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EUROPEAN UNION REQUIREMENTS FOR CARBON FOOTPRINT REPORTING AS A CHALLENGE – THE CASE OF POLAND

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Purpose: This article aims to demonstrate threats to the correct reporting of carbon footprint according to the requirements of the European Union, using the example of Poland.
Design/methodology/approach: The research methods used include analysis of secondary data from Eurostat, analysis of legal acts, and literature studies on the measurement and reporting of carbon footprint.
Findings: The introduction of uniform reporting standards (European Sustainability Reporting Standards - ESRS) and key indicators for assessing the performance of units means the need to collect numerous data. The obligation to prepare sustainable development reports will significantly impact the scope of work and the accounting tools used in both financial and management accounting. Current European Union requirements for determining and reporting carbon footprint information will challenge accountants. The very complexity of the construction of the carbon footprint and the methods of its calculation, which require the use of dedicated software, may open up room for errors and abuse.
Research limitations/implications: The EU's environmental policy and ESRS reporting requirements will evolve. The actual enforcement of the accuracy of carbon footprint reporting remains to be verified; therefore, such a study should be repeated.
Practical implications: Poland is a country that has a lot to do in the field of environmental protection among the European Union countries. This will lead to remarkably high pressure and costs imposed on companies, increasing the potential threat of violations of ethical standards when preparing non-financial reporting regarding the impact of companies' activities and products on the natural environment. The problem for accountants is also the fear of the consequences of disclosing information, which indicates the negative impact of the activities of these entities on the natural environment. This is undoubtedly an area susceptible to unethical activities.
Originality/value: The paper's originality lies in comparing carbon footprint reporting requirements with the ecological situation of Poland, among other European Union countries, as a source of potential irregularities in the reports of Polish companies.
Keywords: carbon footprint; Green Deal, non-financial reporting ESRS; accounting; ethics.
Category of the paper: research paper.

1. Introduction

Entry into force of uniform reporting standards known as the European Sustainability Reporting Standards – ESRS (Herzig, Schaltegger, 2011) and key indicators for assessing the performance of units means the need to collect numerous data. The obligation to prepare sustainable development reports will significantly impact the scope of work and the accounting tools used in both financial and management accounting.

However, sustainability reporting is not only an obligation fulfilled by companies due to government requirements. Sustainability information included in the non-financial reporting of listed companies directly affects the decisions of external stakeholders, especially stock exchange investors. Indirectly, such information has an impact on most stock exchange indices of corporate social responsibility (CSR) or environmental, social, and governance (ESG) performance of listed companies (Huterski, Kaz, 2020). Also, every company can use information about its pro-ecological and pro-social activities to strengthen its image for public relations purposes (Łapińska, Huterska, Łapiński, 2017).

The European Commission sees the introduction of uniform ESRS reporting standards as part of its set of policy initiatives, called the European Green Deal, to make the European continent climate-neutral. The key goal of the European Green Deal is to achieve net zero greenhouse gas emissions by 2050. A concept related to measuring greenhouse gas emissions is carbon footprint. The name of this indicator emphasizes the key importance of reducing CO2 emissions, but its structure also includes the emission of other gases that may contribute to global warming.

The topic of carbon footprint (CFP) is becoming increasingly popular and essential, both from the point of view of global climate policy and business conditions (Sneddon, Howarth, Norgaard, 2006). Therefore, some entities should prepare for the introduction of the provisions of the Corporate Sustainability Reporting Directive (CSRD 2022/2464), adopted by the European Parliament in November 2022. Selected entities must disclose non-financial information about the carbon footprint, one of the most critical factors in environmental issues assessed by the company's key stakeholders. However, in addition to the dominant non-financial data, financial data are also used in this process.

Companies in EU countries complain about excessive legal regulations (Amelang, 2023). At the same time, they are not exceptionally committed to reducing their carbon footprint, and they focus on financial results and short-term activities. This creates incentives for eco-scams and green PR, mainly known as greenwashing (Amatucci, Mollo, 2024; Zhao, 2023).

This article aims to demonstrate threats to the correct reporting of carbon footprint according to the requirements of the European Union, using the example of Poland.

To support the achievement of the above objective, the research question was posed:

What factors threaten the correct carbon footprint reporting by Polish enterprises and institutions?

The research methods used include analysis of secondary data from Eurostat, analysis of legal acts, and literature studies on the measurement and reporting of carbon footprint.

2. Poland as a greenhouse gas emitter compared to European Union countries

Based on Eurostat's standard statistics for air emissions accounts for greenhouse gases, it is clear that Poland ranks among the top GHG emitters. The authors aggregated available quarterly data for the last full calendar year to account for the annual climate cycle. Regarding millions of tonnes of CO2, Poland ranked fourth in 2023, behind much larger economies like Germany, France, and Italy, but ahead of Spain. Poland's nominal GDP for the same period is equivalent to only 18% of Germany's GDP and 51% of Spain's GDP (Figure 1).

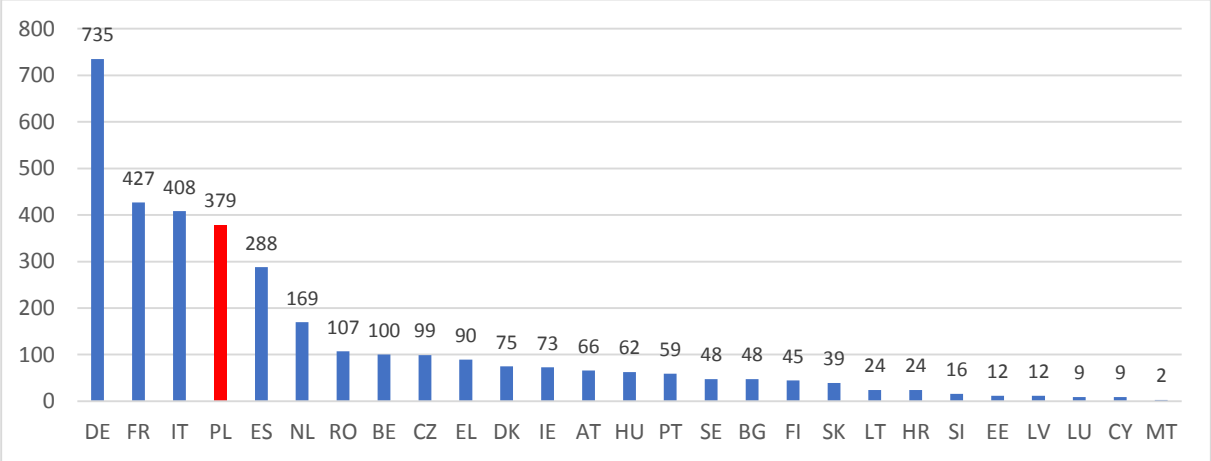

Figure 1. Air emissions accounts for greenhouse gases in the EU countries (2023, million tonnes).
Source: Authors' calculation based on Eurostat data (env_ac_aigg_q).

Regarding per capita, Poland's GHG emissions in 2023 also rank fourth in the EU, after Ireland, Luxembourg, and Denmark, while Germany ranks 9th, France 20th, and Italy 18th. However, in terms of GDP per capita, Poland ranks only twentieth in the EU (Figure 2).

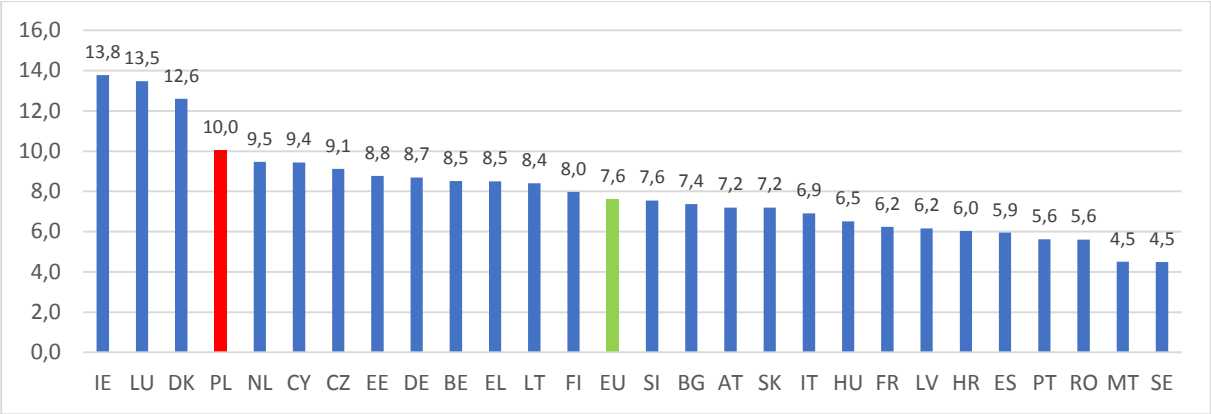

Figure 2. Air emissions accounts for greenhouse gases in the EU countries (2023, per capita).

Source: Authors' calculation based on Eurostat data (env_ac_aigg_q).

According to the FIGARO tables for 2022, a statistical product of economic modeling, Poland ranked second in greenhouse gas emission footprints counted in a million tonnes of CO2 equivalent (Figure 3). The Eurostat-European Commission FIGARO project means 'Full International and Global Accounts for Research in Input-Output analysis.' It is also known as the EU inter-country Supply, Use, and Input-Output tables (IC-SUIOT).

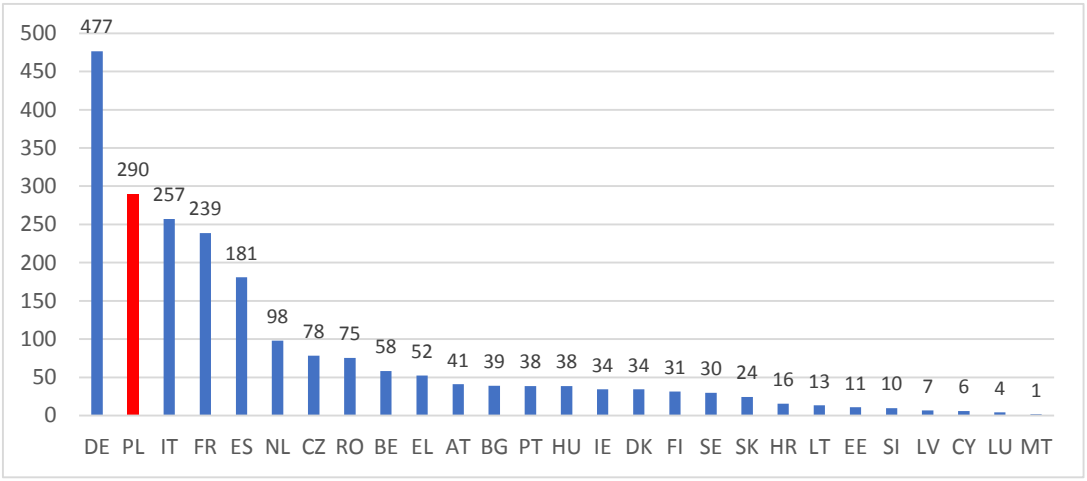

Figure 3. Greenhouse gas emission footprints in the EU countries (million tonnes of CO2 equivalent for 2022, FIGARO application).

Source: Authors' calculation based on Eurostat data (env_ac_ghgfp).

Employers of the Republic of Poland, Instrat Foundation, and Qemetica Group jointly conducted the second reading of the Decarbonization Index of the Polish Economy (IDGP) on October 21, 2024 (Instrat, 2024). According to the study's authors, over half of the surveyed companies (53%) do not calculate their carbon footprint; 47% have this data, of which 18% increased their scope in the first half of this year, and 5% reduced it. In general, many Polish companies still do not calculate their carbon footprint at all, and of those that do, most do so in an incompetent manner. Some companies have reduced the scope of information collected and published.

Despite numerous studies, the level of knowledge in this area and understanding of the principles of calculation still requires improvement, both by companies, accountants, and groups of employees responsible for preparing annual reports. The reporting process will be difficult and expensive. Creating reports will accompany uncertainty and even chaos, including legal problems. These trends are exacerbated by the complexity of the legal framework for carbon footprint reporting and calculating, synthetically presented below. Poland is a country that has a lot to do in the field of environmental protection among the European Union countries. This will lead to remarkably high pressure and costs imposed on companies, increasing the potential threat of violations of ethical standards when preparing non-financial reporting regarding the impact of companies' activities and products on the natural environment.

3. Legal framework for carbon footprint reporting in the European Union

The Accounting Directive (2013/34/EU), as amended by the Corporate Sustainability Reporting Directive (CSDR 2022/2464), obliges large companies and small and medium-sized enterprises (SMEs) listed on a regulated market, as well as parent companies of large groups, to include in a separate section of their business report information necessary to understand the enterprise's impact on sustainability issues and, the other way around, information necessary to understand the implications of sustainability issues on the enterprise's development, performance and situation. Sustainability reporting requirements for large entities and listed SMEs are set out in Art. 19a and 29a of the Accounting Directive.

The Accounting Directive, as amended by the CSRD, also introduces an obligation to report certain sustainability information by branches or subsidiaries of certain non-EU companies (Art. 40a). The reporting obligation for these branches and subsidiaries will apply from the 2028 financial year. The reporting of this information must be following the European Sustainability Reporting Standards (ESRS), to be adopted by the Commission using delegated acts specifying the content and, where appropriate, the structure to be used to present this information (Accounting Directive 2013/34/EU, Art. 29b sec. 1). These publications shall include, where appropriate, information relating to the short, medium and long term (Accounting Directive 2013/34/EU, Art. 19a sec. 2, para. 2 and Art. 29a sec. 2). Where appropriate, it includes information about the entity's own operations and value chain, including its products and services, business relationships and supply chains.

The European Union legislation to be taken into account when reporting carbon footprint is the Regulation on disclosure of sustainability-related information in the financial services sector (2019/2088) and related delegated acts, the relevant delegated acts adopted under the Taxonomy Regulation (2020/852), the relevant delegated acts adopted under the Benchmarks

Regulation (2016/1011), certain implementing acts adopted under the Capital Requirements Regulation (CRR 575/2013), Commission Recommendation on the life-cycle environmental performance of products and organizations (2021/2279), the Greenhouse Gas Emissions Trading Scheme Directive (2003/87/EC), the Climate Neutrality Regulation (2021/1119), the EMAS Regulation (1221/2009) and the Whistleblower Protection Directive (on the protection of persons who report breaches of Union law, 2019/1937).

The largest public interest entities with more than 500 employees will be the first to be obliged to report their carbon footprint for the 2024 financial year following the CSDR 2022/2464 directive. Subsequently, other large entities, small and medium-sized companies listed on the regulated market (for the first time for the financial year 2025 and 2026), and selected companies based outside the EU (for the first time for the financial year 2027) will report, respectively. Small and medium-sized entities whose securities are not admitted to trading on a regulated market in the Union but are suppliers or customers in value chains will have the opportunity to use the standards voluntarily.

4. Carbon footprint in the light of ISO standards

A "carbon footprint" is the impact of an entity (e.g., a company, a person) on the climate based on a specific metric that takes into account all relevant sources of emissions, removals, and storage both during consumption and production within spatially and temporally defined system boundaries (Peters, 2010). A carbon footprint (Onat, Kucukvar, 2020) is often defined as the total greenhouse gas emissions caused directly or indirectly by a given person, organization, event, or product. It should be emphasized that the carbon footprint includes emissions of carbon dioxide, methane, nitrous oxide, and other greenhouse gases that are expressed in CO2 equivalent. The carbon footprint measure is tCO2e - a tonne of carbon dioxide equivalent. This measure determines a specific process or product's impact on climate change or indicates how much Earth's resources are used. Therefore, to determine the carbon footprint, it is necessary to calculate the total sum of greenhouse gases (West, Owen, Axelsson, 2016) produced directly or indirectly by an economic entity (person, product, or event).

The principles, requirements, and guidelines for quantifying and reporting the carbon footprint of a product (CFP) (Raza et al., 2012) for entities conducting business activity are set out in the ISO 14067 standard. It is consistent with the ISO 14040 and ISO 14044 standards on product life cycle assessment (LCA) (Cabeza et al., 2014; Earles, Halog, 2011). One can calculate the carbon footprint based on the ISO 14067 standard. In addition, commercial programs (applications and calculators) have appeared on the market (Mulrow et al., 2019), which will allow for the correct calculation of the carbon footprint (Ahmad et al., 2016). Free openLCA software is already on the market (Ciroth et al., 2020), but its functionality does

not satisfy everyone. However, it is worth remembering that when making such calculations, access to databases about products and their production processes plays a vital role because the carbon footprint calculation is based on direct and indirect emissions – calculated over a specific period (Wiedmann, Barrett, 2010). Most often, the amount of greenhouse gas emissions is recorded annually.

Three scopes are analyzed to determine the carbon footprint of a business entity. The first scope covers all direct emissions generated by equipment used by an economic entity and concerns, among others, emissions from the car fleet and heating fuels. The second scope concerns indirect emissions related to the consumption of electricity and heat purchased by the entity. However, the third scope is considered the most problematic to calculate because it includes all indirect emissions not included in the first and second scope and occurred in the value chain. This is related to determining the amount of GHG (Greenhouse Gases) emissions, which include carbon dioxide, water vapor, freons, halons, methane, ozone, and industrial gases generated during the production process of purchased raw materials, materials, manufactured and managed waste or use of the offered products (Gillingham, Stock, 2018; Abrell, Kosch, Rausch, 2017; Hughes, Podolefsky, 2015). Within the third scope, emissions can be distinguished at the production (upstream) and consumption (downstream) levels, divided into 15 categories.

5. Calculating the carbon footprint

Calculating and managing the carbon footprint following the ISO-14064-1 standard and the GHG Protocol requires the correct counting of materials and raw materials used, but above all, the development of a material and energy balance along with the source and type of raw material origin (primary, secondary) and transport. The results of calculating the carbon footprint will form the basis for developing environmental declarations and reporting. It is also worth noting that the carbon footprint and information about it are already included on selected products containing information on CO2e.

Calculating carbon footprint emissions will be difficult and require additional paid applications. However, this may allow the entity to review its processes to optimize them, which helps in taking action to reduce gas emissions and build a competitive advantage in the market. CO2e emission values must be aggregated, and limit values should be introduced. There is a high probability that standardization will gradually occur in individual industries, as nowadays observed in the automobile and construction industries (Andreasi Bassi et al., 2023). The agricultural sector will face the most difficulty measuring and reporting GHG (Miao, Zhao, Chen, 2023).

6. Conclusions

The assumptions of the European Green Deal, by their very nature, also include regulating and monitoring procedures for creating and presenting information on the impact of the activities of all enterprises and institutions on polluting the natural environment, especially the one that strongly impacts global warming. Appropriate accounting services in these enterprises and institutions must expand the scope of collected and shared information regarding environmental impact.

In a negative sense, Poland's high position compared to other EU countries in terms of greenhouse gas emissions, presented in Eurostat data, is essential for assessing the risks of correct carbon footprint reporting. Firstly, accidental or intentional errors in calculation and reporting leading to underestimation of the carbon footprint will have a high cumulative value due to the high reference point. Secondly, with high greenhouse gas emissions, the benefits for reporting entities, even marketing and PR, from underestimating or omitting the carbon footprint are high, which provides a stronger motivation for dishonesty. Thirdly, high greenhouse gas emissions from a wide variety of sources translate into the need for a more precise understanding of the details of the relevant legal regulations for reporting.

As presented above, the legal framework for carbon footprint reporting is complicated. This creates more substantial incentives for Polish accountants to provide dishonest reporting. They result from the increased costs of correct reporting (for example, expenditure on staff qualifications and software purchases and potential adverse effects of honestly demonstrating a large carbon footprint of an enterprise or institution). At the same time, the conclusions presented in the article from the results of the Decarbonization Index of the Polish Economy 2024 (IDGP) confirm major weaknesses in incorporating the principles of calculating and reporting the carbon footprint by the relevant services of Polish enterprises and institutions.

Additional indirect factors that may make it difficult for Polish accounting services to report the carbon footprint properly include the overload of public finances with military expenditure resulting from Russia's aggression against Ukraine and the necessary huge expenditures on restructuring the outdated and inefficient Polish energy sector. This may tempt the Polish authorities to prioritize short-term economic effects over environmental benefits. This may manifest in weakening state services' supervision over the correctness of carbon footprint reporting. This problem is aggravated by the increasingly clear anti-environmental rhetoric of the new US authorities from 2025, intensifying the already existing anti-ecological trends in the societies and authorities of some European Union countries.

Most specialists assume that companies will make mistakes at the beginning of the ESG carbon footprint reporting process due to the issue's complexity. As mentioned above, preparing economic entities to calculate the carbon footprint is multi-element (Scopes 1, 2, and 3). Inevitably, we will learn from our mistakes. However, an essential aspect of this process

will be employing people with appropriate qualifications and training selected employees responsible for preparing carbon footprint reports.

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