

Greenhouse gas emission rights in accounting – is a global benchmark needed?

Prawa do emisji gazów cieplarnianych w rachunkowości – czy potrzebny jest globalny wzorzec?

MONIKA PERLIŃSKA *

Abstract

Purpose: The aim of the article is to verify accounting methods used to map the essence and specifics of greenhouse gas emission rights trading in corporate financial reporting.

Methodology/approach: A literature review and an analysis of national and international environmental regulations and accounting guidelines were conducted for the United States, Canada, New Zealand, China, Japan, Germany, Great Britain, France, and Poland. The EU market for trading greenhouse gas emission allowances and the efforts made by the International Accounting Standards Board are presented separately.

Findings: There is a regulatory gap in the recognition, measurement and disclosure of greenhouse gas emission rights in the financial statements. So far, no environmental accounting regulation (standard) of international importance has been adopted, although few of the proposals from national environmental organizations differ between jurisdictions.

Practical implications: There is a need to fill the identified regulatory gap and improve financial reporting by establishing consistent and uniform principles for recognizing, measuring and presenting greenhouse gas emission rights.


Originality/value: The article emphasizes the importance of the accounting information system in providing a coherent picture of the achievements of economic entities (including environmental performance) and identifies challenges for the scientific discipline of accounting in relation to the development of greenhouse gas emissions trading around the world.

Keywords: greenhouse gas emission rights, trading in greenhouse gas emission rights, trading in greenhouse gas emissions, environmental accounting regulations, accounting standards, environmental accounting.

Streszczenie

Cel: Celem artykułu jest weryfikacja rozwiązań z zakresu rachunkowości służących odwzorowaniu istoty i specyfiki handlu prawami do emisji gazów cieplarnianych w sprawozdawczości finansowej przedsiębiorstw.

Metodyka/podejście badawcze: Przeprowadzono studia literaturowe oraz analizę regulacji środowiskowych i wytycznych rachunkowości o zasięgu krajowym i międzynarodowym. Badaniem objęto Stany Zjednoczone, Kanadę, Nową Zelandię, Chiny, Japonię, Niemcy,

* Monika Perlińska, PhD, assistant professor, University of Lodz, Faculty of Economics and Sociology, Department of Public Finance,  <https://orcid.org/0000-0001-5013-7038>, monika.perlinska@uni.lodz.pl

Wielką Brytanię, Francję oraz Polskę. Oddzielnie przedstawiono unijny rynek handlu uprawnieniami do emisji gazów cieplarnianych oraz wysiłki czynione przez Radę Międzynarodowych Standardów Rachunkowości.

Wyniki: Potwierdzono istnienie luki regulacyjnej w obszarze ujmowania, pomiaru wartości i ujawniania praw do emisji gazów cieplarnianych w sprawozdaniu finansowym. Dotychczas nie przyjęto regulacji środowiskowej (standardu) rachunkowości o znaczeniu międzynarodowym, natomiast nieliczne propozycje krajowych organizacji środowiskowych różnią się pomiędzy jurysdykcjami.

Praktyczne implikacje: Konkluzje z przeprowadzonego badania wskazują na konieczność wypełnienia zidentyfikowanej luki regulacyjnej oraz udoskonalenia sprawozdawczości finansowej na drodze ustanowienia spójnych i jednolitych zasad ujmowania, wyceny i prezentacji praw do emisji gazów cieplarnianych.

Oryginalność/wartość: W artykule podkreślono znaczenie systemu informacyjnego rachunkowości w dostarczaniu spójnego obrazu dokonań jednostek gospodarczych (w tym wyników środowiskowych) oraz określono wyzwania dla dyscypliny naukowej rachunkowości w związku z rozwojem handlu emisjami gazów cieplarnianych na świecie.

Słowa kluczowe: prawa do emisji gazów cieplarnianych, handel prawami do emisji gazów cieplarnianych, handel emisjami gazów cieplarnianych, regulacje środowiskowe rachunkowości, standardy rachunkowości, rachunkowość środowiskowa.

Introduction

Protecting the natural environment, stopping its overexploitation and degradation, and in particular, limiting climate change, while supporting civilization and economic development, are among the most pressing problems and challenges of the modern world. The intense pressure that people, and especially companies, exerted on the environment from the beginning of the industrial era led to an unprecedented increase in emissions and concentration of greenhouse gases in the Earth's atmosphere, and consequently to the worsening of the greenhouse effect, global warming, and adverse climate changes (Perlińska, 2020, pp. 21–35). The resulting natural hazards shape the environmental awareness and information needs of enterprises and their stakeholders and influence environmental regulations and standards.

The activity of economic entities, which are mainly responsible for the use of available natural resources and the introduction of pollutants into the environment, is assessed through the prism of economic and social and environmental criteria (Domańska-Szaruga, 2011). This is because enterprises are expected to undertake an economic activity that simultaneously helps provide economic growth, social development, and respect for the laws of nature, which determines the sustainable development of the world. In this context, measuring the environmental results of how economic units function is vital. A lack of transparency may mean serious financial consequences, deterioration of the competitive position, and the loss of the good reputation and stakeholder confidence in the activities undertaken by those companies.

The genesis of the concept of emission allowance trading is associated with the publication of the works of Crocker and Dales in the 1960s. Trading in tradable emission rights is classified as an economic instrument of environmental protection. It is carried out on the basis of market transactions, which should make it possible to determine the optimal pollution level between users of the natural environment. It was established to reduce the negative impact on the environment by pollution emitters. A unit allowance corresponds to a strictly defined amount or concentration of emission of a given pollutant. Emissions trading was initiated in the mid-1970s as a tool to protect atmospheric air in the United States, and in 1992 it was introduced in Chile. It has been used both at the level of individual countries, such as Canada, Mexico, Singapore, Slovakia, the Netherlands, Denmark, and Great Britain, as well as on a global scale, i.e., the international trade in substances that deplete the ozone layer under the Montreal Protocol or international trade in greenhouse gas emissions under the Kyoto Protocol (Dyduch, 2013, pp. 25, 48–49, 51).

In the context of climate protection activities undertaken by organizations and institutions of local, regional, international, and global importance, which include, in particular, the conclusion in 2015 of a new climate agreement (Paris Agreement), there is a growing interest in market solutions to reduce greenhouse gas emissions in an economically efficient way. This is followed by the development of the allowance trading market from a global perspective. Existing greenhouse gas emissions trading schemes around the world operate within different jurisdictions based on local regulations, and they have different principles.¹ The oldest of these schemes have been in effect for several years, they were reformed after their initial period of operation was assessed and have consolidated their place in the economy. Contemporary enterprises, often operating on an international scale, must adapt to the changing realities and consider their uniqueness when making economic decisions and fulfilling their obligations, including reducing greenhouse gas emissions and participating in emission allowance trading.

The purpose of this article is to verify the accounting methods used to map the essence and specifics of greenhouse gas emission rights trading in corporate financial reporting. To do this, the following research questions were formulated:

- 1) Is it necessary to further improve the accounting system in connection with the development of trading in greenhouse gas emission rights?
- 2) What are the environmental accounting regulations, and do they fully meet the needs of economic practice?
- 3) From a global perspective, is it necessary to harmonize and standardize financial reporting methods?

The article is a review. A literature review and an analysis of environmental regulations and accounting guidelines on a national and international scale were

¹ For more on the principles of the organization of air pollution emissions trading, see Perlińska (2020, pp. 52–56).

used. The study covered the United States, Canada, New Zealand, China, Japan, Germany, Great Britain, France, and Poland. The European Union (EU) market for trading greenhouse gas emission allowances and the efforts made by the International Accounting Standards Board are presented separately.

Globally harmonizing and standardizing ways to recognize, measure, and disclose greenhouse gas emission allowances in financial reporting is rarely discussed in the scientific literature and is practically absent in the Polish literature on the subject. The small number of publications, in-depth empirical studies, and comprehensive scientific studies prompted the author to address this subject. It is a voice in the discussion on the desired shape of the accounting system (both for measuring and presenting information) in the era of sustainable development. The article systematizes knowledge and contributes to increasing the awareness of academics, students, members of regulatory authorities, and accounting practitioners in the field of greenhouse gas emission rights trading based on accounting in selected countries.

Later in the article: 1) the importance of the accounting information system in providing a coherent picture of the achievements of economic entities (including their environmental effects) is presented, 2) environmental regulations and accounting guidelines of national and international importance regarding greenhouse gas emissions trading are discussed, and 3) conclusions from the verification of accounting methods for greenhouse gas emission allowances are presented. The article ends with a summary, which identifies the challenges for the scientific discipline of accounting in connection with the development of greenhouse gas emission rights trading in the world.

1. The accounting system for the 21st century – is further improvement necessary?

Accounting supplies management with financial and non-financial information and is the basis for settling the responsibility of managers for the property entrusted to them, including, in particular, the economic and environmental effects achieved by the company for ensuring social welfare. Measurement involves expressing a given event in monetary units and indicating the area of economic activity that was affected (the entity's achievements or financial situation), thus assigning basic financial categories to the effects of this event (i.e., revenues/costs, receipts/expenses, or assets/liabilities and equity). This is based on superior accounting principles and detailed principles of evaluating a balance sheet and determining the financial results, including the principles of determining the values of the basic financial categories.

Accounting has accompanied economic activity for centuries. Although unchanged in its essence and basic principles, it has evolved over time, constantly

adapting to dynamically changing management conditions, the growing information needs of financial statement users, and the requirements of the business environment. It is reflected in the changes in the subject of interests, the goals of accounting, and the valuation methods and forms of presentation (Śnieżek, Perlińska, 2012). There are discussions and work on improving the accounting system (both for information measurement and presentation). This is being done due to the transformation in the hierarchy of goals that guide businesses, which value maximizing the enterprise's value over maximizing profit, and the accompanying criticism of traditional financial reporting that does not take into account real value generators.

In terms of measurement, the most important issue is the valuation of intangible assets, which are key factors of business success, the valuation of capital, and the use of the correct valuation categories. The proposals regarding the desired shape of financial reporting usually focus on business reporting (reporting on creating enterprise value) or integrated or sustainability reporting (Bareja, 2015; Jędrzejczyk, 2015; Karmańska, 2008; Krasodomska, 2012; Kwiecień, 2015, pp. 273–287; Kwiecień, 2016; Walińska, Jurewicz, 2013; Walińska, 2015). On the one hand, it is necessary to ensure full transparency and make the increasing amount of information available to the public for a full understanding of the company's activities. On the other hand, there is also a need to limit unnecessary disclosures and provide only information that is important and useful in making decisions in an accessible form (Hońko, 2015). The information requirements and preferences of the organization's stakeholders currently determine the hierarchy of financial statements as well as their structure and scope (Bareja, 2014; Walińska, 2009, pp. 18, 140).

Presenting the social and environmental context of how entities function and the economic results achieved in these areas is part of social accounting, a scientific discipline that dates back to the 1970s. Ecological issues began to receive more attention from the mid-1980s as a result of ecological disasters such as Bhopal (1984), Chernobyl (1986), Piper Alpha (1988) and Exxon Valdez (1989). Although scientists appreciate that social accounting is taken up and that specific instruments have been developed (Marcinkowska, 2012), it still does not belong to the main research stream of the broader discipline of accounting (Krasodomska, 2014).

Including environmental issues in the scope of accounting, i.e., the measurement of economic phenomena and processes related to the natural environment, was also raised in the thematic field of environmental accounting, or green accounting, which was established in the 1970s and 1980s. Its primary purpose is to identify, measure, analyze, interpret, and share information that makes it possible to assess the environmental aspects of economic activity and the resulting economic and social consequences. On this basis, both internal and external users make economic and environmental decisions (information function). This information is also used to prepare financial statements and other reports required by environmental protection regulations (reporting function). In addition, environ-

mental accounting supports the rational use of natural resources, counteracting waste and mismanagement in this area. It also ensures that businesses comply with applicable environmental regulations, reveals possible environmental losses, and checks the degree to which environmental objectives have been implemented (control function). The stimulating function of environmental accounting cannot be overestimated. The information provided inspires pro-ecological activities in the organization, limiting its negative impact on the environment and increasing the efficiency of managing natural resources (Szadziewska, 2013, pp. 135, 149, 324–325).

Bearing in mind the importance of global warming and the resulting climate change, as well as the impact of tradable emission allowances on enterprises' property, income, and market value (especially visible in the historically high prices in the allowance market), stakeholders expect businesses to account for their environmental impact (Dyduch, 2008; CO2 market report, 2022, pp. 13–19). An example of this proposal would be the provision of non-financial information on greenhouse gas emissions (in physical units) and financial information on trading in emission allowances for the indicated atmospheric pollutants (in monetary units). The answer to this contemporary challenge undoubtedly determined the development of accounting. It is dictated by the need to establish principles of recognizing, valuating and presenting greenhouse gas emission rights that are consistent, and consistent with the economic content.

2. Environmental accounting regulations versus the needs of economic practice in the context of trading in greenhouse gas emission rights

The dynamic development of Emissions Trading Schemes (ETS) in various parts of the world, subject to the jurisdiction of local authorities that shape their rules, undoubtedly constitutes a serious challenge for organizations responsible for adopting legal accounting regulations, especially those with an international scope. Since the launch of the first international greenhouse gas emissions trading market in the EU in 2005, many other greenhouse gas emissions trading schemes have been launched at local, regional, and national levels across four continents or are under development. Over time, some of them have been transformed under the influence of the experience gained in the initial periods of operation, and some have been merged, such as the Canadian Quebec system and the American California system or the Japanese Saitama and Tokyo systems.

At this point, it is worth taking a closer look at the accounting solutions aimed at reproducing the essence of the trading in greenhouse gas emission rights in the corporate financial reporting (see Table 1).

Table 1. Review of accounting guidelines for greenhouse gas emission allowances in force in selected countries

Country	Name of the greenhouse gas emission rights trading scheme (selected data)	Regulations and guidelines in the field of accounting
United States	<ul style="list-style-type: none"> • Regional Greenhouse Gas Initiative (RGGI), • California's Cap-and-Trade Program 	<p>The Financial Accounting Standards Board (FASB) did not provide the relevant regulation^a. It only recognized the guidelines of the Federal Energy Regulatory Commission (FERC) of 1993 developed for trading in emission allowances for air pollutants other than greenhouse gases, namely sulfur dioxide (SO₂)</p> <p>According to the FERC recommendations, emission allowances should be recognized as (<i>Revision to Uniform Systems of Accounts...</i>, 1993) stocks or other investments (purchase for speculative purposes), and measured at historical cost. It means that allowances received free of charge will have a zero value, while those purchased on the market (including from a related party) will have a value based on the purchase price. The initial valuation should include costs directly related to the purchase, such as brokerage fees and trading commissions (if relevant)</p> <p>As an inventory component, allowances should be grouped by year, i.e., the year they can be used for the first time. For the valuation of the outflow of allowances from inventories (used to cover emissions or sold in the reporting period), the weighted average cost of allowances method should be used, taking into account the year they represent</p> <p>The financial result is charged to the value of allowances subject to redemption in connection with the issue in a given month. In the absence of actual data on emissions, it is allowed to use reliable estimates, which will be corrected in the month of data collection</p>
Canada	<ul style="list-style-type: none"> • Greenhouse gas emission rights trading systems operate in Quebec and Nova Scotia, • Hybrid systems (including a carbon tax and/or a modified variant of tradable allowances – emission reduction credits) exist in several provinces 	<p>There are no detailed national guidelines related to the recognition, valuation, and presentation of economic operations typical of greenhouse gas emissions trading (<i>Accounting for going green...</i>; <i>The time value of carbon...</i>, 2016, p. 20)</p>

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Country	Name of the greenhouse gas emission rights trading scheme (selected data)	Regulations and guidelines in the field of accounting
New Zealand	<ul style="list-style-type: none"> • New Zealand Emissions Trading Scheme (NZ ETS) 	<p>The authors of the national standards did not issue guidance on the ETS^b. Variants of possible solutions were presented by the Auditor General responsible for the financial audit of the public sector in New Zealand (<i>The Emissions Trading Scheme ...</i>, 2011, pp. 45–50). In the opinion of the creators, the recommendations formulated for the government are in line with the NZ-IFRS^c and have been approved by the Ministry of Finance. Due to the specific nature of the NZ ETS, guidelines were formulated separately for owners of forests arranged after 1989 and beneficiaries of a one-off allocation (fishery and forestry). Indications addressed to other members of the public sector can, in principle, also be used by private enterprises. For entities that have not been subject to free allocation of allowances, the cost and obligation that result from the need to transfer them to the authorities should be recognized when the emission occurs and valued according to the best cost estimates necessary to fulfill this obligation (emission volume converted at the market price of allowances). In turn, the balance sheet valuation of liabilities should be performed according to the updated price of the allowances as at the balance sheet date. On the other hand, as part of the accounting policy, enterprises with free allocation may choose the methods of initial and balance sheet valuation of the allowances received, classified as intangible assets.</p> <p>The initial recognition may take place at cost, which is actually zero, or at the fair value of allowances, including income.</p> <p>For balance sheet valuation, the options available are:</p> <ul style="list-style-type: none"> • a cost model – emission units are shown at their initial value (possible zero value of free allowances) or • a revalued value model^d – issuing units at each balance sheet date are revalued to fair value, with the effect recognized in equity. <p>It is left to each organization's discretion to recognize the emission liability at fair value (the full amount of the liability) or at the carrying amount of the allowances held (in case of having only free allowances, it may be zero) plus the fair value of additional allowances needed to settle the emissions. The liability is charged to costs</p>

Country	Name of the greenhouse gas emission rights trading scheme (selected data)	Regulations and guidelines in the field of accounting
China	<ul style="list-style-type: none"> • The Chinese nationwide greenhouse gas emissions trading system, • Regional pilot trade systems are in place in eight cities and provinces. Their range covers sectors and entities excluded from the national ETS jurisdiction. Over time, the regional systems will be integrated into the national system 	<p>No legally binding national English-language guidance on the accounting side for the functioning of the allowance trading market is available online</p> <p>However, there is information that the Ministry of Finance issued a recommendation that the assets of the balance sheet – in an item other than financial assets (and more precisely, in an item other than financial instruments) – should show only vested rights. As a result, the financial statements will ignore the fact that an enterprise has received emission rights free of charge (China National ETS, 2022, p. 5)</p>
Japan	<ul style="list-style-type: none"> • Emission trading systems exist in the Tokyo metropolitan area and Saitama Prefecture, • Advanced Technologies Promotion Subsidy Scheme with Emission Reduction Targets (ASSET), • The J-Credit Scheme is a system for certifying credits obtained in exchange for reducing greenhouse gas emissions or increasing their removals in Japan, • The Joint Crediting Mechanism (JCM) allows domestic and foreign companies to invest in emission reduction projects in developing countries, thanks to which they can obtain offset credits 	<p>In 2004, the Japan Accounting Standards Council established a preliminary accounting approach to emissions trading (namely trading in emission credits generated under the Kyoto mechanisms, for the issuers' own needs or for sale), which was supplemented twice in 2006 and 2009. The last amendment addressed the accounting rules in the context of experimental allowance trading. There is only a Japanese version of the document (<i>ASBJ revises Practical Solution on...</i>)</p>
India, Russia, Brazil,	<ul style="list-style-type: none"> • Not applicable (these countries account for a significant share of global greenhouse gas emissions, yet 	<p>There is no accounting regulation</p>

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Country	Name of the greenhouse gas emission rights trading scheme (selected data)	Regulations and guidelines in the field of accounting
Australia, South Africa Republic	<p>their commitment to climate protection is far from expected. In some cases, this is motivated by economic and / or political reasons. India, Brazil and Australia plan to implement the ETS. So far, Australia has issued carbon credits (Australian Carbon Credit Unit – ACCU). The basis for obtaining them is a verified reduction of emissions as a result of implementing specific projects. These loans are then sold to the government through a reverse auction process. In this case, there is no absolute emission limit or market trading of allowances</p>	
Germany	<ul style="list-style-type: none"> • The European Union Emissions Trading System (EU ETS), • The German National Emissions Trading System. Launched in 2021, it includes distributors and suppliers of fuels used in both transport and heat production. It is a hybrid of the ETS and the carbon tax, as allowances are sold at a fixed price. Starting in 2026, the price of allowances will be gradually released and shaped by market forces (Report from the CO2 market, 2020, p. 10) 	<p>There is no accounting guidance for greenhouse gas emission allowances In light of German banking law and the Act on Trading in Securities, emission rights are neither financial instruments nor derivatives (<i>German National Emissions Trading System, 2022, p. 4</i>)</p>

Country	Name of the greenhouse gas emission rights trading scheme (selected data)	Regulations and guidelines in the field of accounting
Great Britain	<ul style="list-style-type: none"> The UK Emissions Trading Scheme. It started operating on 1 January 2021 as a result of the UK's withdrawal from further participation in the EU ETS. The primary reason was the slightly earlier withdrawal of the United Kingdom from the EU and the end of the transition period 	Lack of accounting regulations regarding greenhouse gas emission rights (<i>FRS Statement of Intent on ..., 2021, p. 7</i>)
France	<ul style="list-style-type: none"> EU ETS 	<p>In 2012, the organization responsible for issuing French accounting standards presented a proposal for accounting regulation. It includes not only the use of greenhouse gas emission allowances applicable in the EU ETS and Certified Emission Reductions (CER) and Emission Reduction Units (ERU) ^e, but also the company's business model</p> <p>Emission rights were treated as specific goods purchased under an obligation imposed on issuers (production model) or for resale (commercial model). By way of exception, the methods typical of this model may be adopted by issuers purchasing allowances unrelated to the need to clear the emissions. Detailed recommendations use the standards contained in the French accounting standards and IFRS</p> <p>In order to confirm the business model, economic entities must document their strategy, indicate goals, present contracts for the purchase of emission rights, and specify plans in this area. In the future, they must prove the consistency of actions taken with the adopted strategy (<i>Proposals for Accounting of GHG Emission Rights ..., 2012, pp. 1–18</i>)</p>
European Union	<ul style="list-style-type: none"> EU ETS 	<p>There is a lack of international accounting regulations regarding greenhouse gas emission rights ^g</p> <p>In June 2005, after only six months of validity, IFRIC Interpretation 3 Emission Rights, published under the auspices of the International Accounting Standards Board, was withdrawn with immediate effect. The justification stated that this was the correct interpretation of the applicable IFRS, consistent with the needs of the EU ETS. However, it requires clarification in terms of measurement and reporting</p>

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Country	Name of the greenhouse gas emission rights trading scheme (selected data)	Regulations and guidelines in the field of accounting
		<p>The most important provisions of the Interpretation were (<i>IFRIC 3 – Emission Rights (withdrawn)</i>):</p> <ul style="list-style-type: none"> • Emission rights are intangible assets and should be presented in the financial statements in accordance with IAS 38 “Intangible Assets” • Where allowances have been issued to an enterprise for a fee lower than their fair value (including free of charge), the difference between the amount paid (if applicable) and the fair value is a government grant. It should be accounted for in accordance with IAS 20 “Government grants and disclosure of information on government assistance”. The parameter of the preliminary valuation of the emission allowances obtained in this way is their fair value • The principles of the initial recognition of acquired rights have not been precisely formulated, which resulted in various interpretations. However, if emission allowances are to be treated in accordance with IAS 38 as intangible assets, then, based on the provisions of this standard (item. 24), they should be initially recognized according to the purchase price or production cost • Issuers obliged to settle the issue should create a provision for the obligation to transfer allowances, based on the current market value of the allowances necessary to fulfill this obligation (then IAS 37 “Provisions, Contingent Liabilities and Contingent Assets” will apply) <p>The list of priorities for 2022–2026 announced by the Council shows that the Pollutant Pricing Mechanisms project was not included in the organization’s action plan, but only on the reserve list. A possible change in the status of the project before 2027 seems very unlikely (<i>Snapshot – Third Agenda Consultation, 2022, p. 4</i>). The project aimed to consider not only different types of systems where allowances are applied (not limited to cap-and-trade systems), but also other economic tools by which pollutant emissions can be managed (Clean Development Mechanism, carbon capture programs and carbon taxes/charges)</p>
Poland	<ul style="list-style-type: none"> • EU ETS 	<p>The Polish Accounting Standards Committee addressed the accounting treatment of emission allowances as early as November 2005. In 2015, the originally adopted position was amended⁴</p>

Country	Name of the greenhouse gas emission rights trading scheme (selected data)	Regulations and guidelines in the field of accounting
		<p>Greenhouse gas emitters, including aircraft operators should recognize the rights as of the date of their registration in the account (in the allowances register) as intangible assets:</p> <ul style="list-style-type: none"> ● acquired rights – at the purchase price ● rights granted – based on the unit selling price on the date of granting them and the number of rights granted (secondary qualification for deferred income) <p>Fees for allocated rights and other fees related to participation in the trading venue should be charged to the production costs of the products or the costs of sold rights, respectively, in the period in which they were calculated</p> <p>The depreciation of the rights used to settle pollutant emissions (established as the product of the rights used in a given period and the unit purchase price) will be charged to the manufacturing costs of the products</p> <p>Excluding used and redeemed rights from the records at the end of the financial year/settlement period is done by charging the redemption of rights and recognizing the emission rights</p> <p>The result on sale is determined as the difference between the net selling price of the rights and their book value (balance sheet value) as at the date of sale and is presented as profit/loss in other operating income/costs, respectively</p> <p>The impairment loss of rights should be recognized in other operating expenses of the period in which the circumstances justifying its creation occurred</p> <p>The provision for the missing number of rights to be settled for the annual issue will be charged to the production costs of products (accruals will be recognized with the value of the product of the missing rights and the unit market price (sale), determined based on market quotations as at the balance sheet date)</p> <p>The cost of verifying the report on the annual issue will be charged to the general and administrative costs of the financial year for which the report was verified</p> <p>The balance sheet valuation of the rights for sale is made according to the market price (value), or the purchase price or market price (value), whichever is the lower</p>

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Country	Name of the greenhouse gas emission rights trading scheme (selected data)	Regulations and guidelines in the field of accounting
		<p>In the balance sheet, rights, irrespective of their purpose (use for the company's own purposes or other regulations^a), are shown separately under intangible assets</p> <p>Entities obliged to prepare a report on their activities should include synthetic information on the allocation and use of emission rights, the results of the report verification, and any difficulties in implementing and using of the emission rights granted</p> <p>The remaining units (intermediaries) recognize the rights acquired for later resale at cost for long- or short-term investments (recommended)</p> <p>The recommended balance sheet valuation parameter is the purchase price or the market price, whichever is lower. Where there are significant differences between the valuation of emission allowances at their purchasers' prices and their market prices, the information on the allowances is disclosed at market value in the notes</p> <p>In the notes to the financial statements, intermediaries should present data on the results of trading in emission allowances, including the amounts of rights acquired and disposed of in a given period, and the concluded futures contracts for their purchase or sale</p>

^a Although such an attempt was made, even jointly with the International Accounting Standards Board (IASB), the draft was removed from the agenda at the beginning of 2014. The work of the FASB and IASB between 2008 and 2010 was intended to cover various forms of emissions trading (cap-and-trade and baseline: credit) and types of tradable rights, including those generated by projects and energy certificates. The project was addressed to both issuers and other entities involved in trading. With regard to cap-and-trade systems, it was provisionally agreed that allowances should be recognized in assets, and that the allocation of royalty-free allowances is an event that meets the definition of a liability. Fair value was considered the parameter of valuation of allowances – initial and balance sheet – regardless of the method of their acquisition, as well as liabilities (which should be measured at the fair value of the allowances received). Although the IASB was inclined to present gross assets and liabilities in the statement of financial position, it affirmed that there was no disagreement with the FASB's approach of presenting its issue assets and liabilities at net value. At the end of 2010, each institution separately decided to change its schedule of work. As a result, further cooperation on emissions trading was abandoned (*Project Updates – Emissions Trading Schemes*, 2014).

^b However, on May 17, 2005, the New Zealand equivalent of IFRIC Interpretation 3 “Emission Rights” (NZ IFRIC 3) was approved. It shared the fate of the source document and on November 16, 2005, it was withdrawn. (*Approval of New Zealand Equivalent to IFRIC*

Interpretation 3 Emission Rights (NZ IFRIC 3), 2005; Approval to Withdraw New Zealand Equivalent to IFRIC Interpretation 3 Emission Rights, 2005; Accounting Standards).

- c For profit-driven entities, national standards and interpretations based on IASB standards and interpretations apply. Although they are called equivalents of the latter (NZ-IFRS), a number of differences have been identified (*New Zealand*).
- d In line with the NZ-IFRS, the revaluation model for intangible assets may be used as long as there is an active market for the asset. For a market to be considered active, it is necessary to meet strictly defined conditions provided for in the regulation. Following the NZ ETS assessment, the Auditor General expressed the conviction that auditors would accept that public sector entities would consider this market to be active and use the revalued model for New Zealand emission units.
- e Issued respectively under the Clean Development Mechanism and the Joint Implementation Mechanism, established under the Kyoto Protocol (Perlińska, 2020, pp. 44–52).
- f Due to the fact that the European Union, as a community of 27 Member States, is at the forefront of the world's largest greenhouse gas emitters, and is simultaneously a pioneer in the fight against changes in the Earth's climate, it has been included in this study. As the world's oldest international emissions trading system, the EU ETS has been and continues to be a benchmark for the creation or improvement of other national or regional systems.
- g Companies listed on EEA regulated markets prepare consolidated financial statements in accordance with the IFRS and interpretations related to them issued by the IASB and adopted by the EU based on the procedure laid down in Regulation (EC) No 1606/2002 of the European Parliament and of the Council of 19 July 2002 on the application of international accounting standards, pp. 1–4.
- h Resolution No. 8/2015 of the Accounting Standards Committee of December 8, 2015, on adopting the Committee's amended position on the accounting treatment of greenhouse gas emission allowances (*Journal of Laws of the Minister of Finance of 2016, item 6*). The reason for changing the position of the Committee was the adoption in June 2015 of the act on the greenhouse gas emission allowance trading scheme, which introduced many modifications compared to the previously binding one. With regard to intermediaries present in the market, the only novelty is the recommendation to disclose concise data on transactions in rights in the notes to the financial statements. Most of the changes relate to issuers and are clarifications. The position of the Committee applies to entities that keep accounting books and prepare financial statements based on national law, that are issuers or trading intermediaries that purchase and sell emission rights for commercial purposes (including forward transactions), except for the auctioneer of allowances (Krajowy Ośrodek Bilansowania i Zarządzania Emisjami).
- i The notes should contain information on the emission rights held, broken down into rights held for own use and rights intended for sale (with an indication of emission allowances – ordinary and aviation – issued in the trading system in question, as well as CERs and ERUs obtained based on the Clean Development and Joint Implementation Mechanism).

Source: author's own elaboration.

3. Standardization and harmonization of accounting – still valid, still real?

Based on the review, no legal accounting regulations of international significance for greenhouse gas emission rights have been developed (regulatory gap). This is all the more puzzling as nearly two decades have passed since the earliest greenhouse gas emissions trading systems were initiated. In 2005, both the EU system (EU ETS) and the US system (RGGI) were launched. There is no point in looking for an appropriate regulation in international standards² or US standards (Karai, Bárány, 2013; Sánchez Generoso, 2014, pp. 1–53; Giner, 2014), recognized as the two basic canons of financial reporting in the world (Śnieżek, 2008, p. 387). At the joint forum of the IASB and the FASB, only preliminary arrangements were made to normalize the trade in greenhouse gas emission rights. This is highly unsatisfactory, especially if we consider the growing use of this economic instrument and the observed or agreed tightening of the rules of individual trading venues to reduce targets set. The latter is expressed, inter alia, in the gradual reduction of greenhouse gas emission limits and moving away from the free allocation of allowances in favor of auctioning. The internationalization of enterprises is also of crucial importance. The reasons can be found in the complexity of the issue itself and/or the lack of will of the regulatory authorities, which may be politically motivated (Ascui, Lovell, 2011; Ramírez, González, 2013; Kim, 2015; de Aguiar, 2018).

On the other hand, the guidelines of national environmental organizations not only do not have the final shape (“initial accounting approach to emissions trading” in Japan), but they also do not cover all aspects of trading in allowances. In addition, they are not binding for all enterprises and, what is worse, they differ at the level of detailed entries. The latter relates to fundamental issues such as the classification of emission units to a specific category of assets (with an indication of intangible assets or inventories) or the choice of initial and balance sheet valuation parameters, which is particularly important for allowances granted free of charge. The above proves the adoption of a completely different perspective in the

² In a publication from November 2019, Nick Anderson, an IASB member, admitted that investors and other interested parties increasingly ask the Council about the reason for the lack of a standard dealing with issues related to climate change (Anderson, 2019, p. 1). In response to these voices, the International Sustainability Standards Board (ISSB) was established in the fall of 2021. Its purpose is to develop a comprehensive global database of standards in the field of sustainable development reporting to meet the information needs of capital market participants (including investors assessing the value of companies in which they have invested funds). Currently, the opinions on the draft of the first two standards, submitted by interested parties, are being verified. The draft first standard contains general requirements for financial disclosure related to sustainable development. Meanwhile, the draft of the second standard concerns the sharing of information on climate change. In both cases, particular emphasis was placed on the consideration of significant risks and opportunities that may affect the financial position, profitability and cash flow of the entity (*Climate-related Disclosures*).

perception of the discussed issue. It is also important for shaping the image of the financial and financial situation of trading participants that is presented in financial statements, and that constitutes the basis for decision-making by stakeholders (Black, 2013; Griffin, 2013; Ayaz, 2017; Mookdee, Bellamy, 2017). As a consequence, the financial statement loses the value of comparability and thus also its usefulness. In the studied countries that belong to the Anglo-Saxon model, accounting laws do not cover the subject of greenhouse gas emission rights trading. Against the background of the above-mentioned research, the Polish position, expressed by the Accounting Standards Committee, should be appreciated. It is formal and legal and covers a wide range of issues related to the trading of allowances. However, it is not intended for all enterprises in Poland.

Guided by the care of the appropriate quality of information on greenhouse gas emissions trading, which should be reliable, objective, consistent, in line with the economic content of economic events, understandable, comparable in time and space, and useful in making decisions, it is urgent to standardize and harmonization financial reporting methods globally.

Adopting an international perspective is very important for several reasons:

- 1) the natural environment is a good that is common to all mankind,
- 2) global warming, which results in climate change, is a global problem,
- 3) counteracting global warming and climate change by striving to reduce anthropogenic greenhouse gas emissions is a topic undertaken in the international arena and is the subject of international agreements, scientific research, and many other initiatives,
- 4) entities in sectors characterized by high emissions that operate on a global scale may be obliged to participate in more than one greenhouse gas emissions trading system in different parts of the world.

Summary

Trading in greenhouse gas emission rights is one of the key economic instruments for environmental protection, used to combat climate change on a global, regional, national, or local scale. There is a justified concern that tradable allowances will be used for a less noble purpose, namely to pursue the interests of states or enterprises that offer low-emission technologies (thanks to keeping the price of allowances at a sufficiently high level). In addition, the actual ecological effectiveness (i.e., achieving the desired emission reduction) and the economic effectiveness of this solution are debatable. This is due to market imperfections manifested in some trading systems in the oversupply of allowances and depreciation of their value. On the other hand, in other systems, it is due to the significant involvement in trading of intermediaries and appreciation of the value of allowances as a result of their speculative activities. Nevertheless, the efforts made to reform individual trading systems and overcome their shortcomings should be appreciated.

Companies are increasingly forced to consider the impact of climate change and the greenhouse gas emissions they cause due to their business practices and

identify potential risks associated with them. They should also try to reduce the pollution they generate and adapt to the conditions resulting from global warming. Participation in the trading of greenhouse gas emission rights has similar implications, especially for emitters of pollutants. It is important from the point of view of the choice of business model, property and financial situation, profitability and solvency of the participating enterprises, in the conditions of high prices of allowances, it may affect their ability to continue as a going concern. This is a serious challenge for the managers of economic entities in the 21st century. Greenhouse gas emissions trading has an increasing impact on specific sectors and the economy as such. It is reflected, for example, in the income and expenditure of the state budget, investment expenditure (related to energy transformation), electricity and fuel prices, macroeconomic indicators (e.g., GDP, unemployment rate, inflation rate) and the value of industrial production.

This important area of activity needs to be reflected in reporting, both in financial reports and other reports provided for by law, including, in particular, nature protection law. This is because it is the duty (and not just good practice) of economic entities to present the environmental aspects of their operations, taking into account their involvement in the market for trading in greenhouse gas emission rights, which also has economic consequences. In answer to this challenge of greenhouse gas emissions trading, one universal and generally accepted set of principles (accounting regulations) should be developed, adopted, and consistently applied globally. Based on this, information on emission units should be recognized, measured and presented. An indisputable benefit would be the limited number of practices in this area and the increased transparency and clarity of how economic entities function.

Therefore, the discipline of accounting faces new, difficult tasks. They are necessary to meet the needs of business practice (building lasting relations between the 21st-century organization and its external and internal environment) preceding the theoretical solutions adopted so far. Conclusions from the review of the accounting guidelines for greenhouse gas emission allowances in selected countries indicate an urgent need to harmonize and standardize financial reporting methods globally. This will help improve the quality of information generated in the accounting system and thus increase its usefulness in decision-making. In light of the considerations presented above, further activities of the International Sustainability Standards Board should be carefully observed.

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