance under IFRS after the withdrawal of IFRIC 3

The EU ETS can significantly influence the financial results of the companies covered by the scheme. Carbon-intensive production, especially in light of decreasing free allocation, is made more expensive as previously free carbon emissions become increasingly costly. Financial accounting should communicate the corresponding figures, together with other relevant financial information about a business participating in the EU ETS, to different groups of actors.

Such communication is guided by accounting standard sets that lay down the framework and rules within which preparers of financial statements have to operate. For companies subject to the EU ETS, the International Financial Reporting Standards (IFRS) are particularly important. In the EU, since 2005, all listed companies must prepare their financial statements in accordance with IFRS.⁴ IFRS, which *inter alia* comprise International Accounting Standards (IAS) and Interpretations developed by the International Financial Reporting Interpretations Committee (IFRIC),⁵ are published by the International Accounting Standards Board (IASB), a private and independent standard setter based in London (UK).⁶ However, the EU adopts new IFRS only if they meet the criteria specified in several EU regulations and pass a standardized endorsement process. Accounting under IFRS has gained widespread acceptance, both within the EU and globally. Currently, more than 100 national jurisdictions require or permit the use of IFRS, and several national standard setters are pursuing convergence projects with the IASB.⁷

Currently, IFRS does not contain specific provisions on emissions trading schemes. In 2004, following the creation of the EU ETS, the International Financial Reporting Interpretations Committee (IFRIC) published an interpretation dealing with accounting for *Emission Rights (IFRIC 3)*. IFRIC 3 suffered from three severe deficiencies, however, and was withdrawn just one year later. First, it failed to address the accounting for emissions allowances of non-participants who can acquire allowances for trading, investment, or speculative purposes. Second, it did not contain any guidance on the accounting treatment of carbon derivatives as part of hedging strategies under the EU ETS. Third and most importantly, the different measurement models for emissions allowances and liabilities under IFRIC 3 created an accounting mismatch which, on balance, resulted in artificial income shifts for participants in the EU ETS. IFRIC 3 was accordingly rejected by the majority of respondents, including national standard setters, associations of chartered accountants, and numerous industry representatives.⁸ The European Financial Reporting Advisory Group (EFRAG), a non-governmental advisory body to the European Commission, noted that the outcomes of IFRIC 3 did not reflect the business reality and

⁴ Regulation (EC) No 1606/2002, OJ L 243, 11.09.2002, p. 1; Regulation (EC) No 1725/2003, OJ L 261, 13.10.2003, p. 1; Regulation (EC) 1126/2008, OJ L 320, 29.11.2008, p. 1.

⁵ *Cf.* IAS 1.7. IFRIC is today's IFRS Interpretations Committee, an interpretative body of the IASB. The IFRIC attempts to address emerging issues in a timely way. Its interpretations are part of IFRS and thus authoritative.

⁶ For a more comprehensive discussion of the development and importance of IFRS, *cf.* Nolke (2007) and Martinez-Diaz (2007).

⁷ *Cf.* IASB (2010).

⁸ Indeed, the level of disagreement was vast; only two comment letters of over forty fully supported the proposed interpretation; *cf.* Casamento (2005).

economic substance of the EU ETS. It therefore issued a negative endorsement advice to the European Commission (EFRAG 2005). Consequently, in June 2005, the IASB decided to withdraw IFRIC 3, with immediate effect (IASB 2005). Thus, the IFRIC 3 approach is not mandatory, but only represents a *possible* approach for accounting under the EU ETS.

The void in authoritative guidance has given rise to a diversity of accounting approaches with regard to the EU ETS (PwC and IETA 2007; Lovell *et al.* 2010). The nature of the accounting issues arising under the scheme and the different accounting approaches will be illustrated in the following sections. In the absence of a specific standard addressing accounting for emissions trading schemes, all approaches rely on a combined interpretation of existing IFRS provisions.

3 Current accounting policies for emissions allowances and liabilities under the EU ETS

Emissions trading schemes contain several features that need to be considered from an accounting perspective. These include the existence and nature of different balance sheet items, their recognition, and their subsequent measurement. More precisely, in addition to the question of which disclosures are necessary to ensure decision-usefulness of financial statements, the EU ETS raises the following questions:

- A. regarding emissions allowances:
 - i. are allowances *assets* and if so, what *type of assets*?
 - ii. how should the value of allowances be *initially measured*, especially in case of free allocation?
 - iii. how should the value of allowances be *subsequently measured*?
- B. regarding liabilities arising from the emission of CO₂
 - i. *when* should such a *liability* under the scheme be recognized?
 - ii. how should the liability be *measured*, initially and subsequently?

A. Accounting treatment of emissions allowances under the EU ETS

Under a large number of accounting approaches observed in practice (Lovell *et al.* 2010), allowances are classified as intangible assets and subject to the measurement models currently in place under IAS 38. While the measurement of allowances will be explained in more detail shortly, the initial recognition of emissions allowances will be considered first.

Initial recognition of emissions allowances

Purchased allowances have to be recognised at cost. Both for allowances acquired on the market and through the auctioning mechanism, this cost refers directly to their purchase price. The accounting treatment of allocated allowances, on the other hand, is fairly controversial. Despite their unmistakable economic value, an entity obtains such allowances at no acquisition cost and will most likely remit a significant share of these allowances in order to meet its compliance requirements under the EU ETS. In practice, the main accounting approaches for allocated allowances are either a *net liability* or a *government grant approach* (Fornaro *et al.* 2009; Wilkinson-Riddl 2008; Rogler *et al.* 2009; PwC 2008). Regarding the initial recognition of allocated allowances, two alternative approaches – (1) recognition at cost, i.e. at nil and (2) recognition at fair value, i.e. the amount for which these allow-

ances could be exchanged between knowledgeable, willing parties in an arm's length transaction⁹ – are widely pursued (Lovell *et al.* 2010):

(1) Net liability approach: Recognition at cost (nil).

Under this approach, allocated allowances are recognized at nominal amount (*nil*). This is in line with the general provisions in place for recognition and measurement of assets under IFRS and takes into account the lack of acquisition costs for allocated allowances.¹⁰ Such an accounting approach is also referred to as a *net liability approach*; indeed, the recognition of allocated allowances at nil is the approach pursued by most of the participants in the EU ETS.

(2) Government grant approach: Recognition at fair value.

Under this approach, which would have been mandatory under IFRIC 3, allocated allowances are initially recognized at their fair value. Recognition at fair value ensures that the economic value of the allowances is properly reflected, despite the lack of acquisition cost. Furthermore, it solves the problem of the heterogeneous treatment of emissions allowances under the net liability approach (purchased allowances are recognized on the balance sheet, while allocated allowances are not). Thus, under the government grant approach, homogenous assets are treated in the same way.

The option to recognize intangible assets initially at fair value is currently available if the allocation of allowances constitutes a *government grant* (IAS 20).¹¹ In the view of many accountants, this is indeed the case: the allocation meets the definition criteria of a government grant because the allowances are valuable and granted in return for future compliance under the EU ETS. The fair value recognition of the allowances must thus be complemented by the recognition of a government grant. Initially, the grant must be recognized at the fair value of the allocated allowances and then be de-recognized as income on a systematic basis over the compliance period.

Subsequent measurement of emissions allowances

Due to their predominant classification as intangible assets under IAS 38, allowances may – irrespective of whether they were initially recognized at cost or at fair value – subsequently be measured in accordance with (1) the cost model or (2) the revaluation model. Whereas the former measurement model uses the initial book value of the assets as an upper ceiling for their maximum book value, the latter ensures the reflection of the fair value of the allowances, even if their current value exceeds their historical value. The two approaches to subsequent measurement are possible irrespective of whether the allowances were initially recognised at nil or at fair value.

(1) Cost model.

Under this model, allowances are carried at cost,¹² i.e. at the initial value recognized under the net liability approach or the government grant approach. Subsequent increases in the value of the allowances are not recognized. Impairments, however, require a write-down. Such impairment losses must be reflected in the statement of income (IAS 36). In practice, allowances held for compliance purposes are also frequently tested for impairment as part of a larger *cash-generating unit* (CGU). IFRS define a CGU as the smallest identifiable

⁹ Cf. IAS 38.8.

¹⁰ Cf. IAS 38.24.

¹¹ Cf. IAS 38.44.

¹² Cf. IAS 38.74.

group of assets that generates cash inflows that are largely independent from the cash inflows from other assets or groups of assets.¹³ Hence, an impairment loss is only recognized in case the fair value of the CGU as a whole (e.g. a power plant) has decreased. For emissions allowances this usually means that no write-down is recognized even though the market price has fallen below the book value.¹⁴

(2) Revaluation model.

Under this model, allowances are revalued according to their fair value (FV) on a regular basis.¹⁵ As a general rule, revaluation losses are recognized in profit or loss, whereas revaluation gains are recognized in other comprehensive income. An exception applies to reversals: to the extent a revaluation gain reverses a revaluation loss which previously had been recognized in profit or loss, the gain is also recognized in profit or loss; similarly, to the extent that a revaluation loss reverses a revaluation gain recognized in other comprehensive income, it is also recognized in other comprehensive income. The revaluation model requires the existence of an active market. Due to the existence of the liquid carbon market, emissions allowances are, in fact, one of the very few types of intangible assets which meet the requirements for the application of the revaluation model.

In theory, these measurement models are applicable under all accounting approaches that classify emissions allowances as intangible assets, regardless of the initial recognition of allocated allowances. It should be noted, however, that a write down is not possible for allocated allowances initially recognized at cost of nil and that, currently, IAS 20 does not explicitly provide for a revaluation or write down of the government grant. *Table 1* provides an overview on the impacts of the different models for allowances on the statement of income (P&L) and other comprehensive income (OCI).

Table 1. Current measurement models for emissions allowances (IAS 38)

	P&L	OCI
i) Cost model*		
<i>FV gains</i>	x	x
<i>FV losses</i>	✓**	x
ii) Revaluation model*		
<i>FV gains</i>	x	✓
<i>FV losses</i>	✓**	x
✓	<i>recognized</i>	
x	<i>not recognized</i>	
*	<i>exceptions apply in the case of reversals: to the extent a revaluation loss was previously recognized in P&L, a subsequent revaluation gain is recognized in P&L as well. Under the revaluation model, to the extent a revaluation loss (gain) was previously recognised in P&L (OCI), the subsequent revaluation gain (loss) is recognised in P&L (OCI) as well.</i>	
**	<i>exceptions apply in case the allowances are part of a larger CGU (no write-down).</i>	

B. Recognition of the offsetting liability under the EU ETS

As initially outlined, entities covered by the EU ETS must remit allowances corresponding in number to their CO₂ emissions during the compliance period. This obligation must be reflected in the financial statements. For accounting purposes, this requires both the identification of an obligating event for the

¹³ Cf. IAS 36.6.

¹⁴ Cf. IAS 36.65; Ernst & Young (2009), PwC (2008).

¹⁵ Cf. IAS 38.75.

recognition date and the correct measurement.

Recognition date of the offsetting liability

Generally, there are two different options regarding the timing of the recognition, especially when an entity receives free allocations of emissions allowances:

(1) On allocation date.

The recognition of a liability takes place as the entity receives a free allocation of allowances under the EU ETS. Since allowances are allocated for compliance purposes under the scheme, an argument in favor of this option is based on the fact that the participating entity will most likely return the allocated allowances in order to offset its CO₂ emissions.

(2) As the entity emits.

Legally, no obligation to remit allowances emerges under the EU ETS until the participant has emitted CO₂. The IFRIC 3 approach therefore defined emissions as the obligating event constituting the existence of an obligation. In practice, the majority of preparers of financial statements follow this lead.

Measurement of the offsetting liability

In addition to the timing of the initial recognition of the offsetting liability, the appropriate *measurement* of the liability has also proven to be controversial. Under existing IFRS, liabilities are measured based on the best estimate of the expenditure required in order to settle the obligation.¹⁶ The offsetting liability can be measured either with reference to (1) the market price of allowances (fair value approach), or to (2) the carrying value of the allowances already owned by the emitting entity (cost of settlement approach), which seems to be the majority approach (Lovell *et al.*, 2010):

(1) Fair value approach.

Irrespective of any allowances held by the entity, the offsetting liability is measured on the basis of the current market prices for allowances. IFRIC 3 suggested this approach following the argument that an entity is not obliged to remit the allowances it already owns, and that the fair value actually represents the real expenditure an entity incurs to offset its emissions. This is of particular relevance for the EU ETS since the reporting date (usually 31 December) and the remittance date (30 April) do not coincide. Under this approach, the measurement of the provision must be carried out *independently* of any allowances held.

Given the current measurement models for intangible assets, the fair value approach can cause income shifts when the price for emissions allowances is rising. The higher expenses of the offsetting liability result in a net loss in the compliance period, because the increase in the fair value of emissions allowances is not recognized as a profit in the statement of income (under the revaluation model, it leads to other comprehensive income). This accounting mismatch eventually caused the withdrawal of IFRIC 3.

(2) Cost of settlement approach.

Different from the fair value approach, the accounting policies primarily applied in practice are *cost of settlement approaches*.¹⁷ This means that the offsetting liability is firstly meas-

¹⁶ Cf. IAS 37.36.

¹⁷ Cf. KPMG (2008).

ured with reference to the book value of any held allowances. Where an entity has purchased or otherwise obtained allowances throughout the year and recognized them at cost, the carrying amount of these allowances can serve as the best estimate for the measurement of the offsetting liability.

The exact consequences of the cost of settlement approach depend on the measurement approach taken with respect to the allowances. If allocated allowances are initially measured at cost (net liability approach), no liability is accounted for until the actual emissions exceed the allowances held by the emitting company. This is because allocated allowances are recognized at nil. Only excess emissions trigger the recognition of a liability, which is usually measured at current market prices. Under a government grant approach, expenses which must be recognized due to the emission of CO₂ under the EU ETS are orientated towards the book value of the allocated allowances. This means that an entity will incur expenses for the recognition of a liability as soon as it emits. In most cases, these expenses are fully balanced out by the income realized as a result of the systematic derecognition of the government grant.

4 Current accounting policies for financial instruments hedging carbon risks

Under the EU ETS, contracts on CO₂ allowances with a host of different settlement modalities are traded, both on exchanges and over the counter (OTC). Power producers use these contracts to fix future compliance costs for contracted power production without an early capital lockup. The handling of these contracts, however, poses additional accounting questions. This is because under IFRS, regular contracts to purchase non-financial items can meet the definition of a derivative¹⁸ and require separate accounting as financial instruments.

Provided they are within the scope of IAS 39, contracts to purchase CO₂ allowances are subject to mandatory treatment at fair value through profit or loss. Depending on the market price developments for CO₂, this can result in a significant degree of volatility in the statement of income. Such accounting is unfavourable to entities that plan to take physical delivery of allowances for their own compliance needs under the EU ETS. The IFRS currently contain two provisions which can mitigate the accounting implications of an imminent classification of contracts to purchase CO₂ allowances as financial instruments:

(1) Own use exemption.

Derivative contracts on CO₂ allowances can meet the criteria of the own use exemption.¹⁹ In this case, they are excluded from the scope of IAS 39 and do not require separate accounting. The contract rate of the agreement can serve as the best estimate for the determination of the offsetting liability.²⁰ In practice, however, these contracts very often do not qualify for the own use exemption even though they are entered into for compliance purposes. This is because allowances are fungible and are traded on a liquid market so that they can be seen as non-financial instruments, which are readily convertible into cash. If participants additionally need to adjust the amount of received allowances according to actual production patterns (as commonly is the case for power producers), the contract falls within scope of IAS 39 and requires accounting as a financial instrument.

¹⁸ Cf. IAS 39.9.

¹⁹ Cf. IAS 39.5.

²⁰ This is true under a cost of settlement approach, cf. PwC (2008).

(2) Hedge accounting.

If a derivative contract on CO₂ fails to qualify for the own use exemption, many entities apply cash flow hedge accounting and report changes in the fair value of the contract in other comprehensive income.²¹ The physical delivery of the allowances is classified as a forecast transaction which is hedged by the contractual agreement. This accounting approach allows participants in the EU ETS to avoid distorting effects on the results of the ordinary course of business.

Table 2 summarizes the different accounting treatments of hedging instruments as currently applied under IFRS and provides an overview of the impacts on the statement of income (P&L) and other comprehensive income (OCI).

Table 2. Accounting policies for carbon risk hedging instruments

	P&L	OCI
i) Regular treatment <i>FV gains & losses</i>	✓	x
ii) Own use exemption <i>FV gains & losses</i>	x	x
iii) Cash flow hedge accounting <i>FV gains & losses</i>	x	✓
✓ <i>recognized in</i> x <i>not recognized in</i>		

Overall, the extent to which entities covered by the EU ETS rely on derivative contracts to meet their compliance purposes and the potential risks involved in such reliance are not easily determinable for users of financial statements. This can become problematic where companies enter into OTC contracts with delivery dates shortly before CO₂ emissions need to be offset. Furthermore, counter-party default risks and rising prices for emissions allowances can contain the potential for substantial regulatory and financial risk exposures, which are not visible in financial statements.

5 Assessment criteria for the evaluation of different accounting approaches

The IFRS framework sets out qualitative criteria, which can help to assess the merits of different accounting policies: *understandability*, *materiality*, *reliability*, and *comparability*. Beyond this, the *incentives and disincentives* created by different accounting provisions for various types of actors should also be considered. For instance, the accounting treatment of emissions allowances and the offsetting liability can significantly impact strategic choices and mid- to long-term decisions regarding the banking of allowances. IFRS can determine which hedging approaches towards carbon risks are successful and favorable from an accounting perspective, and also which actors might have an interest in investing in allowances in the first place.

Such a criteria-based, constitutional approach to financial accounting under IFRS (Buckley 1980) facilitates the structured assessment of different accounting policies for emissions trading schemes. Moreover, it simultaneously permits an integration of aspects that are not primarily derived from the aims of financial accounting as such, but are based on the political nature inherent in IFRS (Perry and Nölke 2006). In particular, this means that IFRS not only *allow* but also *demand* the inclusion of climate policy considerations when it comes to the accounting treatment of emissions allowances and to

²¹ Cf. IAS 39.95.

different hedging approaches. Based on the previously outlined criteria, *Table 3* points out the demands for accounting under the EU ETS.

Table 3. Demands for accounting under the EU ETS

A Understandability (F.25)	The information provided in financial statements must be comprehensible to users. Under the EU ETS, this should include <ol style="list-style-type: none"> i. a comprehensive discussion of the entity-specific <i>risks and opportunities</i>, which arise due to the EU ETS and the current business model, and ii. a clear indication of the <i>financial impacts</i> of the scheme on the current and future performance of the entity.
B Materiality/Relevance (F.26)	Information is regarded to be relevant insofar as it influences the economic decisions of users of financial statements. The accounting for compliance requirements under the EU ETS should <ol style="list-style-type: none"> i. indicate how sustainably a company is producing/operating in an increasingly <i>carbon-constrained world</i>; ii. help to assess the <i>profitability of carbon-intensive production</i> in consideration of a more stringent cap and increasing costs of emitting CO₂,²² and iii. provide a foundation for the estimation of <i>future risk exposures</i> and the development of different performance indicators.
C Reliability (F.31 et seq.)	Financial statements must contain all assets and liabilities of the reporting entity. This is of particular relevance for allocated allowances. Although they constitute assets under IFRS, <ol style="list-style-type: none"> i. the <i>lack of acquisition costs</i> suggests an initial recognition at nil. This could correspond with the call for <i>prudent accounting</i>, as contained in the framework, but does trigger the creation of significant hidden reserves. ii. an initial measurement of allocated allowances at nil represents a deviation from the criterion of <i>completeness</i> and fails to capture the <i>economic value</i> of the allowances in the context of an active market.
D Comparability (F. 39)	The performance of an entity should be assessable and comparable. More specifically, this requires <ol style="list-style-type: none"> i. <i>inter-period comparability of annual reports</i>. Comparability must be ensured over different compliance periods, especially if the amount of free allocations under the EU ETS is gradually reduced and/or replaced by auctioning.²³ ii. <i>comparability of financial statements of different entities</i>. Financial statements of <i>different entities</i> covered by the emissions trading scheme should be ensured. This is of

22 Depending on the EU emissions target, price forecasts for 2016 vary from €33/allowance (20% goal) to €57/allowance (30% goal); cf. Kruppa and Allan (2010).

23 Directive 2009/29/EC, Article 9 states that the “[...] Community-wide quantity of allowances issued each year starting in 2013 shall decrease in a linear manner beginning from the mid-point of the period from 2008 to 2012. The quantity shall decrease by a linear factor of 1.74 % compared to the average annual total quantity of allowances issued [...] for the period from 2008 to 2012.” Due to the absence of carbon leakage, utilities will cease to receive free allocations in Phase II of the EU ETS. Instead, auctioning will be the rule from 2013 onwards.

	particular relevance under the EU ETS, due to the option for transitional free allocations. ²⁴
E Incentives and disincentives	How and why different accounting approaches might attract investments in emissions allowances should be scrutinized. More specifically, this refers to the questions of <ul style="list-style-type: none"> i. whether entities covered by the EU ETS are in any way <i>incentivized to pursue certain hedging strategies</i> due to the accounting treatment of either emissions allowances or carbon derivatives; and ii. whether <i>other actors</i>, such as private investors, might be incentivized to invest/ not to invest in emissions allowances.

6 The way forward: Towards a true and fair view

A comparison of these demands for accounting under the EU ETS and the current accounting treatment of the EU ETS reveal that the current handling is unsatisfactory. While a detailed analysis of the deficiencies of the current accounting treatment will be presented shortly, two general points can already be noted at this stage. First, the above analysis of accounting practices with regard to the EU ETS has made clear that emission allowances do not fit in neatly with any existing IFRS (*cf.* also Lovell *et al.* 2010). Thus, in order to ensure the comparability of the financial statements of participants, a harmonization of accounting policies is urgently needed. Second, financial accounting currently does not provide sufficient and adequate information to users who seek to assess the consistency of corporate strategy with national and international low-carbon objectives. Given these failings, it seems warranted to explore a coherent approach that will offer a true and fair view and avoid artificial income shifts, while at the same time paying sufficient attention to climate policy concerns. For that purpose, several pieces need to be put together.

Accounting for free allocations: Advocating a fair value approach for initial measurement

The prevailing accounting approach, which recognizes free allocations of allowances at nil, is unsatisfactory for three reasons. First, the approach fails to comply with the true-and-fair-view criterion of IFRS, because it does not faithfully represent the resources controlled by the entity. Rather, it understates the value of assets held by the entity. Indeed, during the credit crisis in 2008, it has been observed that some participants in the EU ETS used allowances as a liquidity reserve (Capoor and Ambrosi 2009).

Second, the benefit of free allocations is effectively hidden in the financial statements if they are initially recognized at nil. The benefit only becomes apparent once a possible surplus of allowances is sold on the market, which leads to the realization of gain equal to the sale price. Additionally, from the financial statements of the reporting entity, considerable windfall profits cannot be traced back to free allocation where allowances are initially recognized at nil. Such profits can arise in non-competitive markets with low price elasticities of demand, as carbon costs are passed through to consumers. In Phase I of the EU ETS, such profits were observed in the power sector (Betz and Sato 2006; Sijm *et al.* 2006). This is particularly important for investors seeking to assess future prospects of companies

²⁴ Directive 2009/29/EC, Article 10c, see below.

participating in EU ETS given that free allocation is set to decrease for certain sectors such as the power sector.

Third, in future compliance periods, an initial recognition of allocated allowances at nil could additionally hamper the proper functioning of the EU Single Market. This is due to the *option for transitional free allocations* in the power sector beyond 2012, which was granted to the Member States that joined the European Union in 2004 or thereafter in order to support the modernization of their national electricity production. The benefit of these free allocations, which will not be received by most European competitors in the power sector, should be clearly indicated in the financial statements. This will allow investors to fully understand the reasons behind the financial performance of installations which were granted free allocations, compared to the financial performance of installations which were not.

These problems can be avoided by initially recognizing allowances at fair market value, regardless of whether they were purchased or granted by way of free allocation. At the same time, this fair-value approach allows the recognition of a liability even if CO₂ emissions do not exceed the amount of free allowances granted to the entity. This improves the comprehensibility of the social and economic costs arising from emissions-intensive production and reflects the market-orientated purpose of the EU ETS. An adequate accounting policy for emissions trading schemes must be able to fully capture the impact of the policy instrument on the participating entities. It is crucial to note that the EU ETS has put a price on emitting CO₂, irrespective of whether allowances were allocated by the government or purchased by the entity. A fair-value approach to the initial recognition of allocated allowances thus addresses calls for transparent *reflection of carbon costs* from a policy perspective.

Avoiding a 'day-one-gain' by adopting a government grant approach

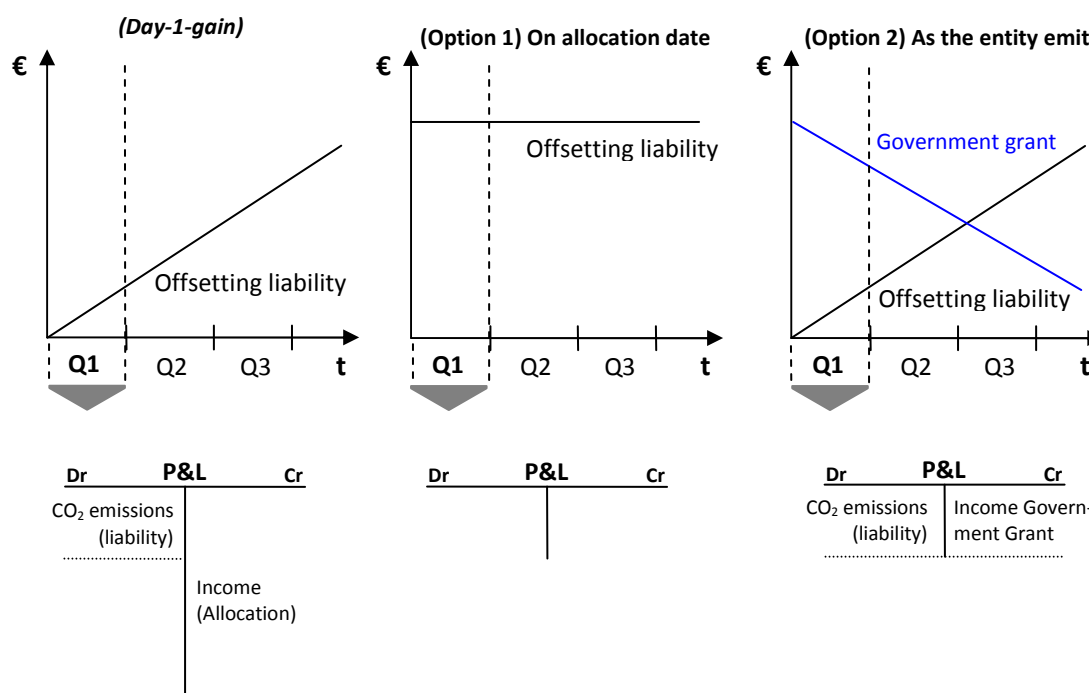
When allocated allowances are recognized at fair value, the need for a corresponding *credit side entry* arises. Otherwise, a so called 'day-one-gain' would arise, as the fair value of the freely allocated allowances would, misleadingly, be recognized as profit. Such gain would create distortions and decrease the comparability of interim reports of entities participating in the EU ETS.

Regarding the credit side entry, two options are conceivable: either an offsetting liability or a government grant as a deferred income item on the allocation date. An entity could recognize an *offsetting liability* (Option 1) as it receives free allocations of allowances at the beginning of the compliance period. This approach takes into account the fact that free allocations under the EU ETS are based on historical emissions levels. It is realistic to assume that the receiving entity will stay in business (i.e. continue producing) and most likely emit an amount of CO₂, which – at least approximately – corresponds with the number of allowances it was allocated by the government. Alternatively, the entity may recognize *deferred income* (Option 2). As argued under IFRIC 3, the allocation of allowances meets the definition of a government grant, because the transfer of emissions allowances is linked to compliance under the EU ETS. Following this approach, the benefit arising from free allocations must be de-recognized on a systematic basis. Such de-recognition can be carried out periodically or based on actual CO₂ emissions.

At first glance, both options appear reasonable. They differ, however, in the extent to which the offsetting liability changes over time. The first option requires amendments to the liability *only* to the extent that the amount of emitted CO₂ deviates from the number of allocated allowances. Thus, the cost of carbon emissions under the EU ETS only becomes visible in the profit or loss statement when the carbon emissions by the entity exceed the number of allocated allowances. By contrast, the second option leads to both gradual income recognition and, based on actual emissions, recognition of the offsetting liability as an expense. Thus, not the allocation itself but the CO₂ emissions constitute the obligating events which require the recognition of a corresponding liability under the EU ETS. *Figure 1* illustrates the basic implications of the different approaches discussed.

Figure 1. Recognition of a liability and income recognition, under different approaches

P&L – 1st Quarter



Upon closer inspection, it becomes apparent that Option 2 is clearly preferable. The recognition of a government grant as a deferred income item and its subsequent recognition as income provide increased transparency and help to illustrate the compliance costs under the scheme as *costs of production*. The definition of the emissions, rather than the allocation, as the obligating event for the recognition of an offsetting liability also avoids distortions if allowances are obtained under different allocation mechanisms. It does not make sense that a participant entitled to free allocations should recognize an offsetting liability, while a participant who acquires allowances through auctioning should not do so until the entity emits. Any different accounting treatment would be misleading, because eventually both entities are subject to identical compliance requirements under the EU ETS. Moreover, showing a government grant in the statement of financial position draws attention to the subsidy character of free allocation of allowances. It thus helps to guide the strategic choices of management for a low-carbon transformation.

All of this implies that on the date of allocation of allowances, a government grant should neutralize the impact of the fair value recognition of the allowances. Over time, as the entity emits, the government grant gradually disappears; at the same time, an offsetting liability is recognized. Through the combination of initial fair value recognition of the allowances, a government grant, and an increasing offsetting liability, a satisfactory accounting treatment for emissions trading can be reached. However, this is only the case as long as no significant change in the market price for allowances occurs.

Coping with changing market prices (I): The subsequent measurement of emissions allowances

Changing market prices for emission allowances create problems for coherent carbon accounting. The discussions surrounding IFRIC 3 have vividly illustrated this fact. To provide a true and fair view in a situation of changing market prices, we advocate a distinction between allowances (1) held for compliance and (2) allowances held for trading. Accordingly, allowances held for trading should be

measured at fair value; any revaluation gains and losses should go through profit or loss. In contrast, with respect to allowances held for compliance purposes, participants in the EU ETS should have the choice between the cost model and the revaluation model. The reasoning behind such a distinction is as follows:

(1) Allowances held for compliance.

Measurement at fair value through profit or loss, an approach which was brought forward with reference to the functional resemblance of allowances to financial instruments, had been discussed during the development of IFRIC 3.²⁵ This approach would have the benefit of providing increased transparency regarding the real-time cost of emitting CO₂. It could therefore be argued that such measurement increased the value of the information provided in the financial statements. However, it appears very doubtful whether such fair value treatment through profit or loss for allowances held for compliance purposes would really be beneficial. In practice, participants will hold a large proportion of their emission allowances exclusively for compliance purposes. Carbon prices under the EU ETS have been volatile in the past and continue to be highly dependent on the political environment.²⁶ Thus, a fair-value approach would make profits strongly dependent on the market price developments for emissions allowances. As a reaction, management may reduce the number of allowances held for long-term compliance. The ensuing lower overall demand for allowances appears undesirable from a climate policy perspective. In that situation, the benefit from a fair value approach would not outweigh the distortive and disproportionate impact on the figures of the normal course of the business.

Therefore, as much as possible, the measurement provisions for allowances held for compliance should leave profit or loss unaffected. There are two possibilities for achieving this aim: entities could carry the allowances at cost or revalue them through other comprehensive income (OCI).²⁷ Revaluing the allowances through OCI has the advantage of increased transparency on the costs of emitting CO₂. Moreover, management attention is drawn to the potential freeing of liquidity when carbon emissions are reduced. In the case of allowances held for compliance, fair value changes should be recognized in OCI in order to avoid distortive effects on the results of the normal course of business. However, in a similar situation, other IFRS standards give entities the choice between carrying at cost and revaluation. Therefore, it would appear conceivable to extend that choice to the case of emission allowances.

Nevertheless, changing carbon prices sometimes have to be reflected in profit or loss. This is because impairment losses as well as reversals have to be recognized in the income statement. To avoid the problem in practice, allowances are often considered part of a larger cash generating unit. Impairment is applied to the larger cash generating unit where allowances are held for compliance rather than to the emissions allowances as such. Impairment occurs only where the larger cash generating unit requires a write-down. This will not usually be the case where the price of allowances falls. At first glance, this approach thus appears to be a viable remedy to the problem. However, restricting impairment of the allowances that are reported in the aggregate balance sheet as liquid assets, even though they are *de-facto* devalued and held in the cash generating unit, is at odds with the currency function of allowances. In this case, avoiding impairment creates the risk of overstating fungible items of the entity. The need for transparency of accounting and

²⁵ Cf. IFRIC BC.14.

²⁶ Cf. Long and Kaminskaite-Salters (2007).

²⁷ As under IAS 16.30 et seq. and different from IAS 40.30 where revaluation gains are shown in profit or loss.

comparability of financial statements can thus be frustrated. Therefore, in our view, allowances should generally not be treated as part of a larger cash generating unit.

(2) Allowances held for trading.

In contrast, when allowances are held for speculative or trading purposes rather than for compliance purposes, measurement at fair value through profit or loss seems appropriate. Although allowances do not qualify as financial instruments as defined in IAS 32.11, they serve an identical function for traders in allowances. Due to the lack of physical substance and the existence of a very liquid carbon market, emission allowances show a considerable resemblance to financial instruments. Thus, financial instruments and emissions allowances held for trading purposes should receive a similar treatment. Admittedly, this approach has a clear drawback: It implies measuring allowances held for trading differently from the same assets, allowances held for compliance. Yet such activity-based accounting fits in well with financial reporting for financial instruments under the future IFRS 9.²⁸ Thus, if allowances are held for trading purposes, the implications of this type of business should be reflected in the financial statements in a timely manner and should have an impact on the overall profit figure. To ensure the practical implementability of the distinction, the following rules could be envisaged: entities that do not operate CO₂ emitting installations are deemed irrefutably to hold emissions allowances for trading purposes. In contrast, entities operating such installations are deemed to hold the allowances for compliance purposes unless they designate all or a part of the allowances as held for trading.

Coping with changing market prices (II): Offsetting liabilities

In line with this argument, the measurement of the offsetting liability should be based on the carrying value of the allowances held for compliance even though an emitting entity is not contractually obliged to remit these allowances. As currently pursued in practice, this cost of settlement approach provides a true and fair view and the best estimate of the costs the entity will actually incur to settle its obligations.

Coping with changing market prices (III): Government grants should follow allowance prices

With regard to free allocations, two aspects need to be aligned. First, financial reporting is pursued on a quarterly basis and requires that the values of assets and liabilities held by the reporting entity be truthfully presented. Second, since emissions allowances are granted on an annual basis, this means that – since they constitute assets— they will also regularly become subject to revaluations or impairment testing. If market prices are changing, this situation might result in volatile quarterly reporting. Therefore, the government grant needs to mitigate these unwanted effects and allow for balanced interim reporting.

Under current IFRS, however, the government grant approach runs into problems when the market price for allowances fluctuates after free allocation. Where the market price of allowances falls, a write-down on the allowances becomes necessary. When the price rises again, the impairment needs

²⁸ Cf. IFRS 9.4.2. At the time of the preparation of this study, IFRS 9 was not yet endorsed by the EU. Therefore, EU listed companies will continue to apply the provisions of IAS 39.45-46 and most likely not early apply IFRS 9 (effective date 1 January 2013).

to be reversed through profit or loss. At present, only the write-down can be balanced with corresponding profit recognition from the government grant, whereas current IFRS rules do not allow the revaluation of the government grant. This means that the reversal of the impairment on the allowances cannot be balanced by a corresponding adjustment of the government grant. Thus, where the market prices of the allowances rise again, the reversal of the previous write-down automatically leads to profit recognition. It implies that profits (temporarily) react to changes in allowance prices even when the entity has received a free allocation of all the allowances it requires. The effect will be reversed only later on, as the government grant gradually disappears and is replaced with the offsetting liability. Nevertheless, the temporary distortion of reported profits seems undesirable.

To resolve this issue, the accounted value of the grant should be allowed to fluctuate in parallel with the allowances, thus neutralizing the impact on profits. The fluctuation should be confined to the special case of allowances from emissions trading schemes. Whereas government grants are usually meant to compensate solely for future expenses, the government grant regarding emissions allowances has an additional function: it must compensate revaluation gains (and losses, when they occur after a reversal of a previous write-down) in order to avoid excessive profit volatility. This issue is bound to become more relevant in future periods, as entities increasingly take up the option of banking and thus hold allowances for future compliance purposes for a longer period of time.

Coping with changing market prices (IV): Accounting for instruments hedging carbon risks

In the light of the above outlined accounting approaches for emissions allowances, offsetting liabilities, and the government grant, the own use exemption, which allows for the calculation of the offsetting liability by taking into account the delivery price of the derivatives contract, should be applied in a very restrictive manner. Otherwise the liability for emissions would be based on two different carbon prices. An easy derivation of carbon intensity from the liability would therefore be rendered impossible. Instead, cash flow hedge accounting, under which changes in the fair value of the contract are reported in other comprehensive income, would fit in better and should be made the general rule where financial instruments are entered into in order to hedge risks regarding future carbon compliance. Conversely, financial instruments held for trading should be accounted for in profit or loss.

Table 4 summarises this section and provides an overview of the possible changes to the current accounting treatment for emissions allowances, the offsetting liability, the government grant and financial instruments to hedge carbon risks.

Table 4. Overview of possible changes

		Current treatment	Alternative treatment explored in article
Emissions allowances	Initial measurement in case of free allocation	Recognition at <ul style="list-style-type: none"> ▪ nil (net liability approach); or ▪ fair value (government grant approach) 	<i>Mandatory</i> recognition at fair value
	Subsequent measurement	Either following the cost model or revaluation model	Distinction between <ul style="list-style-type: none"> ▪ <i>allowances held for compliance</i> (choice between cost model and revaluation model), and ▪ <i>allowances held for trading</i> (fair value through profit or loss)
Offsetting liability	Recognition	Choice between allocation date and 'as the entity emits' approach	<i>Mandatory</i> 'as the entity emits' approach combined with <i>mandatory</i> government grant
	Initial/subsequent measurement	Choice between fair value approach and cost of settlement approach	<i>Mandatory</i> cost of settlement approach
Government grant	Initial recognition	Only if allocated allowances are initially recognized at fair value	<i>Mandatory</i> government grant recognition at fair value
	Subsequent measurement	Only impairment and reversal of a previous impairment	Revaluation of government grant at fair value
Hedging instruments	Accounting treatment	As financial instruments or no accounting (pending transactions under own use exemption)	<i>Mandatory</i> accounting as financial instruments (own use exemption should <i>not</i> be applicable)
	Subsequent measurement	Regular treatment though profit or loss or cash flow hedge accounting	Distinction between <ul style="list-style-type: none"> ▪ <i>financial instruments held for compliance purposes</i>: cash flow hedge accounting as rule ▪ <i>financial instruments held for trading purposes</i>: always measured through profit or loss

7 Concluding remarks

The implementation of the EU ETS has been one of the most remarkable efforts to tackle climate change on a transnational level. Questions on how the impact of the scheme should be reflected in the financial statements of participating entities have opened an ongoing debate, involving academics and market players alike.

As illustrated in this paper, the absence of authoritative guidance under IFRS has led to inconsistencies in the accounting policies for allowances that are applied in practice. The dominant treatment under IFRS is based on the recognition of allocated allowances at nil. This keeps the implications of the EU ETS invisible as long as the emissions of an entity do not exceed the amount of allowances granted by the government. As this paper indicates, policymakers, analysts, and investors should be dissatisfied with the prevailing situation under IFRS, since it may affect the transparency of financial statements and fail to provide a true and fair view of the assets controlled and the risks faced by an entity.

This paper has also offered an evaluation framework, which it has amended from a climate policy perspective. Accounting approaches under the EU ETS must, due to the complexity of the policy instrument, meet differing demands to ensure that the requirements for financial accounting under IFRS are satisfied. They must, *inter alia*, grant users of financial statements the possibility to fully understand and measure the impact of the scheme on participants. The provision of adequate information regarding the sustainability of an entity's production under the EU ETS is of critical importance to users of financial statements, especially given that prices for emissions allowances are expected to rise in the future. In addition, accounting under IFRS must avoid causing competitive distortions. As other global players are discussing the implementation of emissions trading schemes, authoritative accounting guidance for the implications of emissions trading schemes should be provided in a timely and unambiguous manner. This is also important in order to lower compliance costs for entities which are likely to be covered by such a scheme in the near- or mid-term future and to ensure the comparability of the financial statements of participating companies.

Finally, the way forward towards a true and fair view of accounting for EU ETS has been sketched: Allowances should be recognized at fair value even when they are allocated for free. A corresponding government grant should neutralize the impact on profit or loss. As the entity emits, this deferred income position should be derecognized and an offsetting liability should be recognized. To reflect changing market prices, allowances held for compliance should be measured at amortized cost or at fair value whereas allowances held for trading should be measured at fair value with gains or losses for the latter recognized in profit or loss. Liabilities should be measured at a cost of settlement approach. Finally, the value of the government grant should be allowed to fluctuate in line with the allowances granted in the light of changing market prices. Regarding financial instruments entered into for compliance purposes, cash flow hedge accounting should be the instrument of choice, whereas financial instruments held for trading should be accounted for in profit or loss. These principles promise the double advantage of fitting in well with the general accounting principles underlying IFRS and of obeying the imperatives of EU ETS as a climate policy instrument.

Acknowledgements

The authors would like to thank Professor Robert J. Kirsch, Southern Connecticut State University, USA, for his valuable suggestions and helpful comments during the preparation of this study. Support by Climate Strategies is gratefully acknowledged.

References

Adler, Düring and Schmaltz (2007)

Adler, H., Düring, W. and Schmaltz, K. (2007), *Rechnungslegung nach Internationalen Standards*, Section 1B, no. 59, Schäfer-Poeschel-Verlag, Stuttgart.

Anttonen, Mehling and Upston-Hooper (2007)

Anttonen, K., Mehling, M., and Upston-Hooper, K. (2007), 'Breathing life into the carbon market: Legal frameworks of emissions trading in Europe', *European Environmental Law Review*, April, pp. 96–115.

Bebbington and Larringa-González (2008)

Bebbington, J. and Larringa-González, C. (2008), 'Carbon Trading: Accounting and Reporting Issues', *European Accounting Review*, vol. 17, no. 4, pp. 697–717.

Belkaoui (1976)

Belkaoui, A. R. (1976), 'The impact of the disclosure of environmental effects of organizational behavior on the market', *Financial Management*, Winter, pp. 26–31.

Betz and Sato (2006)

Betz, R. and Sato, M. (2006), 'Emissions trading: lessons learnt from the 1st phase of the EU ETS and prospects for the 2nd phase', *Climate Policy*, vol. 6, no. 4, pp. 351–359.

Brewer (2005)

Brewer, T. (2005), 'Business perspectives on the EU emissions trading scheme', *Climate Policy*, vol. 5, no. 2, pp. 137–144.

Brohé, Eyre and Howarth (2009)

Brohé, A., Eyre, N. and Howarth, N. (2009), *Carbon Markets – An international business guide*, Earthscan, London.

Buckley (1980)

Buckley, J. (1980), 'Policy models in accounting: a critical commentary', *Accounting, Organizations and Society*, vol. 5, no. 1, pp. 49–64.

Capoor and Ambrossi (2009)

Capoor, K. and Ambrossi, P. (2009), *State and Trends of the Carbon Market*, New York: The World Bank.

Casamento (2005)

Casamento, R. (2005), 'Accounting for and Taxation of Emission Allowances and Credits', pp. 55–70, in: Freestone, D and Streck, C (eds.), *Legal Aspects of Implementing the Kyoto Protocol Mechanisms: Making Kyoto Work*, Oxford, Oxford University Press.

Coase (1960)

Coase, R. (1960), 'Problem of Social Cost', *Journal of Law and Economics*, vol. 3, no. 1, pp. 1–44.

Cook (2009)

Cook, A. (2009), 'Emission rights: From costless activity to market operations', *Accounting, Organizations and Society*, vol. 34, no. 3-4, pp. 456–468.

Droege (2009)

Droege, S. (2009), 'Tackling Leakage in a World of Unequal Carbon Prices', <http://www.climatestrategies.org/our-reports/category/32/153.html>.

EEA (2008)

EEA (2008), European Environment Agency: 'Application of the Emissions Trading Directive by EU Member States', Reporting year 2008, Technical report no. 13/2008, pp. 74–75.

EFRAG (2005)

EFRAG (2005), 'Final Endorsement Advice: Adoption of IFRIC 3 Emission Rights', 6 May 2005.

Ekins and Parker (2001)

Ekins, P. and Parker, T. (2001), 'Carbon taxes and carbon emissions trading', *Journal of Economic Surveys*, vol. 15, no.3, pp. 325–376.

Ernst & Young (2009)

Ernst & Young (2009), 'Mastering the challenge – Practical IFRS guidance for power and utilities', [http://www.ey.com/Publication/vwLUAssets/Mastering_the_challenge_IFRS_power_utilities/\\$FILE/Mastering_the_challenge_IFRS_power_utilities_GL_IFRS.pdf](http://www.ey.com/Publication/vwLUAssets/Mastering_the_challenge_IFRS_power_utilities/$FILE/Mastering_the_challenge_IFRS_power_utilities_GL_IFRS.pdf).

European Commission (2010)

European Commission (2010), 'Emission Trading System (EU ETS)/ Auctioning', <http://ec.europa.eu/environment/climat/emission/auctioning_en.htm>.

FERC (1993)

FERC (1993), 'Revisions to Uniform Systems of Accounts to Account for Allowances under the Clean Air Act Amendments of 1990 and Regulatory-Created Assets and Liabilities and to Form Nos. 1, 1-F, 2 and 2-A', Order No. 552.

Fornaro, Winkelman and Glodstein (2009)

Fornaro, J., Winkelman, K. and Glodstein, D. (2009), 'Accounting for Emission: emerging issues and the need for global accounting standards', *Journal of Accountancy*, issue 208, no.1, pp. 40–47.

Gibson (1996)

Gibson, K. (1996), 'The problem with reporting pollution allowances: reporting is not the problem', *Critical perspectives on Accounting*, vol. 7, no. 6, pp. 655–665.

Giner Inchausti (2007)

Giner Inchausti, B. (2007), 'La contabilidad de los derechos de emisión: una perspectiva internacional' (Accounting for emission rights: an international perspective), *Revista española de financiación y contabilidad*, vol. 36, no. 133, pp. 175–193.

Hoffmann and Lüdenbach (2006)

Hoffmann, W.-D. and Lüdenbach, N. (2006), 'Die Bilanzierung von Treibhausgas-Emissionsrechten im Rechtsvergleich', *Der Betrieb*, vol. 59, no. 2, pp. 57–62.

IASB (2005)

IASB (2005), 'IASB withdraws IFRIC Interpretation on Emission Rights', *Press Release*, July 2005.

IASB (2010)

IASB (2010), 'IFRS adoption and use around the world', <<http://www.iasb.org/Use+around+the+world/Use+around+the+world.htm>>.

Jaggi and Freedman (1982)

Jaggi, B. and Freedman, M. (1982), 'An analysis of the information content of pollution disclosures', *Financial Review*, vol. 19, no. 5, pp. 142–152.

KPMG (2008)

KPMG (2008), *Insights into IFRS 2008/09*, 5th ed., Sweet & Maxwell, London.

Kruppa and Allan (2010)

Kruppa, M. and Allan, A. (2010), 'Analysts up EUA price forecasts', *Point Carbon CarbonMarket-Daily*, 11.06.2010, vol. 6, no. 108, p. 3.

Long and Kaminskaite-Salters (2007)

Long, S. and Kaminskaite-Salters, G. (2007), 'The EU ETS – Latest Developments and the Way Forward', *Carbon & Climate Law Review*, vol. 64, no. 1, pp. 64–72.

Lovell, Sales de Aguiar, Bebbington and Larrinaga-Gonzalez (2010)

Lovell, H. , Sales de Aguiar, T., Bebbington, J. and Larrinaga-Gonzalez, C. (2010), 'Accounting for Carbon', ACCA and IETA, Certified Accountant Educational Trust, accessible <<http://www.ieta.org/ieta/www/pages/download.php?docID=3545>>.

MacKenzie (2009)

MacKenzie, D. (2009), 'Making things the same: Gases, emission rights and the politics of carbon markets', *Accounting, Organizations and Society*, vol. 34, no. 3–4, pp. 440–455.

Martinez-Diaz (2005)

Martinez-Diaz, L. (2005), 'Strategic experts and improvising regulators: explaining the IASC's rise to global influence, 1973-2001', *Business and Politics*, vol. 7, no. 3, Article 3.

Nolke (2007)

Nolke, A. (2007), 'Introduction to the special issue: the globalization of accounting standards', *Business and Politics*, vol. 7, no. 3, Article 1.

Perry and Nölke (2006)

Perry, J. and Nölke, A. (2006), 'The political economy of International Accounting Standards', *Review of International Political Economy*, vol. 13, no. 4, pp. 559–586.

Patek (2006)

Patek, G. (2006), 'Bilanzierung von Schadstoff-Emissionsrechten und Emissionsrechte-Abgabepflichten nach HGB', *Die Wirtschaftsprüfung*, vol. 59, no. 18, pp. 1152–1160.

PwC (2008)

PwC (2008), *The IFRS Manual of Accounting 2009*, Croner CCH Group Ltd, Surrey.

PwC and IETA (2007)

PwC and IETA (2007), *Trouble-Entry Accounting – Revisited: Uncertainty in accounting for the EU Emissions Trading Scheme and Certified Emission Reductions*, accessible <<http://www.ieta.org/ieta/www/pages/getfile.php?docID =2535>>.

Rogler, Lange and Straub (2009)

Rogler, S., Lange, D. and Straub, V. (2009), 'Bilanzierung von Emissionsrechten', *Zeitschrift für internationale und kapitalmarktorientierte Rechnungslegung*, vol. 9, no. 6, pp. 371–382.

Sijm, Neuhoff and Chen (2006)

Sijm, J., Neuhoff, K. and Chen, Y. (2006), 'CO₂ cost pass-through and windfall profits in the power sector', *Climate Policy*, vol. 6, no. 1, pp. 49–72.

Skjærseth and Wettestad (2009)

Skjærseth, J. and Wettestad, J. (2009), 'The origin, evolution and consequences of the EU Emissions Trading Scheme', *Global Environmental Politics*, vol. 9, no. 2, pp. 101–122.

Wambsganss and Sanford (1996)

Wambsganss, J. and Sanford, B. (1996), 'The problem with reporting pollution allowances', *Critical Perspectives on Accounting*, vol. 7, no. 6, pp. 643–652.

Wilkinson-Riddl (2008)

Wilkinson-Riddl, G. (2008), *International GAAP 2008 – Generally Accepted Accounting Principles under International Financial Reporting Standards*, Wiley, Weinheim.

World Bank (2010)

World Bank (2010), 'State and trends of the carbon market 2010', Carbon Finance at the World Bank, Washington D.C.