



Taxonomy of European Emissions Trading System in the Finnish forestry industry

A qualitative study on changes in the classification of emissions allowances
throughout different phases of the EU ETS

Supervisor: Jean Claude Mutiganda
Faculty of Social Sciences, Business
and Economics, and Law
Åbo Akademi University
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Writer: Rasmus Lundmark	
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Supervisor: Jean Claude Mutiganda	
Abstract:	
<p>European Commission has 2005 set a quota on emissions. They have set up a Cap-And-Trade system where companies receive a set number of emissions allowances that they may emit. One allowance allows the company to emit one kiloton of emissions of carbon dioxide. Emissions Allowances are regulated by the EU Commission under the European Emissions Trading Scheme (EU ETS). Companies within the EU ETS are required to emit less than a quota or be required to pay the cost of the excess emissions allowances.</p> <p>Since 2005 there has been a struggle to find harmony in classification processes. Prior studies have found that Companies have different views on classifications method. The differences depend on national laws and accounting classification methods. The interpretation committee (IFRIC) of the International Financial Reporting Standards Foundation (IFRS) interpreted the Emission allowance classification, IFRIC 3. IFRIC 3 did have issues from the beginning and was discarded after a year of use. The issue with emission allowance classification from the IFRIC point of view was that it gave a mismatch in the balance sheet. The mismatch happens when the emissions allowances are simultaneously measured at null value intangible assets and market value for provisions liabilities. The challenge is that the emissions allowances are both freely given while they hold value after the year-end. The question arises for accountants and managers whether they should value them at fair value or a null value if received for free.</p> <p>I have chosen to study changes in the classification process and how they have explained these differences. The study is conducted on a sample of three companies over some time of three phases. The Phases of the EU ETS are split into four. I have chosen to study annual reports from 2006, 2011 and 2016. These years represent phases one to three.</p> <p>Numerous companies have used different classification methods for emissions allowances. Major groups are categorised into net and gross methods. Where the net method values emissions allowances at fair value at the receipt and the gross method at cost, that is the null value of the emissions allowance. Companies can choose to classify emissions allowances as Intangible assets, liabilities, inventory, cash, and equivalents, or financial instruments. All classifications methods in previous studies and my study led to no profit for the company upon received emissions allowances. The profit or loss of emissions allowances happens when companies must buy more emissions allowances to cover their liability or if they can sell excess emissions allowances.</p> <p>The study coded information from the annual reports of the Finnish companies into tables for easy comparability. The study found that the classification of emissions allowances did not change much for UPM-Kymmene Oyj and Stora Enso Oyj. Metsä Board Oyj did however, change the classification method in the financial year 2016. They changed from valuing emissions allowances from the fair value classification at receipt, to classifying them at null value. They also reported nothing on amortisation and impairment testing which was a standard for all companies in the sample.</p>	
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ABBREVIATIONS

GHG - Greenhouse Gas

CO2 - Carbon dioxide

IASB - International Accounting Standards Board

IFRS - International Financial Reporting Standards

IFRIC - International Financial Reporting Interpretations Committee

EFRAG - European Financial Reporting Advisory Group

EU ETS - European Emissions Trading Scheme

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1 Introduction

This chapter will begin by providing background information about the subject, followed by a problem discussion that will describe the problem area further. Additionally, the purpose of this study will be presented, along with the limitations of the research. In the final part of the chapter, the structure of the thesis will be presented.

The world has seen elements of global warming and changes in business environments due to climate catastrophes. The European Commission has taken it upon itself to tackle rising temperatures by making polluting a costly endeavour and thus reducing emissions of carbon dioxide. The European emissions trading system is based on a Cap-and-Trade system that allocates emissions allowances to large polluting companies to control and reduce pollution. The Emissions Trading System is the world's first major carbon market and has remained the biggest (European Commission, 2022). The system has its roots in the 1997 Kyoto Protocol and is a successor of the USA's 1995 Acid Rain Program, an emissions cap-and-trade system to reduce sulphur dioxide and nitrogen oxides (EPA, 2022 and European Commission, 2022). The European Emissions Trading System (EU ETS) started in 2005 and is a carbon dioxide pollution cap-and-trade mechanism used in Europe. It thus follows the International Financial Reporting Standards (IFRS) system or the national accounting laws of each country. To achieve the goal of the European Commission, a common ground as to how to measure emissions and report them is an essential part of the journey for reducing emissions. The EU ETS journey consists of four phases, where the first phase started in 2005 and the latest phase started in 2021.

EU ETS follows a group of IFRS accounting standards which allows companies to classify their emissions allowances however they chose. The ambiguity leads to a situation where allowances have no unified classification method. All stakeholders should be able to trust the harmonisation process of emission allowance taxonomy. The same standards should be followed by all participants to ensure harmonised treatment of the EU ETS for all stakeholders. Taxonomy is the core of classification

in accounting. It is the systematic approach to classifying unknown objects into known categories. Even though objects have similarities and differences, to make the objects useful, they must refer to a common base of similarities within taxonomy (Johnson, 1972). Alexander and Jermakowicz (2006, p.1) write, “The nature of ‘reality’ in the context of financial reporting is, at best, a generally agreed, inter-subjective human construction”. The issue with the EU ETS allowances is that their taxonomy has been somewhat ambiguous. Studies conducted by Black (2013), Cook (2009), and Haupt and Ismer (2013) on how the treatment has been implemented and should be conducted for the EU ETS. Allowances can be classified as a traded commodity as well as a grant that may be used to cover emissions. In that sense, there is an issue with classification, valuation, and reporting. The challenges extend from the accountant to the external stakeholders. The challenge with ambiguity in taxonomy and classification reflects the presentation in financial reports. Both internal and external stakeholders need to deal with the challenge and try to find a system that works both for classification and lowering emissions. That is, the accountant and finance manager make judgments on how to classify allowances. The taxonomy of emission allowances is important, according to Gröjer (2001), to promote an understanding of the permits and brings order to large quantities of transactions. The shareholder may have challenges understanding the reported allowances and the impact that the EU ETS allowances have on a firm when there is no standardised way to classify and evaluate the allowances.

1.1 Problem discussion

In this thesis, only the International Financial Reporting Standards (IFRS) approach is considered, as the national laws differ substantially. The IFRS is generally seen as a standard-based system in contrast to the rule-based accounting principles of the United States Generally Accepted Accounting Principles (US GAAP). In essence, the IFRS is characterised by the application of qualitative core principles rather than rigid rules. The system was being prepared at the same time, in 2002, as the International Accounting Standards Board (IASB) was implementing International

Accounting Standards (IAS) for all companies whose securities are admitted to trading on a regulated market, also called listed companies in Europe (Cook, 2009). The struggle for the European Commission is that countries within the EU have had different accounting perspectives before adopting the international accounting standard. When the project of the European emissions trading system started in 2005, the IASB had an issue with classifying and recognising emissions allowances. IASB tried but failed when interpreting the reporting of emissions allowances in 2005. IASB gave an interpretation of the EU ETS classification with IFRIC 3. The interpretation had to be discarded soon after implementation (Cook, 2009). Following the nullification of IFRIC 3, companies have had to interpret the standards themselves to report essential information to stakeholders.

The taxonomy of the EU ETS allowances has been of some interest within the accounting community because how a company recognise allowances affects the presentation and comparability of allowances. The challenge concerning taxonomy in financial accounting is to cope with an organisational world that seems to become more immaterial than material, where resources in different immaterial forms act as the key production factors (Gröjer, 2001). Studies on classification find that a lack of clarity on what is being classified reduces the quality of classifications reported (Nobles 2008). Cook (2009) identifies a few distinct methods to classify emissions allowances that have an impact on their valuation. He notes that there were anomalous results due to a mismatch and that IAS 20 provisions should be used to avoid confusion when recognising the emission allowances. Black (2013) and Haupt (2013) continue Cook's (2009) study and found different approaches to classify and noted that IASB should make it clearer how recognition should happen. European accounting environments have their domestic law on how accounting items should be classified. Therefore, it is no surprise that different approaches to classifying emissions allowances have appeared since the beginning (Garcia-Torea et. al, 2022).

1.2 Purpose of the study and research question

The purpose of the study is to construct an understanding of the emission allowance taxonomy and whether the classification and communication have changed through the different phases of the EU ETS. The study will be conducted with the content analysis method, gathering data from companies' annual reports and notes. The purpose of the study is to examine how companies describe their taxonomy approach and determine whether their policy of classification has changed throughout the different phases. How the taxonomy of the EU ETS has been implemented and evolved will be established for the three different phases. The thesis will examine IFRS standards and previous classifications research to provide information on how companies have handled the classification of allowances. The study continues previous studies and contributes to the field of how the different companies within the forestry industry in Finland classify emissions allowances and how and why their communications of emissions allowances differ. This thesis wants to provide an understanding of similarities and differences in the classification of emissions allowances.

1.3 Limitations of the study

Within the European emissions trading system is establishments polluting more than 100 kilotonnes of carbon dioxide. In Finland, there are 17 recognised sectors that are under the EU ETS system and the forestry industry has the fourth largest carbon footprint within the Finnish EU ETS system (Finnish Energy Authority (2021)). This thesis is going to include three listed forestry industry companies. Metsä Board Oyj, UPM-Kymmene Oyj and Stora Enso Oyj. These companies are chosen because their annual reports are readily available on their websites and for their interesting character and history in Finland. A qualitative research method is used to examine the companies. The companies are examined by conducting a content analysis on annual reports. The study examines the taxonomy of EU ETS emissions, whether their classification approach has changed, and if there are any explanations for

changes in annual reports or managerial letters. In the content analysis, I will read through annual reports and gather data on emissions allowance classifications. Emissions allowance data will be coded into spreadsheets to provide the structure of the empirical data and analysis. Furthermore, the scope of the study will include the examination of the classification characteristics of IFRS, not Finnish accounting standards (FAS). FAS is an income statement-based system in contrast to IFRS which has its classification concentrated in the balance sheet (Söderlund, 2012 and Nobes, 2003).

1.4 Research question

The thesis aims to answer the following research question:

How have companies changed the taxonomy and classification method of emissions allowances in annual reports throughout different phases of the EU ETS?

1.5 Structure of the study

The introduction needs no further explanation. In the theory chapter taxonomy, emissions allowances and financial reporting standards will be discussed. The thesis will go in-depth on the core theories used in the thesis. In prior research, I shall investigate discussions from older research on how companies have classified and recognised emissions allowances in their financial reports. In the methodology chapter, I discuss the method and the reliability and praxis of how the research will be executed. The method chapter includes explanations of why the qualitative method is chosen and how it is used in the thesis. The analysis of the thesis will be conducted with the method of choice and data collected from annual reports. The discussion and results chapter will include a summary of the analysis and why and how it might or might not differ from prior research and suggest a continuing further study in the subject.

2 Theoretical background

2.1 European emissions trading system

The European emissions trading system is claimed by European Union to be the cornerstone of fighting rising carbon emissions. The first step taken to reduce carbon emissions by the Cap-and-Trade model was in 2005 which had been planned since the Kyoto Protocol convention of 1997. Due to high administrative costs, the EU ETS was designed to cover only large installations. Thus, the European emissions trading system does not cover all installations that emit greenhouse gases. It accounts for 40 per cent of the EU's total greenhouse gas emissions and includes 14 000 power stations and industrial plants in 31 countries. Thus, it is the largest mandatory scheme in the world and has been seen as the prototype of a future global carbon trading scheme (Engels, 2009). Included in the scheme are at least all installations that emit more than 100 kilotonnes of CO₂ per year. Firms operating smaller installations are not covered by the EU ETS regulations, although the firms themselves might be just as large as those affected by the regulations (Dechezlepretre, Nachtigall & Venmans, 2018; Caeli & Dechezlepretre, 2016). The emissions counted for in the EU ETS are directly produced emissions (scope 1) and directly affecting indirect emissions (scope 2) (GHG, 2004). The EU ETS has been active since 2005 and has been divided into four phases.

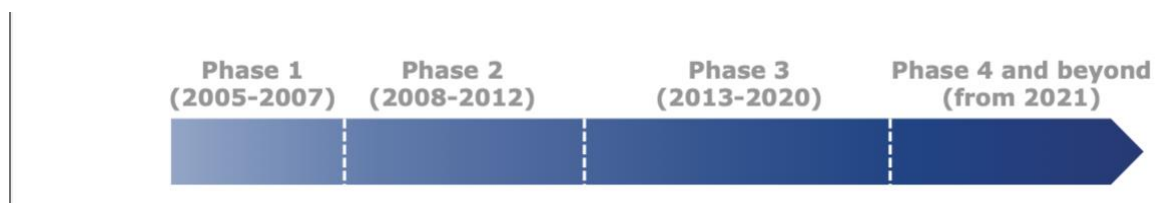


Figure 1: European Emissions Trading System phases

Each phase has its own characteristics and emissions reduction goals. Given the goals, the EU wants to reach set companies in a position to pay the price or change behaviour. A new mindset argues Engels (2009) must take place. The study conducted in 2009 finds that mindset change has been the executive board's responsibility in most companies and that they have relied heavily on specialised private consulting firms and workshops to cope with market changes (Engels, 2009). By each phase, the amounts of emissions allowances have tightened and stricter policies within companies have to take place or pay the price of more allowances. Thus, the change from the executive board's responsibility has been delegated to the special unit that controls environmental aspects of the company's strategy. (European Commission, 2022).

2005 began the first phase of emissions trading and included power generators and energy-intensive industries. In the first phase, the allowances were in majority allocated for free and firms emitting more than 100 kilo tonnes of CO₂ and did not comply had to pay a penalty of 40 € per tonne for not complying. The largest fine for non-compliance has been three hundred thousand (Barlow, 2017). This first phase was seen as a "learn by doing" phase and gave a price on carbon and infrastructure for future phases with more strict guidelines. Due to the estimation of allowances having no factual backing the actual allowances exceeded emissions and could not be banked to the next phase. (European Commission, 2022).

Phase two (2008-2012) gave countries and industries more calculated targets to meet. The new phase included three new countries, Lichtenstein, Iceland, and Norway. The overall cap of emissions was reduced, 6,5 per cent lower compared to 2005, and the freely allocated allowances sank to 90 per cent from the previous 95 per cent. Companies were allowed to buy international credits, which gave the market 1,4 billion tonnes of Co₂ equivalents. In Phase Two, companies were allowed to bank their allowances for the next phases, which they may store in their balance sheet for when they are able to use or sell them. The financial crisis of 2008 affected the carbon market by a notable amount. The price of emission allowances after 2008 fell due to companies lowering their production. Their allowances were

banked, which led to companies not having to buy more from other companies' allowances. (European Commission, 2022).

In phase three (2013-2020), the reform changed considerably from previous phases. The Cap-and-Trade market widened in the second phase. From being national caps allocated, the cap was now set around all the EU nations. That is, the EU is trying to reduce emissions, not just having countries competing for emissions. Free allocation was removed as the default option for allowances and was replaced by auction allocation. After the second phase, banking and borrowing were possible. In other words, allowances have been allowed to cover shortages by borrowing from the year ahead. As for banking, companies were not forced to turn in allowances before receiving new ones, and they were made possible to carry emissions rights forward (Ellerman & Joskow, 2008). The union-wide cap of stationary installations decreased annually by a linear reduction of 1.74 per cent. The 2013 cap was set based on the average total quantity of allowances issued from 2008 to 2012. (European Commission, 2022).

In phase four (2021-2030), the EU ETS cap on emissions continues to decrease annually at an increased annual linear reduction factor of 2.2 per cent (European Commission, 2022). This is a more aggressive decrease from the former reduction of 1.74 per cent annually. To further reduce allowances in circulation, phase four limits the banked allowances to the amount of what has been auctioned during the year. The amount above the auction will lose validity after the year 2023. With phase four, the European Commission reduces the risk of carbon leakage by making rules more fair, predictable, and robust. Furthermore, it should be noted that those installations that are identified as presenting a high risk of relocation will be eligible for a complimentary allocation. At the same time, the emissions trading systems that are more closely integrated within the organisation will be granted such an allocation until the year 2026 (European Commission, 2022).

2.2 Taxonomy

“What do we do when we classify? A simple, and seemingly obvious, answer to this question is that classification is based upon a recognition of difference and similarity between objects in any particular set under consideration.” (Roberts, p 641, 1995)

Classification of the EU ETS allowances is important to be able to report them correctly for stakeholders that want to compare or analyse the allowances for different purposes. It is necessary to know something about what it entails to have a ‘good classification’. It is crucial to understand what good classification looks like. The Gröjer study simplifies the classification challenge into Objective–logical simplicity, Subjective–notational simplicity, and Subjective–logical simplicity. Gröjer (2001) draws similarities between simplicity in accounting with the IASB qualitative characteristics: understandability and relevance (subjective simplicity) and reliability and comparability (objective simplicity). The issue with the classification of allowances is ambiguity. Mackenzie (2009) addressed that classification does not often feel like a choice. Classifiers – bookkeepers and accountants – probably normally come across items that seem familiar and simply “see them as X”. In the ambiguous environment of emissions classification, classifiers have to figure out what they see X as.

To classify something also implies defining it. Therefore, a necessary requirement for classification is a (set of) definition(s). Like most concepts, ‘intangibles’ have no generally accepted meaning or definition. The taxonomy of accounting is the process of making sense of numbers. Measurements of numbers serve as a bridge to a common interpretation of new phenomena that helps sensemaking escalate from the individual level to the organisational level. The authors Ahrens (1997) Andon, et al. (2007), Preston (1986), and Jordan and Messner (2012) from Giuliani and Skoog (2020) address how number users talk about the process of “daily accounting talk”, which forms accounting classifications.

We use language as an example when we describe a language that is an expression for and part of a specific culture. It is reasonable to interpret classifications as linguistic artefacts, it follows logically that they are culture-bound. From a cultural perspective, identical intangibles may not be classified in the same way because they are assigned different properties. Every classification is built upon some ideas about the world and how it ought to be ordered (Giuliani and Skoog, 2020).

The International Financial Reporting Standards (IFRS) are accounting standards to be implemented in Europe, while countries have their national laws and customs of reporting their financial reports. When the EU tried to harmonise financial reports, they had to find similarities and dissimilarities between reports and build a new standard for reporting. Harmonisation is why taxation is important to accounting and especially to IFRS due to it being a standard-based system instead of a rule-based system. The harmonisation of national laws into a unifying international standard to make investment decisions more fluid. Roberts (1995) writes that a sensible classification is not “[a] sensible classification is not produced by a summarisation of a mass of facts. It involves preconceptions, judgements, and weightings”. That’s what also went wrong when IFRS released the IFRIC 4, their judgements and assumptions were not made properly, and the market had a hard time interpreting and implementing the recommendation. This process is to be applied to the European emissions allowances that affect companies polluting emissions in large quantities. When classifying, one must recognise the difference and similarities between objects in any set under consideration. Objects that are like one other can be separated from those that are dissimilar. Although, the problem is most often not that easy because the same things can be used in different ways and therefore classified differently (Roberts, 1995). When classifying, some attributes come more naturally and subjectively than other attributes. As Haupt and Ismer (2013) point out, purchased allowances must be recognised at cost. That is both for allowances bought from the market or through auctioning mechanisms. In this case, you have the cost valued at market price and must classify the allowance in compliance with its use to offset emissions. Allowances that are allocated through the national energy authority are as the authors put it, “fairly controversial”. There is no cost and no set recognition of taxonomy. Important for classifiers are to recognise what the purpose is to be accomplished. The purpose of classifications often comes from the type of

accounting system, whether it has a tax-based/result view or financial position/valuation view.

Core qualitative characteristic of IFRS principles when classifying attributes in an accounting system is clarity, relevance, reliability, and comparability. That is when reporting emissions allowances, whether you own them so that you can sell them or own them to produce emissions these are the same principles to follow. Then depending on your usage of allowances, you must classify them differently depending on assumptions of usage. The accounting system used in Finland is as Nobles (p. 193, 2008) states “low-equity, governmental driven and tax-dominated”. Suggesting that even though companies in Finland use IFRS as a standard their assumption on classification is leaning against the net principle as it is more tax-dominated. A similar conclusion can be drawn from Söderlund's (2012) dissertation. In Finland for private companies, this should imply that emissions allowances are only recognised in the national law as netted against results when sold or bought. Listed companies following the IFRS classification of allowances in the balance sheet are dependent on the assumptions of the item, which is not the case in Finnish accounting law.

The function that accounting is supposed to achieve, is contingent on the ability of accounting to order the world of organisations in a value-relevant way. Gröjer (2001) challenges this ability. How shall assets and liabilities, revenues and costs and cash flows be classified? What is supposed to be `on-balance` and what is supposed to be `off-balance`? And is this order between different classes achievable?

2.3 Emissions reporting and accounting for emissions allowances

Carbon management accounting can be described as that part of carbon accounting as a means for identifying, collecting, processing, disclosing, and communicating carbon information, carbon management accounting encompasses a set of information management tools which are commonly used as part of carbon management and carbon policy in private and public organisations (Burritt, Schaltegger & Zvezdov, 2011). In this study communication and transparency is of interest. The cost of polluting is covered by emissions allowances. How companies receive, store, and allocate emissions allowances is impacted by the classification method. The official communication of emissions allowances is in annual reports. Although all countries do not have the same standard of transparency. Warwick and Ng (2012) noticed that annual reports were not easily accessible for all European countries. Poland for example had 2007 31 installations included in EU ETS. Not a single annual report was found that met their criteria of inclusion in Poland.

The European emissions trading system covers emissions in Scope 1 and Scope 2. Scope 1 covers the Green House Gas (GHG) emissions that a company produce directly for example while running its installations and from transport vehicles (Sotos, 2015). Scope 2 covers the emissions companies produce indirectly (Sotos, 2015). Scope 2 includes the electricity or energy the companies produce by heating and cooling buildings. The emissions produced an “off-balance” item, that has to be covered by emissions allowances. Allowances are either received for free from allocation or bought on auction. How the classification method is implemented affects the presentation of the balance sheets and income statements in different ways.

Some literature even argues that emissions allowances can be classified as “incommensurable” due to the complexity arising from their different uses (Lovell et. al, 2013; Bowker & Star, 2000). The most common classifications are either intangible assets or inventory. Some countries found the IFRIC 3, intangible approach good while others found the inventory approach good. These differences

arise when different national accounting law customs affect classification. Some even found that the volatility was affecting their business and therefore classified them as payment instruments (Allini, Giner and Caldarelli, 2018). IFRIC 3 suggested companies value allowances at fair value at reception by recognising a government grant. The grant would be priced as if they would have purchased them at market value. While the other companies that diverged from IFRIC 3, recognised the cost of emissions allowances when the companies had a surplus of allowances to justify their emissions. This excess was then recorded at a fair value cost.

A liability recognition arises due to the lag between recognition and delivery. It is important to consider that it accrues during the lag between the period in which emissions are made period ending the 31st of December and the delivery of allowances on the 30th of April of the following year (Black, p. 225, 2013). IFRIC 3 suggested that companies record the liability as emissions were made at fair value at the reporting date against an expense directly affecting the income statement. This situation, combined with the valuation of freely allocated allowances, created measurement mismatches between the valuation of the asset and the liability. This issue was one of the reasons leading to its withdrawal of IFRIC 3 (Bebbington and Larrinaga 2008). Domestic accounting standards measuring granted allowances at fair value follow a ‘cost with balance at market value’ approach to addressing the concern. This approach links the liability valuation to that of the asset by measuring the former at the carrying amount of the allowances they previously own. If there is a shortfall, the unsettled allowances are measured at market value at the delivery date. Most firms valued the liability following a ‘cost with balance at market value’ approach (Black 2013; Lovell et al. 2010). Other local standards, however, only required firms to record a liability when they have a shortfall compared to owned allowances. This approach implies that the expense of emissions is offset by allowances held.

Companies that are subject to the EU ETS, are required to have a permit to emit greenhouse gases and /or have an accepted surveillance plan. Without a permit, the installation is not allowed to operate. Companies are required to report their greenhouse gas emissions to the European Commission’s Union Registry. The

emissions emitted must be validated by an accredited controller (Törning, 2021). The Union Registry is the authority over all sectors that emit greenhouse gases. In Finland, the national administrator is The Energy Authority. The energy authority describes its duties as: “The tasks of the national administrator include performing administrative tasks related to the opening of accounts and the changing of representatives, monitoring emissions trading obligations, allocating allowances, providing on-call service related to fraudulent transfers, as well as providing advice and handling communication about the registry” (Energiavirasto, 2021). The yearly calendar for collecting, authenticating, and reporting is as follows: their emissions must be counted, verified by the controller, and reported to the national authority, at the latest by 31 March. By 30 of April, the emissions allowances matching the emitted greenhouse gases must be reported to the national authority. When the emissions allowances are handed over to the national authority, they will be nullified (Törning, 2021).

the EU ETS allowances have different approaches to classify them, thus affecting the way companies value their emissions allowances. The allowances can be allocated for free or bought, they may be classified as assets or liabilities. Depending on view and usage they are classified as financial instruments, intangible assets, or inventory. Thus, depending on the classification, how accountants value allowances will also affect how companies in the end report them to shareholders. The emissions allowances are reported in the annual report and specified in the notes under the relevant standard that has been used. Companies report their emission allowances differently depending on how they have interpreted the international accounting standards and scopes of the Greenhouse Gas Protocol. The classification of allowances and greenhouse gases is important to European Commission. Therefore, the emissions must be correctly reported and verified. The challenging part for companies is to classify and value their emissions allowances (Cook 2009). In Gröjer's (2001) article he describes the purpose of classification as bringing order to large disarray of transactions. This has been an issue ever since intangible assets have become more and more popular according to Gröjer (2001). There is a need to be able to classify assets such as intangible because, if not then manipulation of such assets may become more frequent. The same asset might be interpreted differently because the underlying idea of the asset is not the same. Emission allowances might

for example be classified as financial instruments for trading purposes or allowances to cover emissions emitted.

2.3.1 IFRIC 3 Emission Rights

IFRIC 3 was an interpretation of how to classify and account for emissions allowances implemented by IASB in 2003. The interpretation was withdrawn and was not recommended to use. Cook (2009) discusses in the study the problems that arose from the interpretation. The main cause for the interpretation's failure was the mismatch in the timing of accounting for allowances.

The Interpretation specifies that:

- rights (allowances) are intangible assets that should be recognised in the financial statements in accordance with IAS 38 Intangible Assets.
- when allowances are issued to a participant by the government (or a government agency) for less than their fair value, the difference between the amount paid (if any) and their fair value is a government grant that is accounted for in accordance with IAS 20 Accounting for Government Grants and Disclosure of Government Assistance.
- as a participant produces emissions, it recognises a provision for its obligation to deliver allowances in accordance with IAS 37 Provisions, Contingent Liabilities and Contingent Assets. This provision is normally measured at the market value of the allowances needed to settle it.

(Deloitte, IAS plus)

The International Financial Reporting Interpretation Committee (IFRIC) proposed recording liabilities associated with emissions as fair value at the reporting date, which would then be recognised as an expense in the income statement. The

valuation of granted European Union Allowances (EUAs), as previously discussed, resulted in mismatches between the asset and liability valuations. This inconsistency contributed to the proposal's eventual withdrawal (Bebbington and Larrinaga, 2008).

2.3.1.1 The issue with IFRIC 3

The issue is the timing and valuation between the financial year end and the delivery of allowances to cover emissions costs. “It was noted that the effect of the proposed amendment was to move the gains and losses into the same place (profit and loss); however, the timing might still have a mismatch because, at the beginning of the period, an asset exists, for which fair value gains and losses must be recognised, however, the corresponding liability builds up over the period” (Deloitte, IAS plus, paragraph 5). Cook (2009) also notes that volatility in emissions allowances appears as if it is two things at the same time, a liability, and an asset. It is an asset with a bought or received value, and it is a liability to settle emissions costs in the future. Cook (p. 464, 2009) clarifies why hedge accounting for emissions allowances may not be appropriate: “An important difference from hedge accounting, however, is that emission allowances are given by and repaid to the same party. In that sense, the initial gain is more closely related to the eventual cost than are the gains and losses on hedged and hedging items, which are unrelated except in the mind of the manager.” In June 2005 EFRAG (European Financial Reporting Advisory Group) presented a solution to the mismatch dilemma. They suggested that companies should hedge the allowances until delivery of allowances to the energy authority. As an instrument to reduce emissions allowances, is supposed to be easy to use and not involve default risk that could be costly to consumers. IFRIC 3 had several critics and Cook (2009) even challenges whether all critics were justified. Multiple items in the financial world involve volatility risks such as property, plant and equipment that also have to be evaluated and re-evaluated during the year. IFRIC 3 was withdrawn in July 2005 (Deloitte, IAS plus).

2.3.2 IAS 20, Accounting for Government Grants and Disclosure of Government Assistance.

Accounting for government grants and disclosure of government assistance is of importance in classifications of emissions allowances due to the nature of the allowances. The standard was issued 1983 and has been applicable since the first of January 1984 (IAS plus). They have thereby been applicable for both the sulphur emissions allowances in The United States and in EU emissions allowances. Grants are sometimes also referred to as subsidies or premiums. Emissions allowances are granted by the governing body of the European Union and distributed by national agencies such as Energy Authority in Finland. The question on how to use and account for allowances that are either distributed for free or acquired through an auction from the Energy Authority.

The IAS 20 has two ways of accounting for government grants. The first is to classify them as assets and thus account for them in the balance sheet, and the other is to classify them as result-affecting and thus account for them in the income statement. When classifying them as assets, there are two ways of classifying. One way is to account for the grants as an advance payment and then reduce value systematically after usage in the income statement (IAS 20:26). The second way is to reduce the value of the assets that the grant is supposed to subsidise (IAS 20:27). When classifying the grant as an income affecting component then, the grant is accounted for separately or in the “other income” segment of the income statement. Alternatively, the value of the grant is used to reduce the affected costs (IAS 20:29).

2.3.3 IAS 37, Provisions, Contingent Liabilities, and Contingent Assets.

IFRS defines provisions and liabilities as: Provisions are a liability that has an uncertain timing of use or amount. IAS 37 was accepted in 1998 and is applied to annual report periods after 1 July 1999 (Deloitte, IAS plus). Liability is a present obligation of the entity arising from past events and the settlement of which

embodies economic benefits. Provision differs from other liabilities such as trade payables and accruals because of the uncertainty. A Provision ought to be recognised when a company has a legal or constructive obligation because of a past event. There is a probable event that an outflow of resources embodying economic benefits will be required to settle the obligation. A reliable estimate of economic benefits or outflow can be associated with the obligation.

In some cases, there is no clear present obligation. In such cases, a past event may give rise to a present obligation. When considering all available evidence, it is more likely than not that a present obligation exists at the end of the reporting period. That is if there is more likely than not that a present obligation exists at the end of the reporting period the company should recognise a provision (Deloitte, IAS Plus). When there is more likely that no present obligation exists at the end of the reporting. The entity should disclose a contingent liability unless the possibility of an outflow is remote and will not embody economic benefits.

2.3.4 IAS 38, Intangible Assets.

The standard of intangible assets was originally issued in 1978 with the standard for accounting research and development activities. The 1978 standard was replaced with IAS 9 Research and development costs in 1993. After 1993 IFRS issued the revised IAS 38 intangible assets in April 2001. IAS 38 has been revised three times: in 2004, 2008, and 2014. Intangible assets are described as identifiable non-monetary assets without physical substance (IAS 38:8). They generate revenue or holds value for future revenue and is not fixed asset even though they sometimes can be in a physical form such as CD. I.e., cases of software or a legal document, in cases of licenses or patents, however, the physical form may not be the identifiable attribute (IAS 38:4). Intangible assets can be acquired or activated through research and development expenses if it is expected to generate income by a high degree of certainty, although internally generated intangible assets and goodwill is not activatable such work culture.

To classify something as an intangible asset, attributes needed are separable and/ or arise from a contractual agreement. The asset must be able to be separated through a sale, for example, licensed, rented, or exchanged. The asset could also have developed through a contract or other legal rights. The entity must be able to attain the financial benefits from the asset and have legal control over it that can be enforced through a court of law. Recognition of intangible assets is accepted if and only if: “it is probable that the expected future economic benefits that are attributable to the asset will flow to the entity, and the cost of the asset can be measured reliably.” In IAS 38 22-24, the standard states that it is up to management’s best judgment to evaluate the probability of expected future returns on the assets, and those intangible assets shall be measured initially at cost. That is, intangible assets are not measured at fair value but rather at acquired cost.

2.3.5 IFRS 9 Financial instruments

There are two standards for financial instruments. IFRS 7 is applicable since 2007 and IFRS 9 was issued in 2014 and replaced IAS 39. IFRS 9 involves hedge accounting. That is hedging against future risks in market prices. IFRS 9 is applicable as some companies have used hedges for price fluctuations in emissions allowances. Although emissions allowances are meant to reduce pollution by setting a cap on emissions, emissions allowances are also a tradable commodity, that may be classified as financial instruments. This will be affected by whether the allowance is bought as a future derivative or directly from the market. Emissions allowances as tradable commodities should give the market for allowance more usability as there is more liquidity and the market adjusts better to market prices. This in turn should make allowances more attractive to investors and more expensive for companies to emit carbon dioxide. The purpose of financial instruments in IFRS 9 Chapter 1 should give relevant and usable information to the users of financial reports for the purpose to assess value, timeframe and uncertainty for the company’s future cash flows.

2.4 Finnish forest industry

Finland pledged to reduce emissions by at least 40 per cent by 2030 and 80 per cent by 2050, measured from 1990 yearly emissions (OECD, 2016). A study conducted by OECD (2016) shows that Finland is becoming greener but still has challenges to overcome. These challenges are Finland's energy-intensive industry, long transport distances, and cold weather. Finland was 2016 third highest polluter among the OECD countries. These challenges are Finland's energy-intensive industry, long transport distances, and cold weather. Even though Finland has invested 0,12 per cent of their GDP in research and development, which is the highest among OECD countries, there are still challenges on how to become more emission efficient. A study conducted by Dechezleprêtre in 2018 finds that emissions after the implementation of the European emissions trading system reduced emissions by 10 per cent yearly between the years 2005 and 2012. This thesis is going to study the second largest sector that the EU ETS covers (Carratù, Chiarini & Piselli 2020). Finnish forests are a large part of the land area and a significant actor in the Finnish industry. Up to 80 per cent of Finnish land is forest, and the Finnish forestry industry is labour a significant part of the labour in Finland. The forestry industry is a large part of all industries in Finland, these directives should have some effect on the industry. Finland's forestry industry exports close to 20 per cent of Finland's export (Metsäteollisuus, 2020). The industry generated 33 billion Euro revenue in 2018. Between the years 2018 and 2019, the industry invested directly into new technology at 1,9 billion euros on average. Furthermore, all included direct and indirect investments reached 2,4 billion euros each year in new technologies (Ernst and Young, 2020).

3 Literature Review

This chapter will provide insight into prior research within relevant topics to the study. Firstly, prior studies in Carbon management accounting will be discussed. Then, further analysis will be provided on taxonomy and accounting for carbon emissions allowances and to conclude, a summarisation of the insights provided by these studies.

3.1 Carbon Management Accounting

Carbon management accounting is a policy innovation within the European Union that makes companies and actors within it shift their mindsets. Before 2005 there was no cost of emitting carbon dioxide in the EU. After the EU ETS, there is a cost, and it affects the largest competitors in the business landscape (Engels, 2009). With the EU ETS, companies must develop new knowledge and competencies to be able to account for and optimise the use of emissions allowances and reduce the emissions polluted for more effective production of services. In the study conducted by Engels, they found that there were national differences on who actively traded allowances and thus had under control their consumption of emissions allowances and carbon management. Some in the study did not have knowledge of how to account for carbon and, during the first phase, just paid the price, which was not that high, instead of trying to invest in new technology (Engels, 2009).

Naranjo Tuesta et al. (2020) use carbon management accounting, the European emissions trading system, to evaluate the financial performance of firms that have environmental certificates and are within the EU ETS to companies that are not. They evaluate these from theories such as stakeholder theory, neoclassical theory, and institutional theory. They examined 350 companies from 2007-2018 that they found fit for the hypotheses. They concluded the article by pointing out that the firms included in the EU ETS had no significant pressure from institutions to lower their emissions compared to those that voluntarily report their emissions. This could be a

result of companies trying to find competitive advantages through better corporate image compared to those that are included in an ETS system, and no one thus has an advantage over the other competitor. Furthermore, reports written by McKinsey (2007) and Burritt, Schaltegger and Zvezdov (2011) find that some companies only try to do the bare minimum to comply and not get fined while others try to find new ways to make processes more effective.

Companies approach and use carbon management information in different ways. These are short and long-term and with or without social or policy pressure. Reasons are a few, avoiding trading emissions and thus resulting in direct savings, energy saved that pays off the investment, trying to achieve a market advantage by labelling products carbon neutral and others engaging in carbon management from industry pressure to reduce emissions as an act of environmental commitment (Burritt, Schaltegger & Zvezdov, 2011). There are several ways to reduce emissions and different tools for managers to choose from making it challenging for managers to make decisions on the best fit.

In their sample of 10 leading German companies that have been gathering carbon emissions for a variety of purposes, such as legal compliance, adjusting operational costs, and others use it for investment planning in the long-term (Burritt, Schaltegger & Zvezdov, 2011). Several companies had difficulties in gathering information from different divisions due to managers not knowing what was valuable other than monetary information instead of also reporting physical information (carbon emissions). From the sample, they found that only companies participating in the emissions trading system had sufficient information systems to collect, use and report emissions. Others were relying on their old information systems, typically in the sustainability or environmental departments, to collect and manage such data. Therefore, emissions trading requirements at the time of the study appeared to be an important factor for change. With the push of the EU ETS, managers in the financial departments get the information they need to make better decisions regarding financial and environmental performance together, not separately.

Some articles examine the strategic value companies can get from managing carbon emissions. As the stakeholder's interest change and want to see better management

of resources as well as more climate-friendly resources. It imposes some requirements for companies to evolve. The management of carbon performance according to Gibassier and Schaltegger (2015) requires solid accounting management systems which have the capability to link carbon management with business, and its competitive strategy. The three reporting areas: carbon information, economic business information and carbon reporting, are combined into one system for better strategic performance. In their study, they found evidence of issues between different stakeholders. Both internal and external stakeholders had differences in consensus. What stakeholders want from carbon management accounting was difficult to state due to how the ERP (Enterprise resource planner) accounts for carbon during each process of the business. Issues that were highlighted were products that were made for inventory before being sold and products that were made for sale as soon as possible. This was dependent on whether the company should register carbon emissions for their own process before items were sold. A question then appears can they sell their emissions to another company when items are sold and thus only bear the net emissions from the products? And their carbon footprint within the company is different depending on how the emissions scopes are accounted for.

3.2 Accounting for emissions allowances

Recognition of accounting items starts with classification. Certain transactions are more straightforward than other intangible assets and come in numerous types. Intangible assets can be practically whatever the accountant or manager says it is. Before one can put something in the balance sheet or financial statement, a classification strategy must be chosen. Mackenzie (2009) lifts the issue of classifications of items with ambiguity. Often in accounting classification, an item is either something specific or not classified at all. The same principles do not apply to the classification of emissions allowances. The classification process is not as straightforward as saying something is X or Z. It could be several things, depending on the accountant's view. Gröjer (2001) and Choong (2008) analyse the

problematization of intellectual capital and intangible assets. Their study finds that there are several types of ways to identify and classify items with an intangible nature. What makes an asset non-tangible, and why is it important to distinguish such an asset? An asset that is non-tangible is an asset that provides financial value to the firm without itself being tangible or fixed (Gröjer, 2001). The European emissions trading system trades with allowances that are most often classified as intangible assets (Black, 2013).

The article from Black (2013) puts into perspective different standards used to value emission allowances and their challenges. The study was conducted with a qualitative approach, examining annual reports from 2011, and included 62 companies in the EU ETS. Accounting for emission allowances has contributed to some challenges with the usage and valuation of the emission allowances. This has caused confusion with comparisons of financial reports regarding emission allowances. The standards that may be used to value the emissions allowances are IAS 38 intangible assets, IAS 20 Government grants and government assistance, and IAS 37 provisions, contingent liabilities, and contingent assets. The accounting issue arises in the time lag between reporting emissions and delivery of the emissions allowances. The feature of the EU ETS is that although emissions are measured based on the year ended 31 December, the verifying and reporting of emissions must be submitted before 30 March, and on 31 April, surrender necessary allowances to cover the emissions (Black, 2013). The same mismatch and differences in financial statements were found in Buben's (2018) study when comparing Czech Republic companies and furthermore, he concluded that it is almost impossible to compare financial information on emissions allowances.

Similarly, as Black (2013) searched for similarities and differences in accounting for emissions allowances Haupt and Ismer (2013) also challenges the standards and different ways of accounting for allowances. As Black gives a general picture of how European firms show their allowances Haupt and Ismer (2013) tries to solve the problem and give a general view of the results of different accounting styles. This paragraph however continues, for now, from Black's perspective. The International Accounting Standards Board tried but failed to make an interpretation specifically for emissions allowances. The interpretation was IFRIC 3, the standard had "some

very strange results” according to Cook (2009, p. 462). The interpretation wanted to move gains and losses to the same place as the profit and loss statement. This caused a mismatch in timing in that at the beginning of the period an asset exists for which profits and losses must be recognised. “However, the timing might still have a mismatch because at the beginning of the period an asset exists, for which fair value gains and losses must be recognised, however, the corresponding liability builds up over the period.” (Deloitte, IAS plus). The European Financial Reporting Advisory Group (EFRAG) highlighted concerns with the valuation of emissions allowances, in a “gross” approach instead of net approach. The mismatch arises when the revaluation of allowances would be reflected in equity, whereas the revaluation of liabilities would be reflected in profits and losses. It has been argued that the correct way to report allowances would be to only show a liability when the level of allowances exceeds the level of free allocations. IASB put out a withdrawal statement noting that there was a mismatch in timing on the valuation. The more appropriate approach would be to show a liability when free allocations are exceeded, this approach has been called a net liability or offsetting approach (Black, 2013).

Black’s (2013) study found that companies used either a modified IFRIC 3 approach, a netting approach, or an inventory approach. The netting approach was adopted by 33 per cent of the sample, this approach classified allowances as intangible assets but recorded freely allocated allowances as a null value. Further, only the net liability, that is, the level of allowances that exceed freely allocated allowances is reflected. From the sample, 25 per cent adopted a modified IFRIC 3 approach. They show allowances as intangible assets, recognise the fair value of allocations when received, and subject them to impairment reviews. In the final approach, 12.9 per cent of companies, classified allowances as inventory. In every case, the freely allocated allowances were recognised at null value, and the exceeding allowances were based on carrying value.

Nobes (2008) researched how countries have classified emissions allowances throughout Europe. It gives insights into how countries use their own domestic standards as a benchmark to make judgements on classifications in the IFRS standard. The conclusion the study brings forwards is that accountants and analysts

shall vary when classifying as it may not give stakeholders a true and fair view. The study brings forward that strong-equity countries are faster to converge and adopt classifications in contrast to weak-equity and points out that work is needed for weak-equity countries. Strong equity countries are countries with more weight on the balance sheet whereas weak-equity countries give more value to the income statement. Examples are the Anglo-Saxon British system with strong equity and the continental system used in Finland with income-to-cost accounting.

3.3 The gross and the net methods to classify emissions allowances.

Studies on classifying emissions allowances have found a few main groups. The two most used classification techniques are recognising allowances as either intangible assets or inventory, alternatively as payment instruments due to volatility in income (Cook, 2009). The payment instrument treatment was not used after 2013. Prior studies found that recognising allowances as intangible assets were the most widespread option. The use of inventory recognition was recommended by some local standards which did increase its popularity (Garcia-Torea et. al, 2022). The absence of international accounting standards created a setting where firms following IFRS can freely decide their accounting treatment, if any, to register allowances. Overall, studies have found that several firms lacked guidance on how to register emissions allowances (Allini, Giner, and Caldarelli 2018; Black 2013; Lovell et al. 2013; Warwick and Ng 2012; Lovell et al. 2010).

Concerning their initial valuation, purchased allowances have generally been recorded at their market value cost. The debate arises when registering freely allocated allowances. IFRIC 3 required firms to measure them at fair value upon reception. The IFRIC 3 allowances would be recognised as a government grant that should be treated as deferred income. Garcia-Torea et. al. (2022) studies how different countries have used both international and domestic legislation to classify and recognise allowances. The sample is from 2011 and 2016. This sample was in 2011, 107 groups and 122 groups in 2016. They use The Austrian, Spanish, and

Portuguese standards have suggested valuing granted allowances at fair value, the Polish standard recommends recording them at their cost, nil value. Prior studies reported that most companies followed the latter approach (Allini, Giner, and Caldarelli 2018; Black 2013; Warwick and Ng 2012; Lovell et al. 2010). In German and Dutch settings, firms can choose between recording granted allowances at cost or fair value. Finally, the French and Italian standards only recognise an asset if firms have a surplus of allowances to justify their emissions. This excess is recorded at cost.

IFRIC 3 suggest that companies record the liability as emissions were made at fair value at the reporting date against an expense directly affecting the income statement (Deloitte, IAS plus). This prescription, combined with the valuation of granted allowances (as explained above), created measurement mismatches between the valuation of the asset and the liability. This issue was one of the reasons leading to its withdrawal (Bebbington and Larrinaga, 2008). Domestic accounting standards measuring granted allowances at fair value follow a ‘cost with balance at market value’ approach to addressing that concern. This approach links the liability valuation to that of the asset by measuring the former at the carrying amount of the allowances they own. If there is a shortfall, the unsettled allowances are measured at market value at the reporting date. Austria, Germany, The Netherlands, and Spain follow this treatment. Most firms valued the liability following a ‘cost with balance at market value’ approach (Black, 2013 and Lovell et al. 2010). The local standards, for France, Italy, Poland, and Portugal, only require firms to record a liability when they have a shortfall compared to owned allowances. This approach implies that the expense of emissions is offset by allowances held.

The three implications covered above are essential for understanding how the allowance accounting classification shapes the representation of the financial implications of the EU ETS because, under certain conditions, their specific combination can allow firms to hide the impact of emissions driven by the EU ETS functioning in financial statements (MacKenzie, 2009 as cited in Garcia-Torea, Giordano-Spring, Larrinaga & Rivière-Giordano, 2022). Based on the combination of the different classification choices described above, prior literature has identified two main overall classification methods to register allowances: the gross and the net

methods (Garcia-Torea et. al, 2022). The difference between the gross and net methods is the scope to which they depict the impact of allowances in companies' financial statements.

The aim of the gross method is to capture the full financial impact of the allowances. Gross method records allowances as intangible assets as soon as they are granted or purchased. Granted allowances are recorded at fair value upon reception, while purchased allowances are recorded at cost. Aligning the valuation of granted and purchased allowances is more representative of the economic consequences of pollution (Garcia-Torea et. al, 2022; Wambsganss & Sanford, 1996). This treatment allows firms to consider the opportunity cost of holding emissions allowances (Allini, Giner, & Caldarelli, 2018 in Garcia-Torea et. al, 2022). With the gross method, the liability should cover the emissions at the reporting date and recognise its total value to the profit and loss statement through expenses (Garcia-Torea et. al, 2022).

Companies that have used the net method offset allowances as assets and liabilities. Garcia-Torea et. al. (2022) finds that classification was implemented in two ways. One option is to classify allowances as assets only if they exceed the emissions produced during the period. At reporting date allowances should be classified either as an asset (if exceeding emissions) or a liability (if emissions were under the cap), never both. A third classification treatment aligned with the net method is measuring granted allowances at nil value. This method makes them invisible in the balance sheet at the reporting date (Haupt and Ismer, 2013). "In this case, even if the liability considers the entire obligation to deliver allowances through a cost with balance at market value approach. The value of allowances will show the net effect as if only a shortfall compared to granted allowances was recognised" (Garcia-Torea et. al, p. 100, 2022). Past studies conducted by Black (2013) found some trends in the net and gross methods in different European countries. The French, Italian, Polish and Portuguese for example, used methods resembling the net method. While the Dutch and German standards were aligned with the gross and net methods simultaneously. The Dutch and German have allowed companies to select either valuing granted allowances at cost or at fair value.

Although the net and gross classification methods have the same impact on profit and loss, the gross method is presumed to produce a more transparent overview than the net method (Garcia-Torea et. al, 2022). Part of the liability expense in the gross method is compensated by the deferred income of granted allowances. Recording and displaying the total amount of allowances assets and liabilities of firms in their financial position. The approach offers a more accurate account of the financial impact of allowances and provides a better representation of firms' environmental harm by not reducing the cost of GHG emissions by offsetting assets and liabilities (Black, 2013 cited in Garcia-Torea et. al, 2022). In contrast to the gross method, enabling the treatment of allowances with the net method, the net method would offer a reduced and biased representation of the financial impact of emissions allowances (Allini, Giner and Cardelli, 2018). According to Garcia-Torea et. al. (2022), the net method would allow firms to exclude the societal cost of polluting from financial statements.

4 Methodology

Research methods refer to a systematic, focused, and orderly collection of data to obtain information to solve and answer research problems or questions. This chapter will discuss the method and design of the research in which this study will be conducted. Methods and techniques of data collection are different. A method is data collection through historical review and analysis. The research technique is a step procedure to follow to gather the data needed to find the answers to our research questions (Ghauri, Grønhaug & Strange, 2020).

4.1 Research design

The thesis will analyse the following research questions. How does the Finnish forestry industry classify its emission allowances? The thesis will focus on the classification of allowances during the different phases of the EU ETS. The available research design methods are quantitative and qualitative. These make the core of the methodology philosophy. To choose which philosophy applies the paradigms must be considered. A paradigm according to Bryman and Bell (2011), based on Kuhn from the 1970s, is a cluster of beliefs and dictates for scientists in a particular discipline that influence what should be studied, how to conduct the research, and how to interpret the results. Epistemological and ontological interpretations of the study should be considered. These paradigms are the key points of the research design, as an epistemological aspect of what is (or is considered) correct and ontological social entities that affect how the standards are interpreted. The epistemological paradigm is closely related to natural sciences as it can either be confirmed or denied by claims, facts, and tests. In a quantitative setting, the epistemology setting is positivism, particularly in social sciences and thereby not of concern in this case. The qualitative epistemology view is interpretivism. The ontological paradigm is concerned with whether social entities should be considered objective entities that have a reality external or social actor or whether they should be considered social constructions built from perceptions and actions of social actors.

The ontological quantitative view is objectivistic. The ontological qualitative paradigm is concerned with constructivism.

Prior studies of the subject have both conducted research using qualitative and quantitative methodologies. With the limited amount of data and the scope of the subject, the qualitative method is a suitable method to use. Black (2013), Warwick and Ng (2012) and Garcia-Torea et. al. (2022) conducted studies on the subject using content analysis to gather data from annual reports. Black used a sample of 62 companies that were identified and coded. Warwick and Ng's study included 47 companies of a population of 250 companies. Garcia-Torea found and coded a sample of 107 groups from 2011 and 122 groups from 2016. This thesis continues previous research and focuses on Finland and the forestry industry listed on the stock exchange.

The method used to conduct the research is content analysis. A qualitative, using both an interpretive and constructionist view. In interpretivism, the researcher tries to grasp the subjective meaning of social actions, such as how to classify items (Bryman & Bell, 2011). Constructionism claims that social circumstances and their meanings are continually being achieved by social actors. Both see social actors and their actions as subjects of the research and how they have as a group agreed upon classifying accounting items. The method of gathering material and data is through document analysis. Which follows an epistemological philosophy. The data are thereby collected from official statements from companies and examined and compared to other companies and different years.

4.2 Qualitative research method

The thesis will gather data with a qualitative approach as I try to find a solution to how companies have classified their emissions allowances. The available data are limited to only a few companies as information about the Finnish forestry industry only has three listed companies with sufficient information to conduct research on. Due to this, a more quantitative approach is discarded, and a document analysis is

chosen to discover the topic. Qualitative research has a set of steps that Bryman and Bell (2011) have acknowledged. The first step is to define the general research question which has been discussed in the introduction. Then the general question is selecting the sites and subjects to be researched and collecting the relevant data about the subject. After the collection of data, they must be interpreted and if found to be insufficient then a group of further data must be gathered. The data from the pack are analysed and turned into conceptual and theoretical work. If the research question is not adequate at this phase, it can be specified and reworked. After collection, interpretation and linking to theoretical work, the conclusion is written.

Selecting relevant sites and subjects, this thesis focuses on European emissions allowances and their taxonomy in annual reports. This limits the study to only consider how the past has classified emissions allowances and whether it has changed or stayed the same even though there have been some difficulties in recognising their value and class. The collection of relevant data is from the company's annual report from the beginning of the EU ETS to the present. The qualitative research will not be conducted from interviews with personnel, even though this approach would give a deeper understanding of the company classifications policy. Interviews could be something for further studies.

Interpretation of data begins at the same time as the collection of data. The document analysis must simultaneously determine if the data is relevant to the study. Framing the data into the theoretical work is implemented, it is also critical to examine whether the research question must be reframed. Bryman and Bell (2011) have acknowledged that qualitative research often appears non-numeric but is not that straightforward. The data in the thesis was collected from the annual report and then collected and coded into tables to showcase how the companies define and classify emissions allowances. Changes in the classifying methods are represented in the coded tables. After conducting the empirical analysis, the research question should be tightened to fit the study and if needed more data to support or reject the question is conducted. The final part of the research process is writing the conclusion of the findings. Here it is important to stay as objective as possible because the data is collected by myself and only the data that I find relevant is selected. This is true for the whole collection process. If the research question has sufficient data to support

claims or reject it needed to be specified in this part of the research. Further studies on the subject are also given in the conclusions (Bryman & Bell, 2011).

4.3 Documents as source of data

“Documents as the source of data comprise a searching-out of underlying themes in the materials being analysed. It can be discerned in several of the studies referred to earlier, such as Dougherty and Kunda (1990) and Gephart (1993). Unlike quantitative content analysis, the processes through which the themes are extracted are usually left implicit.” (Bryman & Bell s.560, 2011).

” Content analysis is ‘a systematic, objective, and quantitative procedure for summarising the content of written, recorded, or published communication’ (Colton and Covert 2007: 235). It involves ‘codifying qualitative and quantitative information into pre-defined categories to derive patterns in the presentation and reporting of information’ (Guthrie and Abeysekera 2006: 120).” (Warwick 2011, p.58). Using documents as the source of data in the thesis is from the previous studies' view logically. It continues the work that prior authors have conducted and uses their advances on the Finnish companies within the EU ETS landscape.

Financial statements are essential for stakeholders. Stakeholders use financial statements to evaluate, judge and compare companies. Numerous stakeholders exist and all are not as powerful as the others, albeit all are meaningful. How companies disclose information could be crucial for investment or the use of services.

4.4 Data gathering

The data will be gathered from annual reports and financial statements. The sample will be annual reports and financial statements between the years 2005 and 2020. Companies with permits to auction and hold EU ETS allowances are a total of 150 companies as shown in Appendix 1 (Finnish Energy Authority, 2022). 141

on company websites. The age of the annual report was a hindrance to finding annual reports all in the same language. The annual report from UPM-Kymmene Oyj statements was only found in Finnish, and the rest were found in English. After examination, the same data are found in both languages only with minor, immaterial differences. UPM-Kymmene Oyj had only their 2016 annual report on their investor's page. The 2006 and 2011 annual report was found on other web pages not related to UPM-Kymmene Oyj (vuosikertomukset.net). M-Real Oyj annual report 2016 was found in the Aalto University library database. Metsä Board Oyj's annual reports for 2011 and 2016 were found on their investor's page. All annual reports were in English except for UPM-Kymmene Oyj 2006 and 2011 annual reports as they were in Finnish. The gathered data was collected into an Excel file where I summarised the data. The coded data followed the same schemes for replication purposes as Black (2013) and Warwick and Ng (2012).

For replication and ease of comparison, the data coding descriptors have been largely based on those used in earlier studies, but the sample is stricter. The specific area of the study will only include Finnish companies and the classification practices of Finnish-listed companies within the forestry industry. Prior contributors to content analysis and coding data on emissions allowances are Black (2013) and Warwick and Ng (2012). Warwick and Ng used only English annual reports from 2007, and Black complemented their study with a wider sample from 2011 not limited to only English annual reports.

The coded data is presented in the next chapter on empirical analysis. The data is coded into how the company recognised granted emissions allowances upon initial receipt and subsequently in the balance sheet. How freely allocated emissions allowances have been recognised. The final question is how liabilities for emissions allowances have been recognised.

4.5 Reliability and validity of the research

Reliability of the research and findings is a moral responsibility of the researcher to follow guidelines and constraints of research techniques and measurements. The value of the judgment by the researcher depends on the researcher's own perception and interpretation of the findings which is affected by the environment and period. The researcher must make decisions on what evidence is sufficient to be included in the study and find out what evidence is satisfactory to draw conclusions on from the findings. The research built by prior research tries to complement and build a better understanding of phenomena for future studies in the same or similar subjects. (Ghauri, Grønhaug & Strange, 2020). Bryman and Bell (2011) argue that reliability is concerned with whether the results and findings are repeatable. It is important therefore that the arguments and theories in the thesis are consistent (Bryman & Bell, 2011).

Bryman and Bell (2011) describe validity as being one of the most important criteria of research. The validity of research should be reflected in the results as the results measure what they are supposed to measure. By being able to support that results correlate with established theories and measures of the concept. For a result to be reliable the results should be accurately produced and be able to be replicated. Reliability and validity questions will be further analysed in the discussion chapter.

5 Empirical analysis

In this part of the thesis, the chapters will have the following disposition: The companies included in the study are presented. After the company presentation, the data gathered from annual reports will be presented.

5.1 Selected companies

5.1.1 Metsä board Oyj

Metsä board Oyj has its roots in a cooperative movement called Metsäliitto cooperative, which is the parent company of Metsä Group. Metsäliitto Cooperative began in 1947 and has through mergers and restructurings become Metsä Group. Metsä board Oyj is a subsidiary of the Metsä group. Metsä Board Oyj describes itself as a leader in high-quality fresh fibre paperboard with a strong shareholder base from Finnish households, institutions, and organisations. (Metsä Group sijoittajasivut 2023). In the thesis selection, the Metsä group is called M-real in the sample from 2005 and 2011. Metsä Board Oyj was M-real before restructuring in 2012. (Metsä Group sijoittajasivut 2023).

5.1.2 UPM-Kymmene Oyj

UPM-Kymmene is a corporation with roots in 1870. “Our predecessors Aktiebolag Walkiakoski and Kymmene Ab were established in 1871 and 1872, respectively. Several significant Finnish forest industry companies such as Kymi, United Paper Mills, Kaukas, Kajaani, Schauman, Rosenlew, Raf.” (UPM-Kymmene sijoittajasivut). UPM-Kymmene structure as it is today began in 1996. UPM-Kymmene Oyj has not changed company structure or name throughout the thesis study selected years.

5.1.3 Stora Enso Oyj

Stora Enso is a merger of the Finnish company Enso Oyj and Swedish company Stora Kopparbergs Bergslags Aktiebolag in 1998. Stora Enso Oyj can trace its roots back to 1288 with recorded documents from copper mining in Sweden. That mining company has through history emerged to Stora Kopparbergs Bergslag in 1862. The Enso company half dates to 1872 when W. Gutzeit & Co company with sawmill activities was founded in Kotka, Finland, by the Norwegian Hans Gutzeit. (Stora Enso Oyj, 2023).

5.2 Accounting Principles and Classifications

All companies follow IFRS standards and report accordingly their emissions and emissions allowances. The Emissions allowances are presented in notes, Other operating income, Other operating costs, intangible assets, government grants and provisions. As prior studies also pointed out that some may use their emissions allowances as inventory or cash and equivalents were not found, and neither were they classified as financial instruments (Garcia-Torea et. al, 2022).

IFRS standards used in the selected years have been IAS 20, IAS 37, IAS 38, and IAS 39 for reports until 2011. In 2016 IFRS 9 replaced IAS 39, even though the standard was not yet in use in annual reports by then.

5.3 Classification of emissions allowances in annual reports

5.3.1 Metsä board Oyj

In the 2006 annual statement, Metsä board Oyj have written: “Allowances received by the governments free of charge have initially been recognised as intangible assets and the corresponding government grant as advance payment in liabilities based on the fair value at the date of initial recognition. Allowances are measured at their cost or fair value if less. Allowances are not amortised. The emissions produced are recognised as cost and as liability together at the date of initial recognition.” Thus, using a net approach by offsetting allowances as assets and liabilities at fair value or at cost. Emissions allowances have been consumed within the period. Only the cost from purchasing allowances and the sale of unused rights affect profit and loss. (M-Real Oyj, 2006).

Annual report 2011 for Metsä Board Oyj wrote about emissions allowances: Allowances received by the governments free of charge have initially been recognised as intangible assets and the corresponding government grant as advance payment in liabilities based on the fair value at the date of initial recognition. Allowances are measured at their cost or at their fair value if less. Allowances are not amortised. The emissions produced are recognised as a cost and a liability together with the corresponding government grant as income based on the value at the date of initial recognition. Rights consumed that are within the original range have no positive or negative effect on profit for the period. The costs of unused rights affect profit. No change in the explanation of the classification method. (M-Real Oyj, 2011).

In the financial year, 2016 Metsä Board updated their classification of emissions allowances. They described in more detail whether the allowances have been received from the government or bought at the free market. The Group has received emission allowances in accordance with the European Union Emissions Trading System. Allowances are treated as intangible assets and are measured at fair value.

Since allowances from governments are received without consideration, their acquisition cost is zero. Emission allowances are used simultaneously with the carbon dioxide emissions generated during their validity period. Surplus emission allowances are sold, and the earnings generated are recognised in other operating income. If the emission allowances received free of charge are not sufficient to cover the amount of the emissions produced, the Group purchases additional allowances from the market. The allowances purchased are recognised in intangible rights at the fair value of the acquisition date. The provision to fulfil the obligation to return the emission allowances is recognised at the fair value on the closing date of the reporting period if the emission allowances received free of charge and purchased are not sufficient to cover the amount of the actual emissions. (Metsä board Oyj, 2016).

In the years 2011 and 2016, Metsä Board Oyj added that there is a commodity risk associated with emissions allowances. The Commodity risk note discusses how they plan to adjust for volatility with financial hedges, albeit mostly against fluctuations in the prices of oil and gas (Metsä board Oyj, 2016).

5.3.2 UPM-Kymmene Oyj

Emissions allowances in 2006 annual statement: The group participates in government programs aimed at reducing greenhouse gas emissions. Emission allowances received without consideration from the government are recorded as intangible assets at the fair value at the time of acquisition. No depreciation is made for the emission allowances, but they are recorded at the highest market price on the balance sheet date. Public grants are recorded as receivables in the balance sheet and systematically recognised over the period for which the corresponding emission allowances have been granted. Emission allowances and related provisions are derecognised when they are delivered to meet obligations or sold. Any sale gains or losses are recorded in the income statement. UPM-Kymmene was used in the financial year 2006 as a netting approach. (UPM-Kymmene Oyj, 2006).

2011 annual report on emissions allowances: The Group participates in government schemes aimed at reducing greenhouse gas emissions. Emission allowances received from governments free of charge are initially recognised as intangible assets based on the market value at the date of initial recognition. Emission rights are not amortised or depreciated but are recognised at an amount not exceeding their market value at the end of the financial year. Government grants are recognised as deferred income in the balance sheet at the same time as emission rights and are recognised in other operating income in the income statement, systematically, over the compliance period to which the corresponding emission rights relate. The emissions realised are expensed under other operating costs and expenses in the income statement and presented as a provision in the balance sheet. Emission allowances and associated provisions are derecognised when disposed of. Any profit or loss on disposal is recognised in the income statement. The Company specify that they are actively involved in the EU ETS marketplace. They use gas, coal, and energy hedges to avoid and manage volatility in price. UPM-Kymmene Oyj does not specify whether they are hedged against volatility in emissions rights prices. (UPM-Kymmene, 2011).

Emissions allowances 2016 in the notes to the financial statement: The group participates in the European Emissions Trading Scheme aimed at reducing greenhouse gas emissions. Emission allowances received from governments free of charge to emit a fixed tonnage of carbon dioxide in a fixed period give rise to an intangible asset for the emission rights, a government grant, and a liability for the obligation to deliver emission rights equal to the emissions that have been made during the compliance period. Emission rights are initially recognised as intangible assets based on the market value at the date of initial recognition. Emission rights are not amortised. If the market value of emission rights on the balance sheet date is lower than their recognised costs, surplus emission rights that are deemed unnecessary to offset real and anticipated emissions for the fiscal year are subject to impairment at their market value. Government grants are recognised as deferred income in the balance sheet at the same time as emission rights. They are recognised in other operating income in the income statement systematically over the compliance period to which the corresponding emission allowance relates. The liability to deliver emission rights is recognised based on actual emissions. The emissions realised are expensed under other operating costs and expenses in the

income statement and presented as a provision in the balance sheet. The liability is settled using emission rights on hand, measured at the carrying amount of those emission rights. Emission rights and associated provisions are derecognised when disposed of. Any profit or loss represents the costs of purchasing additional rights to cover excess emissions, the sale of unused rights in the case realised emissions are under emission rights received free of charge or the impairment of unused emission rights. UPM-Kymmene Oyj does not specify whether they are hedged against volatility in emissions rights prices. (UPM-Kymmene, 2016).

5.3.3 Stora Enso Oyj

Emissions allowances in the annual report of Stora Enso Oyj 2006: The Group's participation in the European Emissions Trading Scheme, in which it has been allocated allowances to emit a fixed tonnage of carbon dioxide in a fixed period, gives rise to an intangible asset for the allowances, a government grant and a liability for the obligation to deliver allowances equal to the emissions that have been made during the compliance period. Emissions Allowances recorded as intangible assets are recognised when the Group can exercise control and are measured at fair value at the date of initial recognition. If the market value of emission allowances experiences a significant decline that is considered permanent, and this results in a carrying amount that exceeds the market value, an impairment charge is recognised for those allowances that the Group will not utilise internally. The liability to deliver allowances is recognised based on actual emissions. The liability will be settled using allowances on hand, measured at the carrying amount of those allowances, with any excess emissions being measured at the market value of the allowances at the period end. (Stora Enso Oyj, 2006).

In the Income Statement, the Group will expense the cost of the emissions allowance, under Materials & Services, at the fair value of the rights at their grant date, together with purchased emission rights at their purchase price. Such costs will be offset under Other Operating Income by the income from the original grant of the rights used at their fair value at the grant date, together with income from the release

or sale of surplus rights. The Income Statement will thus be neutral in respect of all rights consumed that were within the original grant, any net effect representing either the costs of purchasing additional rights to cover excess emissions, the sale of unused rights or the impairment of allowances not required for internal use. (Stora Enso Oyj, 2006).

Annual Report 2011: The Group's participation in the European Emissions Trading Scheme, in which it has been allocated allowances to emit a fixed tonnage of carbon dioxide in a fixed period, gives rise to an intangible asset for the allowances, a government grant and a liability for the obligation to deliver allowances equal to the emissions that have been made during the compliance period. Emissions Allowances recorded as intangible assets are recognised when the Group can exercise control and are measured at fair value at the date of initial recognition. When the carrying amount of emission allowances exceeds their market value due to a significant and permanent decline in the latter, the Group is required to recognise an impairment charge for those allowances that it has no intention of using internally. This measure ensures that the financial statements accurately reflect the net realisable value of the allowances, consistent with the principles of fair value accounting. The liability to deliver allowances is recognised based on actual emissions. The liability will be settled using allowances on hand, measured at the carrying amount of those allowances, with any excess emissions being measured at the market value of the allowances at the period end. (Stora Enso, 2006).

In the Income Statement, the Group will expense, under Materials & Services, emissions made at the fair value of the rights at their grant date, together with purchased emission rights at their purchase price. Such costs will be offset under Other Operating Income by the income from the original grant of the rights used at their fair value at the grant date, together with income from the release or sale of surplus rights. The Income Statement will thus be neutral in respect of all rights consumed that were within the original grant, any net effect representing either the costs of purchasing additional rights to cover excess emissions, the sale of unused rights or the impairment of allowances not required for internal use. (Stora Enso, 2006).

The financial statement of Stora Enso Oyj describes the classification of emissions allowances as the following: The group's participation in the European Emissions Trading Scheme, in which it has been allocated allowances to emit a fixed tonnage of carbon dioxide in a fixed period, gives rise to an intangible asset for the allowances, a government grant and a liability for the obligation to deliver allowances equal to the emissions that have been made during the compliance period. Emission allowances recorded as intangible assets are recognised when the group can exercise control and are measured at level 1 fair value at the date of initial recognition. In accordance with the principles of sound financial reporting, the Group is obligated to recognise an impairment charge for emission allowances that are not expected to be used internally when their market value experiences a significant and permanent decline, resulting in a carrying amount that exceeds their net realisable value. This ensures that the financial statements provide users with reliable and relevant information concerning the Group's financial position and performance. The liability to deliver allowances is recognised based on actual emissions, the liability will be settled using allowances on hand, measured at the carrying amount of those allowances, with any excess emissions being measured at the market value of the allowances at the period end. (Stora Enso Oyj, 2006).

In the Consolidated Income Statement, the group will expense, under materials and services, emissions made at the fair value of the rights at their grant date, together with purchased emission rights at their purchase price. Such costs will be offset under other operating income by the income from the original grant of the rights used at their fair value at the grant date, together with income from the release or sale of surplus rights. The Consolidated Income Statement will thus be neutral in respect of all rights consumed that were within the original grant. Any net effect represents the costs of purchasing additional rights to cover excess emissions, the sale of unused rights, in the case realised emissions are under allowances received free of charge or the impairment of allowances not required for internal use. (Stora Enso Oyj, 2016).

6 Findings

In the findings chapter, the results of the study are presented and analysed. This chapter aims to answer the research questions and objectives set out in the introduction based on the data collected during the research process. Each phase of the EU ETS will be analysed.

6.1 Characterisation of emissions allowances

Selected companies during the sample years have all classified emissions allowances as intangible assets which follows the same results given by Black (2013), Warwick and Ng (2012), and Garcia-Torea et. al, (2022), stating classification of emissions allowances as intangible assets is the majority approach. Classifying emissions allowances as the IAS 20 intangible assets, instead of the IAS 2 standard for inventories is likely due to Finland's regulatory approach of valuing items in the income statement before itemising them to the balance sheet, rather than valuing items in the balance sheet and income statement as a differentiator. Thus, giving emissions allowances a better or fairer value according to the accountants. The inventory approach has been more popular in the Austrian, Dutch, Portuguese, and Polish standard setters, with a more equity-strong Anglo-Saxon approach perhaps giving more flexibility to value the emissions allowances. In Appendix 1-3, all companies have been accounting for emissions allowances as intangible assets with the IAS 38 standard. As in intangible assets, all companies classify emissions allowances as government grants with IAS 20 standard. The government grant is a liability that needs to be settled in April of the following financial year. By receiving a grant from an authority, they classified it as an advance to be fulfilled in the future. As emissions allowances are valued at financial year end but allocated to emissions produced after year-end in February, they, thus, must defer the income or cost associated with emissions allowances. Classifying allowances as intangible assets and government grants as a liability followed prior studies' majority consensus without deviation. This approach differs from the EFRAG IFRIC 3 interpretation. IFRIC 3 stated that emissions allowances upon receipt should be measured at market

value for the intangible asset and the difference between fair value and receipt value as a liability according to IAS 20. All companies have adopted to classify emissions allowances as government grants and liabilities until they will be used or sold, then they will be discarded from the balance sheet or sold at market value. This follows prior studies, that intangible assets are the majority approach of classification (Cook 2009), (Black, 2013) and (Garcia-Torea et. al, 2022).

6.2 The initial valuation of allocated emissions allowances

In Appendix 2 and 3, UPM-Kymmene Oyj and Stora Enso Oyj have adopted without changes to the use of fair value valuation upon receipt of freely allocated emissions allowances. Companies did not all follow each other in classifying emissions allowances at null value and fair value. Fair value is what companies would have to pay for the emissions allowances had they bought them from the market. A null value is a free allocation with no associated cost or value at receipt. In Appendix 2, Metsä Board Oyj, before 2016 they were measured at fair value at financial year-end. They were recognised as advance payments in liabilities based on the fair value at the date of initial recognition. Metsä Board Oyj specified that they value emissions allowances at null value upon receipt in the financial year 2016. Null value classification was in Garcia-Torea et. al. (2022) the majority approach with one-third of the sample companies. Fourteen per cent of companies in their sample used the fair valuation approach in classification. They also conclude that companies receiving fewer emissions allowances are more likely to change the classification method. This thesis could not disclose why Metsä Board Oyj have changed the classification method.

6.3 Amortisation and impairment

None of the companies in Appendix 1-3 have amortised their emissions allowances. Prior studies have noted that only one-third of companies used to amortise their emissions allowances (Black, 2013), (Warwick, Ng 2012). In the chosen sample of Finnish companies, not one specified to be amortising their emissions allowances. In appendix 2 and 3, Stora Enso and UPM-Kymmene Oyj did not specify whether they amortise or not. Appendix 1, Metsä Board Oyj is the only company of the sample to specify not to amortise in the financial year 2016.

However, most of them have been testing the allowances for impairment. Metsä Board Oyj did not specify whether they test emissions allowances for impairment at years end. Stora Enso Oyj has specified that the income statement shall remain neutral to changes in emissions allowances except for the excess of emissions allowances that are not used to cover the liability of emissions. Excess emissions allowances shall be tested for impairment with the IAS 38 standard and may affect income statements in other operating profits or losses. The same is true for UPM-Kymmene Oyj which states that impairment of excess emissions allowances will give an effect on the income statement. Studies conducted by Garcia-Torea et. al (2022) found that most companies did not report on subsequent events and that almost one-third of companies did report to do impairment testing. Only a few companies reported on performing revaluation during year-end and that was also found to be true in this sample of Finnish companies as no one reported on performing revaluation of emissions allowances. Revaluation and impairment are both allowed in IFRS noted Garcia-Torea et. al (2022).

6.4 Recognition of emission allowance liabilities

All companies in the sample have mostly adopted the net approach. They recognised emission allowance as IAS 37 liabilities upon receipt. If emissions allowances were not sufficient to cover their liability the company bought at market value allowances

to cover the liability. Furthermore, if the companies had excess emissions allowances after delivering their liability, they netted their profit in the income statement. The net effect was what the company sold or could have sold their emissions allowances for at the year's end. Most of the time companies reported selling excess and profiting on the gain at the year's end. Metsä Board Oyj have chosen a different classification method in 2016. They chose to classify them at null value upon receipt and did not specify whether they impair test them or not. As a contingent liability, IAS 37, the allowances have their value when used but Metsä Board have chosen to not disclose value in the balance sheet prior to covering the emission liability in April of the following year. Prior studies found the net method to be the popular method of classification (Black, 2013), Warwick and Ng, (2012) and (Garcia-Torea et al 2022). Although most companies in their sample used Net methods of classification. They also found that companies would be more likely to move from a gross approach to the net method of classification.

7 Discussion

The purpose of the thesis was to continue and adapt prior studies and find out how companies have classified their emissions allowances. Prior studies have found that there is no harmony among EU ETS companies. In the thesis sample, I have found that there is mostly harmony in classification and comparability. Although some changes have occurred during this sample period. During the time between 2006 and 2011, there were no changes in classification. In 2016 there have been some changes in classification.

7.1 Discussion of analysis results

Emissions allowances have seen some changes in presentation throughout the years, as presented in the previous chapter. Classification methods have in the Finnish forestry industry not seen major changes. Openness and transparent presentation have, however, increased over the years as emissions allowances and climate change have become more apparent. UPM-Kymmene Oyj and Stora Enso Oyj have expanded how they present information on their emission allowance classification method. Metsä Board Oyj has not expanded its transparency, it is apparent that it could have been less transparent in its classification method.

Emissions allowances classifications in Finland and the forestry industry have not seen much or any change in classification practice since 2006. Some differences between companies can be found. Such as the presentation on amortisation and impairment. The thesis could not give a conclusion as to whether the changes have results or valuation effects on the company. Metsä Board Oyj did not specify whether they impair test their emissions allowances while UPM-Kymmene Oyj and Stora Enso Oyj specified that they do an impairment test if the valuation of emissions allowances is lower than fair value. This study was in consensus with prior studies. As all companies used a netting approach and did not use the gross method of the IFRIC 3 interpretation. The netting approach of classifying emissions allowances as intangible assets with a corresponding liability to be executed upon

delivery of emissions allowances was used throughout the sample years. This approach followed the results from previous studies Garcia-Torea et. al. (2022).

The Finnish companies have overall been transparent on how they classify emissions allowances. The study conducted by Garcia-Torea et.al. (2022) concludes that 40 per cent of German companies did not provide any information on emissions allowances. Although the sample is small in this thesis and does not take into consideration the majority population of Finnish EU ETS companies it does include most of the exchange-listed companies. They also could conclude that 76 per cent of companies did not modify their method. Garcia-Torea et.al. (2022) notes that companies that moved away from net methods did not receive large amounts of emissions allowances. They conclude that financial pressure to buy emissions allowances at market value could be a factor to adopt the gross method. In their study, in contrast, they conclude that only a few of their sample moved towards the net method and most used no disclosure of those that changed classification methods. Regardless of the firms giving up a hybrid method for a net method, the other firms were still receiving, on average, a substantial amount of granted emissions allowances. The Finnish companies did not change any radical view on how to classify emissions allowances, however, changes were made in Metsä Board Oyj. They moved from valuing emissions allowances from market value to a null value in 2016 and, went from non-disclosure to disclosing not to amortise the emissions allowances. The reason why they changed the method was not disclosed but follows prior studies that companies change classification methods in 2016 from net to gross classifications methods.

7.2 Limitations of the study

A clear limitation of the study is the sample size albeit there have been practical constraints to the chosen sample size. One limitation of using a smaller sample is that the findings might be inconclusive. To limit the effect of the chosen number of companies is to give each company sufficient time to see the effects of changes whether there are any. Another limitation of the study is that content analysis can be

time-consuming. The effects of being time-consuming the study might suffer in quality as the process continues for a longer period. The limitation is handled through a methodological process of gathering data into Microsoft Words documents and Excel spreadsheets to handle the data. Furthermore, in content analysis limitations is the interpretation of the data. Gathering the data and analysing the data is subject to biases and other constraints (Bellman & Bell, 2011). The limitations mentioned above were recognised and taken into consideration when conducting the empirical analysis. Using data from annual reports and hand-picking data is a simplified model of how prior studies have been conducted with more rigorous methods of data collection. Albeit the limitations the study has found connections to prior studies that may add to continuous research.

8 Conclusion

The purpose of the thesis was to continue and adapt prior studies and find out how companies have classified their emissions allowances. The purpose included the examination of differences in the classification of the three phases of EU ETS. The scope of the study examined companies from the forestry industry in Finland. The sample industry differs from prior studies by being only a specific industry while other studies have included multiple industries and larger samples. The purpose and research questions were fulfilled with qualitative research. The thesis examined the question of *how companies annual reports disclosed the taxonomy and classification of emissions allowances throughout different phases of the EU ETS*. The study was conducted with a content analysis gathering data from the notes in the annual reports. The dataset was collected from 2005, 2011 and 2016.

Prior studies have found that there is no common classification strategy harmony among EU ETS companies Black (2013), Warwick and Ng (2012) and Garcia-Torea et. al. (2022). The study gathered data on companies' initial classification upon receipt, what standards were used and whether companies used the gross or net classification method. The thesis sample found that there is mostly classification harmony exists. Classification and comparability of emissions allowance follow the sample, only Metsä Board Oyj have changed classifications method during the sample period. The study found that all companies classified them as intangible assets and the liability of the emissions allowance was classified as provisions of government grants. They did not during the sample period amortise or impair the value of emissions allowances. The difference in classifications strategy within the sample occurred in Metsä Board Oyj, they changed classification from market value recognition to null value at recognition. This change gives them the ability to present no value of the emissions allowance if they do not buy more of the allowances during the financial year. Prior studies that found no harmonisation, give companies the possibility to choose how they want to present their emissions allowances. The possibility to present however they want might be in some instances good. Albeit the emissions allowance purpose is to reduce the impact of a global issue with emissions pollution. The study found that during the time between 2006 and 2011, there were

no changes in classification. In 2016 there have been some changes in classification. The results in the study follow prior study results, although the prior studies have inconclusive results on how to classify emissions allowances.

This study has been a continuation of previous studies on the classification of emissions allowances as an accounting master's thesis. The study complements and continues the previous studies by providing a sample from Finnish companies within the forestry industry. The taxonomy of emissions allowances might see changes in the future and continue to be interesting for future studies. Further studies in emissions allowances and their effects on management, companies and society will probably continue to be a subject of interest as the world economic situation is widely subject to environmental concerns.

Summary in Swedish

Taxonomi av europeiska utsläppshandelssystemet inom den finska träförädlingsindustrin

Avhandlingen behandlar utsläppsrätternas taxonomi och dess förändring inom bokföringen och presentationen i bokslut i den finska träförädlingsindustrin. Europeiska utsläppshandelssystemet (EU ETS) är en mekanism inom Europa för att kontrollera och gradvis minska på utsläpp. Bolag inkluderade i EU ETS är energiintensiva industribolag eftersom de påverkar koldioxidutsläppen till atmosfären i hög grad. Problemet sedan 2005 då utsläppsrättshandeln började har varit taxonomi av utsläppsrätterna. Utsläppsrätternas syfte är att ge en kostnad på utsläpp av koldioxid. Hur bolag klassificerar utsläppen påverkar deras värdering och därmed interna kostnader för dem. Värderingen och kostnaden för utsläppsrätterna är en viktig del av utsläppshandelssystemet men hör inte till problemområdet i denna avhandling. Genom att påverka kostnaderna för utsläpp kan man noggrannare reglera genom incitament hur mycket bolag har ”råd att emittera”. Avhandlingen fokuserar på taxonomi, klassificeringen och presentationen av utsläppsrätterna. Forskningsfrågan i avhandlingen är hur taxonomi och klassificering av utsläppsrätter har förändrats i de finansiella rapporterna genom de tre första faserna av EU ETS.

Utmaningen med utsläppsrätterna är att de kan förvärvas på olika sätt och likaså utnyttjas på olika sätt. Inom tidigare studier har detta diskuterats omfattande. Tidigare studier har funnit två huvudgrupper: nettoprincipen och bruttoprincipen. Undergrupper i klassificeringen är immateriella rättigheter, finansiella tillgångar eller omsättningstillgångar. Olika internationella standarder används för att klassificera utsläppsrätterna. European Financial Reporting Advisory Group (EFRAG) ger vid behov tolkningar på IFRS standarder. De ger tolkningar och råd om användningen av standarder i form av IFRIC-tolkningar. IFRIC har rekommenderat att använda en helhetstolkning av de olika International Financial Reporting Standards (IFRS). De utgav IFRIC 3-tolkningen som skulle användas för klassificeringen av utsläppsrätterna men gav missvisande resultat. Tolkningen av

standarderna avyttrades inom ett år efter dess introduktion. IFRIC 3 frambringade ett förvirrande resultat vid klassificering av utsläppsrätter. Användningen av IFRIC 3 mer eller mindre tvingade bolagen att värdera utsläppsrätterna till deras förväntade värde. I och med att man blir tvungen att värdera något i framtiden uppstår det ett värderingsproblem som måste hanteras antingen genom att acceptera volatiliteten eller att skydda sin position med kontrakt av terminer eller futurer. Genom att använda sig av finansiella avtalsarrangemang involverar man risken för fluktuationer. Därmed ökar risken med något som inte borde involvera annan risk än hur mycket eller hur lite man använder sig av utsläppsrätter.

Ett flertal studier har utförts för att hitta en harmoni bland klassifikationen av utsläppsrätter. Det har varit tydligt att bolag i olika länder klassificerar på olika sätt beroende på hurdan norm och lag de följer. Studier har visat att bolag har klassificerat utsläppsrätter som omsättningstillgångar, finansiella tillgång, immateriella tillgångar och skulder. Dessutom kan bolag välja att värdera utsläppsrätterna till nollvärde eller verkligt värde vid upptagningen. Studierna har funnit att enbart vid försäljning eller köp av mera utsläppsrätter uppstår en kostnad eller intäkt som kan påverka resultatet. Oberoende av hur de har klassificerat utsläppsrätterna visar deras resultat av klassifikation noll värde i resultaträkningen. Ifall det uppstår en kostnad eller en intäkt vid försäljning eller förvärv av utsläppsrätter tas det upp i resultaträkningen som övrig verksamhetsintäkt eller kostnad.

Avhandlingen är en kvalitativ studie. Jag studerar kvalitativt hur de finska träförädlingsindustribolagen har förändrat sitt sätt att klassificera utsläppsrätterna. Den kvalitativa studien utförs som dokumentanalys. I dokumentanalysen används bolagens bokslut. Avhandlingens empiri är från noterna av boksluten. Från noterna samlas data på hur bolagen har presenterat klassifikationen av utsläppsrätterna. Bolagen i studien är Metsä Board Oyj, UPM-Kymmene Oyj och Stora Enso Oyj. För att fånga förändringen har jag valt att studera bolagen i tre olika EU ETS-faser. Det finns fyra faser totalt, den första började 2005 och sista faser började 2021. I avhandlingen beaktas faserna ett till tre. Jag har valt åren 2006, 2011 och 2016 som omfattar första andra och tredje fasen.

I avhandlingen har jag funnit att majoriteten av de finska träförädlingsindustribolagen genom åren har utfört EU ETS-handel vars klassifikationsmetod inte förändrats med tiden. Jag kodade upp tabeller för att kunna jämföra resultat. För kodningen tog jag modell av tidigare studier av Black (2013) och Warwick och Ng (2012). Modellen användes för att enkelt kunna jämföra resultat med tidigare studier. Jag studerade hur bolagen beaktar utsläppsrätten vid mottagande av rättigheten. Dokumentanalysen studerade klassifikationen av utsläppsrätter i tre moment. Första momentet tar upp ifall utsläppsrätterna värderas till nollvärde eller till marknadsvärde. Andra momentet fortsätter med huruvida bolagen amorterar och nedvärderar utsläppsrätterna vid bokslutstillfället. Slutligen samlas data om utsläppsrätterna är klassificerade som immateriella rättigheter, finansiella tillgångar eller omsättningstillgångar. Studien sammanfattas med att Stora Enso Oyj och UPM-Kymmene Oyj har behållit samma klassifikationsprinciper. Metsä Board Oyj har under sampelperioden ändrat på principen för klassifikation av utsläppsrätten. I bokslutet 2016 har de frångått att värdera rättigheten till marknadsvärde till nollvärde jämfört med åren 2006 och 2011. Metsä Board Oyj skriver i bokslutet 2016 att de inte amorterar vid bokslutstillfället. Vid tidigare perioder har Metsä Board Oyj inte nämnt amorteringen av utsläppsrätter.

Avhandlingen bidrar med att ge en insyn i Finlands träförädlingsindustri i frågan hur de värderar utsläppsrätter. Utsläppsrätter kommer att vara relevanta i framtiden då i och med att deras kvot minskar kommer även deras värde att stiga. I och med att värdet stiger kommer bolagens utsläpp att kosta mera. De som lyckas minska utsläppen kommer att kunna utnyttja vinster av utsläppsrätterna och de som inte utvecklas kommer att straffas med högre kostnader.

References

- Alexander, D., & Jermakowicz, E. (2006). A true and fair view of the principles/rules debate. *Abacus*, 42(2), 132-164.
- Barlow, M. (2017). Six-figure penalties for non-compliance with climate change regulations. Burges Salmon. Acquired 17.10.2022. URL: <https://www.burges-salmon.com/news-and-insight/legal-updates/six-figure-penalties-for-non-compliance-with-climate-change-regimes>.
- Bell, E. & Bryman, A. (2011). *Business research methods*. Oxford university press.
- Black, C. M. (2013). Accounting for carbon emission allowances in the European Union: In search of consistency. *Accounting in Europe*, 10(2), 223-239.
- Buben, O. (2018, May). Emission Rights Reporting by Czech Companies. In *Annual Conference on Finance and Accounting*(pp. 239-248). Springer, Cham.
- Calel, Raphael and Dechezlepretre, Antoine (2016) Environmental policy and directed technological change: evidence from the European carbon market. *Review of Economics and Statistics*, 98 (1). pp. 173-191. ISSN 0034-6535
- Carratù, M., Chiarini, B., & Piselli, P. (2020). Effects of European emission unit allowance auctions on corporate profitability. *Energy Policy*, 144, 111584.
- Choong, K. K. (2008). Intellectual capital: definitions, categorization and reporting models. *Journal of intellectual capital*, 9(4), 609-638.
- Cook, Allan. (2009). Emission Rights: From Costless Activity To Market Operations. *Accounting, Organizations and Society*. 34. 456-468. 10.1016/j.aos.2007.12.001.
- Dechezleprêtre, A., Nachtigall, D., & Venmans, F. (2018). The joint impact of the European Union emissions trading system on carbon emissions and economic performance.
- Engels, A. (2009). The European Emissions Trading Scheme: An exploratory study of how companies learn to account for carbon. *Accounting, Organizations and Society*, 34(3-4), 488-498.
- Ellerman, A. D., & Joskow, P. L. (2008). *The European Union's emissions trading system in perspective* (pp. 12-64). Arlington, VA: Pew Center on Global Climate Change.
- European Commission. (2022). EU Emissions Trading System (EU ETS). URL: https://climate.ec.europa.eu/eu-action/eu-emissions-trading-system-eu-ets_en. Taken on date: 4.3.2023.

- Ernst and Young. (2020). Metsäteollisuuden taloudelliset vaikutukset Suomessa. 5fae995a5fef4c2680df41cf_Metsateollisuuden_taloudelliset_vaikutukset_2020.pdf (webflow.com).
- Finnish Energy Authority. (2021). Päästökauppa. URL: https://energiavirasto.fi/etusivu?p_p_id=fi_yja_language_version_tool_web_portlet_LanguageVersionToolMissingNotificationPortlet&_fi_yja_language_version_tool_web_portlet_LanguageVersionToolMissingNotificationPortlet_missingLanguageVersion=1. 15.11.2021.
- Garcia-Torea, N., Giordano-Spring, S., Larrinaga, C., & Rivière-Giordano, G. (2022). Accounting for Carbon Emission Allowances: An Empirical Analysis in the EU ETS Phase 3. *Social and Environmental Accountability Journal*, 1-23.
- Giuliani, M., & Skoog, M. (2020). Making sense of the temporal dimension of intellectual capital: A critical case study. *Critical Perspectives on Accounting*, 70, 101993.
- Ghuri, P., Grønhaug, K., & Strange, R. (2020). *Research methods in business studies*. Cambridge University Press.
- Gibassier, D., & Schaltegger, S. (2015). Carbon management accounting and reporting in practice: a case study on converging emergent approaches. *Sustainability Accounting, Management and Policy Journal*.
- Gröjer, J. E. (2001). Intangibles and accounting classifications: in search of a classification strategy. *Accounting, Organizations and Society*, 26(7-8), 695-713.
- Haupt, M., & Ismer, R. (2013). The EU Emissions Trading System under IFRS—Towards a ‘True and Fair View’. *Accounting in Europe*, 10(1), 71-97.
- Johnson, O. (1972). On Taxonomy and accounting research. *The Accounting Review*, 47(1), 64-74.
- Söderlund, K. (2012). Den finländska redovisningsnormeringen i korstrycket mellan institutionaliserad teori och internationella standarder.
- MacKenzie, D. (2009). Making things the same: Gases, emission rights and the politics of carbon markets. *Accounting, organizations and society*, 34(3-4), 440-455.
- M-Real Oyj. (2006). M-Real Oyj Annual Report 2006. URL: <https://web.lib.aalto.fi/fi/old/yrittyspalvelin/pdf/2006/Emreal2006.pdf>. On date 20.4.2023.
- Metsä Board Oyj. (2011). Metsä Board Oyj Annual Report 2011. URL: <https://www.metsagroup.com/metsaboard/news-and-publications/news/2012/m->

- [reals-annual-report-2011-and-summary-of-the-year-2011-published/](#). On date 20.4.2023.
- Metsä Board Oyj. (2016). Metsä Board Oyj Annual Report 2016. URL: <https://www.metsagroup.com/metsaboard/news-and-publications/news/2017/metsa-boards-2016-annual-report-and-financial-statements-published/>. On date 20.4.2023.
- Metsä Group. (2023). Why invest in Metsä Board? URL: <https://www.metsagroup.com/metsaboard/investors/metsa-board-as-an-investment/why-invest-in-metsa-board/>.
- Metsäteollisuus. (2020). Metsäteollisuus. numeroina. URL 20-9-2021. <https://www.metsateollisuus.fi/uutishuone/metsateollisuus-numeroina>
- Naranjo Tuesta, Y., Crespo Soler, C., & Ripoll Feliu, V. (2021). Carbon management accounting and financial performance: Evidence from the European Union emission trading system. *Business Strategy and the Environment*, 30(2), 1270-1282.
- Neuendorf, K. A. (2018). Content analysis and thematic analysis. In *Advanced research methods for applied psychology* (pp. 211-223). Routledge.
- Nobes, C. (2008). Accounting classification in the IFRS era. *Australian Accounting Review*, 18(3), 191-198.
- Nobes, C. (2003). On the myth of “Anglo-Saxon” financial accounting: A comment. *The International Journal of Accounting*, 38(1), 95-104.
- OECD. (2016). OECD Economic Surveys FINLAND. untitled (oecd.org)
- United States Environmental Protection Agency. (2022). Acid Rain Program. 10.5.2022. URL: <https://www.epa.gov/acidrain/acid-rain-program>
- UPM-Kymmene. (2016). UPM-Kymmene Oyj Annual report 2016. URL: <https://www.upm.com/investors/reports-and-presentations/2016/>. On date 20.4.2023.
- Sotos, M. (2015). GHG Protocol Scope 2 Guidance - An amendment to the GHG Protocol Corporate Standard. Greenhouse gas Protocol. URL: <https://ghgprotocol.org/sites/default/files/2023-03/Scope%20%20Guidance.pdf>. On date 21.6.2023.
- Stora Enso Oyj. (2006). Stora Enso Oyj Annual report 2006. URL: <https://web.lib.aalto.fi/fi/old/yrittyspalvelin/pdf/2006/Estoraenso2006.pdf>. On date 20.4.2023.
- Stora Enso Oyj. Download Center: Stora Enso Oyj Annual report 2011 and 2016. URL: <https://www.storaenso.com/en/download->

[centre?page=1&tab=documents&type=b1d30dca-0fed-45a3-8556-a4216149bf6e&year=2011](https://www.storaenso.com/en/about-stora-enso/our-history). On date 20.4.2023.

Stora Enso Oyj. (2023). Our history. URL: <https://www.storaenso.com/en/about-stora-enso/our-history>. On date 20.4.2023.

Törning, E. (2021). Redovisa rätt 2021. Sanoma utbildning. Stockholm.

Protocol, G. G., & Greenhouse Gas Protocol Initiative. (2004). A corporate accounting and reporting standard. *World Resources Institute and World Business Council for Sustainable Development*.

Roberts, A. (1995). The very idea of classification in international accounting. *Accounting, Organizations and Society*, 20(7-8), 639-664.

Vuosikertomukset. (2023). UPM-Kymmene Oyj vuosikertomus 2006. URL: https://vuosikertomukset.net/resources/UPM/fin/vuosikertomukset/UPM_vuosikertomus_2006.pdf. On date 20.4.2023.

Vuosikertomukset. (2023). UPM-Kymmene Oyj vuosikertomus 2011. URL: http://vuosikertomukset.net/resources/UPM/fin/vuosikertomukset/UPM_vuosikertomus_2011.pdf. On date 20.4.2023.

Appendices

Code

0 = Private company

1 = Listed on the stock exchange

2 = Public but not listed on stock exchange

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	2	4
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Appendix 1: Finnish Energy Authority EU ETS actors.

METSÄ	2006	2011	2016
Characterisation of emissions allowances			
Intangible assets	x	x	x
Initial valuation of freely allocated emissions allowances:			
Market value	x	x	
Nil value			x
Amortisation or Impairment			
a, Is amortisation adopted			
Yes			
no	x	x	
not specified			x
b, Are they subject to impairment testing			
Yes			
No			
not specified	x	x	x
How liabilities for emissions allowances have been recognised			
Gros			
Net	x	x	x
Other			

Appendix 2: Metsä Board Oyj table of classifications.

UPM	2006	2011	2016
Characterisation of emissions allowances			
Intangible assets	x	x	x
Initial valuation of freely allocated emissions allowances:			
Market value	x	x	x
Nil value			
Amortisation or Impairment			
a, Is amortisation adopted			
Yes			
no	x	x	x
not specified			
b, Are they subject to impairment testing			
Yes	x	x	x
No			
not specified			
How liabilities for emissions allowances have been recognised			
Gros			
Net	x	x	x
Other			

Appendix 3: UPM-Kymmene Oyj table of classifications.

Stora Enso	2006	2011	2016
Characterisation of emissions allowances			
Intangible assets	x	x	x
Initial valuation of freely allocated emissions allowances:			
Market value	x	x	x
Nil value			
Amortisation or Impairment			
a, Is amortisation adopted			
Yes			
no			
not specified	x	x	x
b, Are they subject to impairment testing			
Yes	x	x	x
No			
not specified			
How liabilities for emissions allowances have been recognised			
Gros			
Net	x	x	x
Other			

Appendix 4: Stora Enso Oyj table of classifications.

Figures

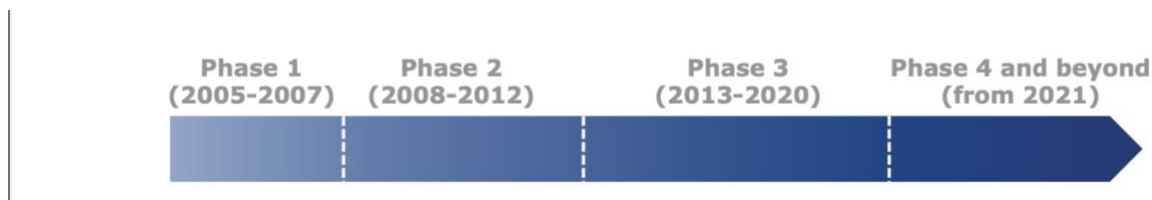


Figure 1: European emissions trading system phases.

		Approach 1	Approach 2	Approach 3
Initial recognition	Allocated allowances	Recognise and measure at market value at date of issue; corresponding entry to government grant.		Recognise and measure at cost, which for granted allowances is nil .
	Purchased allowances	Recognise and measure at cost .		
Subsequent treatment	of allowances	Allowances are subsequently measured at cost or market value , subject to review for impairment.		Allowances are subsequently measured at cost , subject to review for impairment.
	of government grant	Government grant amortised on a systematic and rational basis over compliance period .		Not applicable.
Liability	Recognition	Recognise liability when incurred (ie as emissions are produced).		Recognise liability when incurred (ie as emissions are produced). However, the way in which the liability is measured (see below) means that often no liability is shown in the statement of financial position until emissions produced exceed the allowances allocated to the participant.
	Measurement	Liability is measured based on the market value of allowances at each period end that would be required to cover actual emissions, regardless of whether the allowances are on hand or would be purchased from the market.	Liability is measured based on: the carrying amount of allowances on hand at each period end to be used to cover actual emissions (ie market value at date of recognition if cost model is used; market value at date of revaluation if revaluation model is used) on either a FIFO or weighted average basis; <i>plus</i> the market value of allowances at each period end that would be required to cover any excess emissions (ie actual emissions in excess of allowances on hand).	Liability is measured based on: the carrying amount of allowances on hand at each period end to be used to cover actual emissions (nil or cost) on a FIFO or weighted average basis; <i>plus</i> the market value of allowances at each period end that would be required to cover any excess emissions (ie actual emissions in excess of allowances on hand).

Figure 2: IFRS table of recognition of emissions allowances.