

Carbon Credits: Accounting Issues and Challenges

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Over the past few decades, extensive research has been conducted on climate change and the need for sustainable natural resource management. The Kyoto Protocol (1992), was a critical treaty in the field of climate change, international and national regulations on emissions trading. This study investigates carbon credits and related accounting practices. It is a useful source for companies recording carbon credit and reporting it on their financial statements. At present, accounting practices for carbon credits lack standards. Although there are no specific standards for accounting carbon credits, certain existing standards can be applied to the practice. The most popular carbon credit classifications are “intangible assets” and “provisions for contingent liabilities and contingent assets”. The different standards applied for carbon credits in accounting practice necessitate guidelines that are easier to follow and unidirectional. This has implications for financial statements that inform stakeholders’ decisions.

Key words: *Carbon credits, Carbon accounting, Accounting practices.*

Introduction

The effects of climate change are significant, unpredictable, and cannot be mitigated (IEA, 2005; Jermstittiparsert, 2019). The Kyoto Protocol, endorsed by the United Nations Framework Convention on Climate Change (UNFCCC), has divided the world into two categories: Annex I Countries (developed nations that have accepted the emission reduction goals) and Non-Annex I Countries (developing nations with no emission targets). The Kyoto Protocol also developed three flexible mechanisms, one of which is the Clean Development Mechanism (CDM). It yields Certified Emission Reductions (CERs) that can help Annex I Countries reduce their carbon levels (Parnphumeesup and Kerr, 2015).

Greenhouse gas (GHG) emissions have emerged as an acceptable side effect of business for humanity and the international community (Nena, 2015; Haseeb, Wattanapongphasuk, & Jermisittiparsert, 2019; Jermisittiparsert & Chankoson, 2019). Technological advancements and industrial development have introduced new ways to reduce GHG emissions in the atmosphere (Tolon-Becerra et al., 2010). One way to do so is to trade emissions, which will help businesses achieve their environmental goals (Dargusch and Griffiths, 2008). Although no current accounting practice has been established for carbon credits (CA, 2008), Lee (2011) found that GHG emissions have become a real business with a high income. Some companies may interpret GHG emissions as intangible assets, inventories, or research and development costs (Ernst and Young, 2009). Accounting guidelines must be established based on general accounting principles as well as the background of each company. These guidelines should help improve the quality of the financial information in financial statements which inform stakeholder decisions.

The authors of this study aim to research accounting practices for carbon credits, which may affect the current and future choices of the financial accounting approach.

Defining Carbon Credits and Accounting Practices

Carbon credits generated by CDM have been defined by different research studies:

Having studied the financial aspects of carbon trading, Kundu (2006) observed that carbon credits refer to the recognition of agreements and costs incurred on GHG emissions from developing countries. The study also noted that developed countries need to buy CERs under CDM projects. Bebbington and Larrinaga-Gonzalez (2008) studied the accounting and reporting issues in carbon trading and opined that from a financial perspective, carbon credit refers to the valuation of the assets and liabilities of polluting gases. Based on an analysis of corporate responses in an emerging climate regime Kolk et al. (2008) stated that carbon credit refers to the amount of GHG emissions that can be purchased or sold. Hespenheide et al. (2010) studied accounting for sustainability performance and noted that carbon credits are measured in financial and non-monetary aspects from the internal and external perspectives of an organisation. Another interpretation was provided by Gupta (2011) who explained carbon credit as the amount of global GHG emissions controlled by buying and selling. Okonkwo (2015) studied carbon credit development and argued that carbon credits can be defined as certificates or emission rights that can be traded.

Accounting principles can be described as the rules and guidelines that companies must regularly follow when reporting financial data (Cordazzo, 2008). According to Sanusi and Izedonmi (2014), accounting practices refer to accounting and financial reporting methods that represent the truth and fairness of a business to stakeholders and users who can then employ

this information in making right decisions. Accounting practices ensure the preparation and presentation of financial statements (Idris et al., 2012).

Based on this literature review, the authors conclude that carbon credit refers to the measurement and assessment of GHG emissions as assets or liabilities that can be exchanged or traded.

The Meaning and Importance of Accounting Practices for Carbon Credits

According to KPMG (2008) and Hespeneide et al. (2010), accounting for carbon credits combines the concept of climate change, through the carbon-trading mechanism, with the accounting concept. Stechemesser and Guenther (2012) stated that accounting practices for carbon credits involve reporting financial information on environmental performance to external stakeholders. Along similar lines, Molisa and Wittneben (2008) opined that accounting practices for carbon credits provide environmental information in terms of revenue and environmental investment costs, which reflects corporate social responsibility.

After the Kyoto Protocol set carbon emission rights and commitments for each country, carbon credits started to become more popular around the world. Accounting practices had to keep up with this new economic development, which affects financial statements (Bebbington and Larrinaga-Gonzalez, 2008). The special features and complexity of GHG emissions (Ascui and Lovell, 2011) contributed to the development of carbon accounting systems or accounting for carbon emissions, particularly for financial reporting (Deloitte, 2007; KPMG, 2016; Ernst and Young, 2009).

Accounting practices for carbon affect the relationship between business and corporate social responsibility (Lee, 2008). However, no accounting standards have been specified for them (CA, 2008). After IFRIC-3 was withdrawn in February 2005, the IFRIC had agreed to prepare a limited amendment to IAS38; however the discussion indicated that a mismatch still existed because at the start of the calculating period assets will exist for which fair value gains and losses must be recognised upfront. A similar mismatch can also arise because of the location in which the gains and losses on these assets and liabilities are reported. Ambiguity entered accounting guidelines which is why accounting practices remain diverse (Cook, 2009; Ascui and Lovell, 2011; MacKenzie, 2009). Elfrink and Ellison (2009) found accounting rules for carbon trading deficient. This is similar to the observations of Uddin and Høltedahl (2013) who felt the lack of accounting practices related to GHG emissions or an accounting framework for environmental issues affects all businesses. Hopwood (2009) stated that in the absence of International Accounting Standards (IAS), accountants must comply with relevant standards, and financial reporters can use existing accounting standards as a guide for interpretation or analysis as per their expertise and/or knowledge.

Since accounting practices are important for financial reporting (Bebbington and Larrinaga-Gonzalez, 2008) and play a role in addressing climate change issues (Australia, CPA 2008b; ICAA and PricewaterhouseCoopers, 2010; Lodhia, 2011), accounting standards related to carbon emissions are essential for improving the quality and comparability of financial reporting (Burritt and Schaltegger, 2010). However, differences in practices weaken financial performance and render decision-making processes more difficult (Lovell and MacKenzie, 2011). Although accounting practices for climate change are complex, they can be shared with other stakeholders (Bebbington and Larrinaga-Gonzalez, 2008). Guidelines must support the involvement of other stakeholders, such as governments and suppliers (Lodhia, 2011). Accounting practices and financial reporting for carbon credits should not be limited to financial data since they are directly linked to business performance (Burritt and Schaltegger, 2010).

Accounting Background for Carbon Credits

Accounting is a business language used across the world (Mookdee, 2013). Stechemesser and Guenther (2012) noted that general accounting practices are a collection of accounts, balance sheets, audited financial statements, and financial reporting that focus on external stakeholders such as investors or creditors. Deloitte (2007) and Ernst and Young (2009) pointed out that general accounting must explain accounting policies to investors and other stakeholders. It should provide fair and reasonable financial information to shareholders (ACCA, 2009). International Accounting Standard Board (IASB) (2009) described general accounting practices as a guide for preparing financial statements to reflect users' satisfaction and ongoing operations; for this reason, financial information must be understandable, dependable, and comparable.

Although carbon accounting is a part of environmental accounting as well as financial accounting (Stechemesser and Guenther, 2012), accounting guidelines are lacking for emission rights (Cook, 2009). Lovell et al., (2010) stated that in the absence of suitable accounting standards, IASB accounting guidelines should be tweaked to fit the context. An entity must comply with paragraph 10 of IAS 8, *Accounting Policies, Changes in Accounting Estimates, and Errors*.

In the absence of specific guidelines for accounting standards for carbon credits, the following can be applied: 1) IAS 2, inventories; 2) IAS 20, accounting for government grants and disclosure of government assistance; 3) IAS 37, provisions for contingent liabilities and contingent assets; 4) IAS 38, intangible assets; and 5) IAS 39, financial instruments: recognition and measurement (Lovell et al. 2010; Cook, 2009; Ascui and Lovell, 2011; MacKenzie, 2009). Burritt and Schaltegger (2010) also discuss IASB regulations suitable for use in the absence of relevant accounting standards, citing the same standards. These

accounting standards are important for the quality of the data gathered and for comparing financial statements accurately.

Chotaliya (2014) noted that accounting practices for carbon credits in India had credible accounting principles for acquiring CERs in accordance with CDM project requirements regarding perceived measurement and disclosure. The relevant accounting standards include IAS 20, IAS 37, and IAS 38. However, the acceptance of accounting standards depends on the context in which a company records carbon credits as intangible assets or an item of inventory, as costs adsorptions, or fair value.

The literature review reveals that the most popular carbon credit classifications are “intangible assets” and “provisions for contingent liabilities and contingent assets”. Greek companies who generate CDM projects recorded GHG emissions as “intangible assets,” and “provisioning for contingent liabilities and contingent assets.” These companies did not implement IFRIC-3 as a guideline since their government grants a nil value upon receipt (Schaltegger and Burritt, 2000). The results are similar to those from surveys conducted by PricewaterhouseCoopers and IETA (2007): 65% of respondents recorded government grants as “intangible assets;” 5% adopted IFRIC-3 as a guideline; and another 30% indicated a nil value (Karatzoglou and Karatzoglou, 2011).

Mookdee (2013) studied the accounting of carbon emission trading in Australia and found that comparing carbon accounting was difficult since standards were dissimilar. The study also found that accounting practices for carbon credit used existing standards and frameworks based on expert perspectives and the nature of the business.

The authors of this study conclude that although there are no specific accounting standards for carbon credits, the following could be applied:

Assets:

IAS 2: Inventory

According to Mookdee (2013), many organisations define GHGs as an inventory item because CERs can be traded like general goods. This is similar to the WRI/WBCSD GHG protocol, which defines emission gas as part of an inventory. The FERC Uniform System of Accounts (USofA) also classifies carbon dioxide emission as an inventory item and arranges appropriate holdings. FERC EITF also defines carbon dioxide emission as an item of inventory. Deloitte (2007) noted that the FERC USofA considers GHG emissions as items of inventory to be used to record GHG trading costs or market prices. The cost of inventory items is calculated by the weighted average method. When CERs are considered inventory items, they are examined in the same way.

IAS 38: Intangible Assets

Krupova and Cerny (2007) argued that though intangible assets are non-monetary, they can be identified. They must, however, be identified separately from goodwill. Intangible assets are recognised and measured reliably when there is a possibility of future economic benefits, such as carbon credits that are not visible or tangible, but which can be traded or exchanged. As a result, the IAS recognises intangible assets through two methods: cost and revaluation. IASB (2010) recognises that IFRIC-3 supports the concept of GHG emissions as non-monetary assets and measures them at fair value.

Discussing accounting practices in Australia, Veith et al. (2009) asserted that these identify GHG emissions from donations and acquisition as intangible assets that can also be sold, transferred, or exchanged legally. EITF (2003), cited in Deloitte (2007), stated that GHG emissions are classified as intangible assets because they have no physical substance. Deloitte (2009) claimed these practices were widely used by both US GAAP and IFRS because their emission permits were more closely related to intangible assets rather than inventory items. Although the Financial Accounting Standards Board (FASB) has indicated that intangible assets must be tested for impairment, there is no evidence that GHG emissions are an intangible asset or that impairment testing will have a negative impact on accounting for emissions trading.

Although Ernst and Young (2009) stated that the amortisation of intangible assets requires an impairment test, Deloitte (2009) held that the amortisation method may be unreasonable because costs incurred will not be recorded until the project is completed or canceled. Lovell et al. (2010) found that companies treat carbon credit as intangible assets measured in accounts at cost. If they were obtained at no cost, they were shown as nil value but if carbon credits were purchased, they had an associated cost in the accounting.

IAS 39: Financial Instruments; Recognition Measurement

International Financial Reporting Standard 9 (IFRS 9), a financial instrument issued on July 14, 2014, supersedes this measurement. Recognition criteria include the valuation of financial and non-financial assets. Requirements for the classification and measurement of financial liabilities became effective on January 1, 2018 (Deloitte, 2017). Since IAS 39 was difficult to understand and implement, an amended version was presented in IFRS 9. Most regulations have not changed, but financial liabilities are reflected at fair value. Moreover, financial instruments are contracts that give rise to financial assets, such as cash from equity securities, right to operate, and financial instruments or equity held for trading or held to maturity (FAP, 2015). While EITF (2003) held that GHG emissions did not meet the requirements of financial

assets due to disputes relating to transfer and clearing of liabilities, Deloitte (2009) stated that financial obligations arising from derivative financial instruments should be classified as financial instruments or derivatives. Ernst and Young (2010) noted that GHG emissions could be traded as futures or futures contracts. Like other financial instruments at this committed to cash or financial assets for exchanging financial assets or financial liabilities with others in accordance with terms and conditions. Krupova and Cerny (2007) believe that GHG emissions are more a financial instrument than intangible assets. However, a counter argument was that carbon derivatives are a short-term asset, which a company could sell or repurchase. KPMG (2012) stated that carbon credits obtained from emission grants or donated or produced are the result of legal obligations, not a relationship specified in the contract.

Liabilities

IAS 20: Accounting for Government Grants and Disclosure of Government Assistance

Deloitte (2007) and Ernst and Young (2009) described government grants as assistance to companies in the form of resources, in exchange for compliance with the terms and conditions of past or future business operations. At the launch of a project, government grants may be transferable assets, such as land and resources. Lovell et al. (2010) indicated that these grants were recognised as income. Government grants account for carbon credit at nil value if credit is granted at no charge or the company initially accounts at fair value, with the difference between fair value and cost recognised as a government grant and presented as deferred income. Deac (2013) stated that government grants should be considered deferred income and should be recognised systematically as income over the period for which GHG emissions at fair value were issued. Krupova and Cerny (2007) argued that government grants recognised as income represent a reduction in emissions, while Bebbington and Larrinaga-Gonzalez (2008) opined that if grants do not match market price or interpretation of guidelines, they may result in an inaccurate income statement. However, Deloitte (2007) noted that GHG emission licenses should be measured on market value, holding licenses as current assets.

IAS 37: Provisions for Contingent Liabilities and Contingent Assets

Carbon credits may be recorded as contingent liabilities or contingent assets. Lovell et al. (2010) stated that carbon credit made as an obligation should be treated as a provision in terms of assessing and accounting for liabilities. The liability should be measured at fair value that recognises the best estimate of the expenditure required to settle the present obligation.

Nevertheless, accounting practices for carbon credit do not have accounting standards. The literature review reveals several approaches to carbon accounting for interpreting IFRS. For example, some companies interpret carbon credits as intangible assets or research and development costs. Gallego-Alvarez et al. (2016) observed that most accounting decisions were

based on the Positive Accounting Theory, which describes corporate contextual accounting practices. The theory, which emphasises accounting roles for shareholders and investors, involves accounting approaches that interpret whether the company chooses to adopt practices one way or another. Indeed, there are no separate accounting standards prescribed for accounting, measurement, and disclosure of carbon credits (Chotaliya, 2014). Diverse practices must be consolidated to improve carbon credit accounting and the quality of financial information.

Table 1: General accounting and carbon credit accounting on IAS 2: Inventory

General Accounting	Carbon Credit Accounting
Inventory items are measured at the lowest cost and net realisable value, for which cost is assigned as first-in, first-out or weighted average cost	Carbon credit is an inventory item that can be traded and recorded as CERs at cost or market price

Table 2: General accounting and carbon credit accounting on IAS 20: Accounting for government grants and disclosure of government assistance

General Accounting	Carbon Credit Accounting
Government grants are recognised in profit or loss, over a period, at fair value and includes non-monetary grants, which set up the grant as deferred income or asset	Government grants for carbon credits may be transferred as assets such as land and resources. If carbon credits are granted at no charge then government grants are accounted for at nil value

Table 3: General accounting and carbon credit accounting on IAS 37: Provisions for contingent liabilities and contingent assets

General Accounting	Carbon Credit Accounting
A conditional liability is not recognised in the statement of financial performance but is disclosed in the notes when it is more likely for benefits to occur	Carbon credits made as an obligation should be treated as a provision. The liability should be measured at fair value that recognises the best estimate of the expenditure needed to settle the present obligation

Table 4: General accounting and carbon credit accounting on IAS 38: Intangible assets

General Accounting	Carbon Credit Accounting
Intangible assets are initially measured at cost. After initial recognition, an entity usually measures an intangible asset at less accumulated amortisation. Intangible assets without useful life require annual impairment testing but cannot be amortised	Carbon credits recognised as intangible assets should be separate from goodwill that is measured at fair value and requires impairment testing or is measured in accounts at cost. If they were obtained at no cost they are shown as nil value but if carbon credits were purchased they have an associated cost in the accounting

Table 5: General accounting and carbon credit accounting on IAS 39: Financial instruments; recognition measurement

General Accounting	Carbon Credit Accounting
A financial asset or financial liability measured initially at fair value. Subsequent measurement depends on the category of the financial instrument. Some categories are measured at amortised cost and fair value	GHG emissions can be traded as futures or futures contracts at fair value, whereby carbon trading in carbon derivatives is an expected short-term asset that a company can sell or repurchase

Discussions and Conclusion

Although there are no specific accounting standards for carbon credits, most companies focus on the same five IAS as their relevant standards. As carbon credits are inventory items, they can be traded at market price, calculated by the weighted average method. Government grants may be considered a transferable asset and should be treated as deferred income or recognised as income at fair value. Carbon credits should be separated as assets and liabilities, and costs should be estimated at fair value. In addition, carbon credits should be separated from goodwill and recognised as an intangible asset measured at fair value, requiring an impairment test. Furthermore, carbon credits can be traded as futures or futures contracts at fair value.

The absence of accounting guidelines for carbon credits is the main reason for the variety of accounting practices that influence balance sheets, income statements, and notes to financial statements, making financial statements difficult to compare. Therefore, companies are concerned about the comprehensibility, reliability, and comparability of financial information proposed by these diverse accounting practices.



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