

Justyna **GODAWSKA**

THE USE OF CORPORATE EXTERNAL ENVIRONMENTAL REPORTING IN THE EVALUATION OF THE STATE ENVIRONMENTAL POLICY

Justyna **Godawska** (ORCID: 0000-0002-7470-7696) – *AGH University*

Correspondence address:

Gramatyka Street 10, 30-067 Cracow, Poland

e-mail: godawska@agh.edu.pl

ABSTRACT: The condition for carrying out an evaluation of the environmental policy is the availability of relevant information. One source of this information could be corporate external environmental reporting. The aim of the article is to determine to what extent the applicable UE legal regulations, Global Reporting Initiative (GRI) and Task Force on Climate-related Financial Disclosures (TCFD) guidelines for corporate environmental reporting enable the use of the disclosed information by enterprises in the assessment of the state environmental policy. The content analysis of legal acts and guidelines was used in the research. The applicable EU legal regulations, GRI and TCFD guidelines enable the use of corporate environmental reporting in evaluating environmental policy mainly in terms of environmental efficiency and, to a small extent, in terms of cost-effectiveness and implementation feasibility.

KEYWORDS: environmental information, sustainability reporting regulation, environmental policy evaluation

Introduction

Nowadays, enterprises more and more often and, to a greater extent, provide various stakeholders with obligatory or voluntary information on the ecological aspects of their functioning in a market economy. Investors' demand for corporate environmental information is growing, which is mainly due to the development of the socially responsible investment market and the increasing importance of environmental protection for the market value of companies. According to the institutional investor survey conducted by the consulting company EY in November 2021, 77% and 79% of investors intended to spend considerable time and attention to evaluating physical and transition climate risk implications, respectively, when they make asset allocations and selection decisions (Nelson, 2021). Corporate external environmental reporting is becoming an increasingly popular business practice around the world, especially among large listed companies. In 2020, around 80% of the largest companies from 52 countries reported on sustainability issues (including environmental ones) compared to 18% of them in 2002 (KPMG, 2020). Companies disclose environmental information primarily in annual reports and in other types of reports (corporate social responsibility, sustainable development, integrated and environmental).

Environmental information disclosed by enterprises can be a tool for evaluating environmental policy in terms of its efficiency, cost-effectiveness, distributive justice and implementation feasibility (Godawska, 2021). In the assessment of various environmental policy instruments, such as fees, emission standards, and tradable allowances for air pollution emissions, information is needed on, for example, the volume of pollutants emitted into the air, the degree of modernity of the environmental protection installations used, and the number of fines imposed for non-compliance with environmental protection regulations. Some of this information is collected as part of the state monitoring of environmental protection, but some are created by enterprises as part of their internal and external reporting.

The scope and quality of environmental information disclosed by enterprises – and the related usefulness of this information in the assessment of the state environmental policy – depends to a large extent on the applicable legal regulations in this regard and on the guidelines of various institutions used by the reporting enterprises. In the EU countries, corporate reporting on sustainable development (including environmental issues) is largely shaped by the Non-Financial Reporting Directive 2014/95/EU (Directive, 2014) and the Corporate Sustainability Reporting Directive (Directive, 2022). The Regulation of the European Parliament and of the Council on the establishment of a framework to facilitate sustainable investment (Regulation,

2020) is also an important factor influencing the environmental reporting of the EU companies. There are many reporting standards and frameworks on the presentation of environmental information (especially non-financial) developed by sustainability reporting standard-setting bodies (such as e.g. Global Reporting Initiative (GRI), Task Force on Climate-related Financial Disclosures (TCFD) and International Financial Reporting Standards Foundation) that can be used by companies, both in mandatory and voluntary disclosures. Despite the existence of many guidelines on sustainability reporting, the guidelines developed by the GRI have become the dominant standard in the world (KPMG, 2020; De Villiers et al., 2022).

The aim of the article is to determine to what extent the applicable UE legal regulations, GRI and TCFD guidelines for corporate environmental reporting enable the use of the disclosed information by enterprises in the assessment of the state environmental policy.

Criteria of environmental policy evaluation and information used in this evaluation

In formulating environmental policy and selecting appropriate policy instruments, a multi-criteria evaluation of planned solutions or outcomes of already applied instruments is needed (Van den Bergh et al., 1997). Environmental policy evaluation can be carried out retrospectively (to determine the impact of a selected policy or implementation strategy after its adoption) or prospectively (to inform decision-makers what policy instruments should be used and how to solve an environmental problem). In the former case, the results of the evaluation can also provide useful information for the analysis of new policy initiatives. The importance of environmental policy evaluation for public decision-making has been growing in importance, especially in the EU, since the 1990s (Schoenefeld & Jordan, 2019).

Environmental policy can be assessed according to five criteria (Mickwitz, 2003; Venmans, 2012; Dyduch, 2013; Richter & Mundaca, 2015):

- environmental efficiency,
- cost-effectiveness,
- distributive justice,
- flexibility,
- implementation feasibility.

Environmental efficiency, which is, next to cost-effectiveness, the most important criterion for assessing environmental policy, generally means the degree of achievement of the assumed objectives. These objectives may be e.g. to reduce the emission of pollutants to a certain level or an acceptable concentration of pollutants. Environmental efficiency can be distinguished in

the strict and broad sense. The former means not exceeding the total emission (immission) in a given area and at the level of individual companies – not exceeding the permissible emission standards. The latter relates to the motivational (incentive) function of the environmental policy instruments used, consisting of providing a constant incentive to reduce pollutant emissions and searching for technological innovations (Dyduch, 2013).

The criterion of cost-effectiveness of environmental policy instruments is met while minimising the total costs of achieving the environmental goal. The costs of achieving a specific environmental target include the costs of reducing emissions of pollutants in enterprises and other costs related to the implementation and operation of a given environmental policy instrument, i.e. transaction costs incurred by both regulatory authorities and the emitters of pollutants, such as, e.g. costs of monitoring or commissions.

Distributive justice as a criterion for assessing the applied environmental policy instruments refers to the just manner of sharing the benefits and costs associated with a given instrument among members of society (Graczyk, 2005; Venmans, 2012) and concerns distribution effects related to shifting financial burdens of polluting firms onto consumers and equal treatment of economic entities. The financial burden related to environmental protection means – directly or indirectly – the impact on the prices of intermediate and final goods and factors of production, which in turn implies the emergence of distributional effects on enterprises, households and the state. The implemented solutions in the field of environmental policy should not differentiate economic entities and social groups without a justified reason.

The flexibility of environmental policy can be understood in two ways: as the ability of policy instruments to adapt to the changing legal, organisational and economic environment, and as the freedom to choose the method of adapting to environmental requirements by the enterprise, e.g. freedom to choose reduction technology and adaptation strategy (Folmer et al., 1996).

The feasibility of implementing a given instrument of environmental policy depends on many factors: organisational, legal and technical (the existence of legal and institutional foundations enabling the implementation of the instrument as well as organisational and technical solutions enabling the introduction and supervision over the operational functioning of the instrument) and socio-economic (political will to use the instrument, resistance of the industrial lobby to its implementation, the economic situation of a given state, social acceptance of environmental protection programs and bearing some of the costs activities by society, the scale of financial burdens on economic entities and households with the previously introduced environmental policy instruments).

A properly conducted evaluation of the environmental policy depends on up-to-date and reliable data on environmental outcomes and other non-pol-

icy determinants of environmental outcomes, such as economic and technological factors (Benneer & Coglianesse, 2005). Some of the necessary information is collected in publicly available databases managed by regulatory institutions in the field of environmental and other public policies, such as the Toxic Release Inventory in the USA. Researchers aiming at assessment of environmental policy can also adapt information from existing studies (Iovanna & Griffiths, 2006; Johnston & Bauer, 2020) or use other sources of information such as industry surveys (Ellerman et al., 2000) and corporate external reporting (Benneer & Coglianesse, 2005).

Table 1 presents a proposal for the use of environmental information from corporate reporting in assessing environmental policy against the five previously mentioned criteria. The environmental information disclosed by companies can allow the assessment of environmental taxes, emission standards, emission rights trading programs and other environmental policy instruments mainly in terms of environmental efficiency and cost-effectiveness and, to a lesser extent, in terms of distributive justice and implementation feasibility. On the other hand, the flexibility of environmental policy instruments is defined a priori and results directly from the adopted regulatory solutions for individual instruments (legal, economic and technical conditions). Corporate disclosures are not relevant to this criterion (Godawska, 2021).

Table 1. Environmental information disclosed by enterprises as a tool for assessing the state environmental policy

Criterion for the evaluation of environmental policy	Type of environmental information	The way of using environmental information in the evaluation of environmental policy
Environmental efficiency	<ul style="list-style-type: none"> – quantitative non-financial information: <ul style="list-style-type: none"> • indicators of the level of the company's environmental impact (e.g. dust and gas emissions) • indicators of the effects of the company's environmental impact (e.g. changes in the quantity and quality of water resources) – descriptive non-financial information, i.e. information on conducting business in accordance with the required legal and administrative permits in the field of environmental protection – financial information, i.e. environmental fines for exceeding established emission standards 	The information enables the assessment of environmental efficiency in the strict sense

Criterion for the evaluation of environmental policy	Type of environmental information	The way of using environmental information in the evaluation of environmental policy
Environmental efficiency	<ul style="list-style-type: none"> – descriptive non-financial information, i.e. the characteristics of environmental protection technologies used and planned to be implemented in the enterprise, taking into account the degree of their modernity and innovation – financial information, i.e. investment expenditure on environmental protection projects 	The information enables the assessment of environmental efficiency in a broad sense
Cost-effectiveness	<ul style="list-style-type: none"> – financial information: <ul style="list-style-type: none"> • depreciation of fixed assets and intangible assets used in the reduction of pollutant emissions • consumption of materials and energy for the purposes of reducing pollutant emissions • remuneration of employees involved in the operation and supervision of environmental protection installations • social insurance and other benefits related to the remuneration of employees involved in the operation and supervision of environmental protection installations • external services in the field of operation and supervision of environmental protection installations • other costs related to the operation of environmental protection installations (e.g. property insurance) 	The information enables the measurement of the costs related to the abatement of pollutant emissions incurred by the firm
	<ul style="list-style-type: none"> – financial information: <ul style="list-style-type: none"> • depreciation of control and measurement devices and computer software used to measure pollutant emissions and prepare reports for the needs of regulatory institutions in the field of environmental protection • consumption of materials and energy for the purposes of monitoring pollutant emissions • remuneration of employees involved in the monitoring of pollutant emissions, preparation of external reporting for the needs of regulatory institutions in the field of environmental protection, preparation of internal reporting and analysis of its results • social security and other remuneration benefits of employees involved in the above activities • external services for the performance of laboratory analyzes for the purposes of monitoring pollutant emissions • conducting obligatory environmental audits, training employees on changes in the applicable environmental protection regulations etc. • administrative fees (e.g. registration fees for considering applications for an integrated permit) • brokerage fees and transaction fees related to the purchase of emission allowances • other costs (e.g. concluding contracts for the purchase of protective installations, submitting applications for environmental permits) 	The information enables the measurement of transaction costs of environmental policy instruments borne by the firm

Criterion for the evaluation of environmental policy	Type of environmental information	The way of using environmental information in the evaluation of environmental policy
Distributive justice	<ul style="list-style-type: none"> – financial information: <ul style="list-style-type: none"> • environmental costs that are part of the cost of manufacturing the product • revenues from the sale of the product (other than environmental information) 	The information enables the assessment of the extent to which environmental costs are passed on to product buyers
Flexibility	–	The information is not useful in assessing the flexibility of environmental policy instruments
Implementation feasibility	<ul style="list-style-type: none"> – financial information: <ul style="list-style-type: none"> • costs of reducing pollutant emissions • transaction costs of environmental protection instruments borne by the enterprise • costs of fees for using the environment • costs of purchasing air pollutant emission allowances 	The information makes it possible to assess the scale of the company's financial burden related to environmental protection, which may affect its acceptance of new instruments of environmental policy
	<ul style="list-style-type: none"> – quantitative and descriptive non-financial information: <ul style="list-style-type: none"> • characteristics of environmental protection technologies used and planned to be implemented in the enterprise, taking into account the degree of their modernity and innovation 	The information makes it possible to assess the technical possibilities of further reducing pollutant emissions by firms

Source: author's work based on own study (Godawska, 2021).

In the strict sense of environmental efficiency assessment, indicators of the level and effects of the company's impact on the environment, as well as information on the compliance of the company's operations with the required legal and administrative permits in the field of environmental protection and incurring fines for exceeding the permissible environmental standards can be used. On the other hand, information characterising the level of modernity and innovation of environmental protection technologies in enterprises and information on their expenses on pro-ecological projects may be useful in assessing the fulfilment of the incentive function of the applied instruments of environmental policy.

Information disclosed by enterprises also allows them to determine the costs incurred by them to achieve a given environmental goal, i.e. the costs of reducing pollutant emissions and the transaction costs of environmental policy instruments. However, the precise measurement of some of these costs requires detailed records by enterprises.

Information on the environmental costs incurred by given enterprises and included in the cost of manufacturing a product, along with information on the revenues from the sale of the product, allows to determine the distribution effects of the state environmental policy, i.e. to determine the extent to which enterprises pass on the financial burden related to environmental protection to consumers. These two pieces of information (environmental costs and sales revenues) can be used by comparing the amount of additional environmental costs with the change in sales revenues before and after the introduction of an environmental policy instrument (*ceteris paribus*).

If the costs of environmental protection incurred by firms (emission reduction costs, transaction costs, fees for using the environment, costs of purchasing emission allowances) are severe for them, the level of their acceptance towards the introduction of another instrument of environmental policy may be low. Information on the scale of the company's financial burden related to environmental protection allows for the assessment of acceptance of new environmental policy solutions and the possibility of their implementation. In the assessment of the technical possibilities of further reduction of pollutant emissions by enterprises, the information characterising the degree of modernity and innovation of the environmental protection technologies used by them may be useful. In the case of using the best available technology by most firms in a given industry, the scope of the reduction of pollutant emissions that can be achieved is not large.

Research methods

The research problem is as follows: Do the legal requirements resulting from the EU regulations on corporate reporting and guidelines in this area make the information disclosed in corporate external environmental reporting useful in assessing the state environmental policy? The research method applied to solve that problem is content analysis, which is 'a research technique used to determine the presence of certain words or concepts within the text' (Sweeney & Coughlan, 2008, p. 116).

The following documents were analysed:

- Directive 2014/95/EU of the European Parliament and of the Council of 22 October 2014 amending Directive 2013/34/EU as regards disclosure of non-financial and diversity information by certain large undertakings and groups (Directive, 2014),
- Directive (EU) 2022/2464 of the European Parliament and of the Council of 14 December 2022 amending Regulation (EU) No 537/2014, Directive 2004/109/EC, Directive 2006/43/EC and Directive 2013/34/EU as regards corporate sustainability reporting (Directive, 2022),

- Regulation (EU) 2020/852 of the European Parliament and of the Council of 18 June 2020 on the establishment of a framework to facilitate sustainable investment and amending Regulation (EU) 2019/2088 (Regulation, 2020),
- the GRI Standards (GRI, 2022a),
- the TCFD recommendations (TCFD, 2021).

In the content analysis, the environmental disclosures required or recommended in the above-mentioned documents were identified and classified into a group of information enabling the assessment of environmental efficiency, cost-effectiveness, distributive justice and implementation feasibility, respectively, in accordance with the classification of environmental information presented in Table 1.

The Directive 2014/95/EU was adopted in 2014. Companies within its scope had to report in accordance with its provisions for the first time in 2018 (covering financial year 2017). It applies to large public-interest entities with an average number of employees in excess of 500. Approximately 12 000 firms in the EU are subject to the reporting requirements of Directive 2014/95/EU.

The Regulation (EU) 2020/852 – the so-called Taxonomy Regulation – sets up a classification system for environmentally sustainable economic activities in order to combat the greenwashing of ‘sustainable’ financial products. The Taxonomy Regulation requires companies falling within the scope of Directive 2014/95/EU on non-financial reporting to disclose certain indicators related to the part of their activities that, according to the taxonomy, are classified as sustainable (Regulation, 2020).

The Directive 2014/95/EU was amended by the directive on corporate sustainability reporting (Directive, 2022), which was adopted by the European Parliament in December 2022. The amendment to Directive 2014/95/EU introduced more detailed reporting requirements and increased the number of firms that will be subject to it to approximately 50,000 in the entire EU.

The GRI Standards contain both general and detailed content, taking into account the practical aspects of the functioning of entities from various sectors, which makes it possible for them to be used by various organisations, including enterprises, regardless of their size, business profile or location. The GRI Standards were selected for analysis from among many sustainability reporting guidelines due to their popularity among reporting companies. They have a dominant position as a global sustainability reporting standard (Szennay et al., 2019; De Villiers et al., 2022).

The Task Force on Climate-related Financial Disclosures is another international initiative established by the Financial Stability Board in 2015 in order to develop recommendations on disclosures that would be useful to

assess climate-related risks and opportunities. The TCFD recommendations on voluntary disclosures are, therefore, dedicated to only one specific type of environmental information. More and more firms in the world apply the TCFD recommendations, which results, among others, from important actions by regulators and international standard-setters to use these guidelines in developing climate-related reporting requirements (TCFD, 2022).

Results of the research

The Directive 2014/95/EU imposed the obligation for certain large enterprises to prepare a non-financial statement containing information relating to environmental matters and other issues related to corporate social responsibility. Such a statement should be included in the enterprise's management report and should contain a description of the business model, policies, outcomes, risks, and non-financial key performance indicators related to environmental matters (cf. Table 2).

The Directive (EU) 2022/2464 detailed the list of required information regarding the description of the business model and strategy and added requirements to disclose the description of:

- the role of the administrative, management and supervisory bodies with regard to sustainability matters,
- the due diligence process implemented with regard to sustainability matters,
- the principal actual or potential adverse impacts connected with the enterprises' value chain,
- any actions taken and the result of such actions to prevent, mitigate or remediate actual or potential adverse impacts.

While the preamble to Directive 2014/95/EU clarifies what specific environmental information companies are required to disclose, it should be noted that the disclosure requirements (in both directives on corporate reporting) are very general and leave quite a lot of flexibility to companies on what to present in their management's reports. The general wording of disclosure requirements means that some of the information may or may not be relevant to environmental issues.

It can be assumed (taking into account the high degree of generality of the requirements provided in the directives) that the environmental information disclosed by the reporting companies may be useful mainly in assessing environmental performance in the strict and broad sense. Information on the role of the administrative, management and supervisory bodies with regard to sustainability matters may indirectly be useful in assessing transaction costs incurred by enterprises in connection with environmental policy.

Information on the resilience of the undertaking's business model and strategy to risks related to sustainability matters can help assess the acceptability of firms regarding the introduction of new or tightening of existing environmental policy instruments.

Table 2. Disclosure of environmental information according to the EU reporting directives and its reference to the criteria for assessing environmental policy

Legal act	Environmental information required to be disclosed	Reference to the environmental policy evaluation criteria
Directive 2014/95/EU – article 1	<p>Information to the extent necessary for an understanding of the undertaking's development, performance, position and impact of its activity, relating to (...) environmental (...) matters (...), including</p> <ul style="list-style-type: none"> • a brief description of the undertaking's business model; • a description of the policies pursued by the undertaking in relation to those matters, • the outcome of those policies; • the principal risks related to those matters linked to the undertaking's operations including, where relevant and proportionate, its business relationships, products or services which are likely to cause adverse impacts in those areas, and how the undertaking manages those risks; • non-financial key performance indicators relevant to the particular business. 	Possibly environmental efficiency in the strict and broad sense
Directive 2014/95/EU – preamble (point 7)	<p>The current and foreseeable impacts of the undertaking's operations on the environment, and, as appropriate, on health and safety</p> <p>The use of renewable and/or non-renewable energy</p> <p>Greenhouse gas emissions</p> <p>Water use</p> <p>Air pollution</p>	Environmental efficiency in the strict sense and possibly in a broad sense
Directive (EU) 2022/2464/EU (article 1)	<p>Information necessary to understand the undertaking's impacts on sustainability matters, and information necessary to understand how sustainability matters affect the undertaking's development, performance and position, including in particular:</p> <p>(a) a brief description of the undertaking's business model and strategy, including:</p> <ul style="list-style-type: none"> (i) the resilience of the undertaking's business model and strategy to risks related to sustainability matters; (ii) the opportunities for the undertaking related to sustainability matters; (iii) the plans of the undertaking to ensure that its business model and strategy are compatible with the transition to a sustainable economy and with the limiting of global warming to 1.5 °C in line with the Paris Agreement; (iv) how the undertaking's business model and strategy take account of the interests of the undertaking's stakeholders and of the impacts of the undertaking on sustainability matters; 	<p>Environmental efficiency in the strict and broad sense</p> <p>Possibly implementation feasibility</p> <p>Possibly and indirectly cost effectiveness</p>

Legal act	Environmental information required to be disclosed	Reference to the environmental policy evaluation criteria
Directive (EU) 2022/2464/EU (article 1)	(v) how the undertaking's strategy has been implemented with regard to sustainability matters; (b) a description of the targets related to sustainability matters set by the undertaking and of the progress the undertaking has made towards achieving those targets; (c) a description of the role of the administrative, management and supervisory bodies with regard to sustainability matters; (d) a description of the undertaking's policies in relation to sustainability matters; (e) information on the existence of incentive schemes linked to sustainability matters which are offered to the administrative, management and supervisory bodies; (f) a description of: (i) the due diligence process implemented with regard to sustainability matters; (ii) the principal actual or potential adverse impacts connected with the undertaking's value chain, including its own operations, its products and services, its business relationships and its supply chain; (iii) any actions taken, and the result of such actions, to prevent, mitigate or remediate actual or potential adverse impacts; (g) a description of the principal risks to the undertaking related to sustainability matters, including the undertaking's principal dependencies on such matters, and how the undertaking manages those risks; (h) indicators relevant to the disclosures referred to in points (a) to (g).	Environmental efficiency in the strict and broad sense Possibly implementation feasibility Possibly and indirectly cost effectiveness

Source: author's work based on Directive (2014, 2022).

Pursuant to Article 8 of the Taxonomy Regulation (Regulation, 2020), enterprises are obliged to 'include in their non-financial statements information on how and to what extent the undertaking's activities are associated with economic activities that qualify as environmentally sustainable'. Economic activity qualified as environmentally sustainable means the economic activity that contributes substantially to one or more of the environmental objectives set out in the Taxonomy Regulation (e.g. pollution prevention and control).

In particular, non-financial enterprises shall disclose information on (Regulation, 2020):

- the proportion of their turnover derived from products or services associated with economic activities that qualify as environmentally sustainable,

- the proportion of their capital expenditure and the proportion of their operating expenditure related to assets or processes associated with economic activities that qualify as environmentally sustainable.

The above information can be used to assess environmental efficiency in a broad sense.

Detailing of the requirements regarding disclosure of environmental information in accordance with both EU reporting directives and Taxonomy Regulation are included in the European Sustainability Reporting Standards (ESRS), the version of which developed by EFRAG was adopted by the European Commission on July 31, 2023 (European Commission, 2023). This is the first set of 12 universal standards, which consists of 2 cross-cutting standards and 10 topical standards, including 5 standards on environmental issues (cf. Table 3), 4 standards on social issues and 1 standard on governance issues. In general, these standards include a detailed list of required information, the purpose of disclosure, recommended sources of information and the method of presenting information (e.g. taking into account the base year and target years). The ESRS is not discussed in detail in this article due to the limited volume of the article and, above all, due to the fact that the thematic scope of information and its usefulness for the assessment of environmental policy coincides with the EU regulations discussed above. Table 3 shows only selected environmental information required by the environmental topical standards included in the ESRS.

Table 3. Selected environmental information to be disclosed according to the ESRS

Topical standards	Environmental information recommended for disclosure	Reference to the environmental policy evaluation criteria
E1 – Climate change	Description of transition risks, including enhanced emissions-reporting obligations	Possibly and indirectly cost effectiveness
	Significant monetary amounts of CapEx and OpEx required to implement the actions climate change mitigation actions taken or planned	Environmental efficiency in the strict and broad sense
	Fuel consumption from coal and coal products (MWh)	Environmental efficiency in the strict sense
E2 – Pollution	Description of the process to collect data for pollution-related accounting and reporting, including the type of data needed and the information sources	Possibly and indirectly cost effectiveness
	A list of any non-compliance incidents or enforcement actions necessary to ensure compliance in case of breaches of permit conditions, payment of fines and penalties imposed by regulators or government authorities	Environmental efficiency in the strict sense

Topical standards	Environmental information recommended for disclosure	Reference to the environmental policy evaluation criteria
E3 – Water and marine resources	Description of transition risks, including enhanced reporting obligations on marine ecosystems and related services, transition to new monitoring technologies (e.g. satellite)	Possibly and indirectly cost effectiveness
	Total water consumption in m ³ Total water consumption in areas at water risk including areas of high-water stress in m ³ Total water recycled and reused in m ³	Environmental efficiency in the strict sense
E4 – Biodiversity and ecosystems	Description of transition risks, including enhanced reporting obligations on biodiversity, ecosystems and related services; transition to new monitoring technologies (e.g. satellite) The frequency of monitoring, key metrics related to biodiversity and ecosystems change being monitored	Possibly and indirectly cost effectiveness
	The size and location of all habitat areas protected or restored, whether directly or indirectly controlled by the undertaking, and whether the success of the restoration measure was or is approved by independent external professionals	Environmental efficiency in the strict sense
E5 – Resource use and circular economy	The weight in both absolute value and percentage, of secondary reused or recycled components, secondary intermediary products and secondary materials used to manufacture the undertaking's products and services (including packaging)	Environmental efficiency in the strict sense

Source: author's own work based on European Commission (2023).

The establishment of the GRI in 1997 in the USA followed public concern about the environmental damage caused by the Exxon Valdez oil spill. The main goal of GRI was to create the first accountability mechanism that would ensure compliance by companies with the principles of responsible conduct in the field of environmental protection, which was then extended to include social, economic and corporate governance issues (GRI, 2022b). Since 2000, six versions of the GRI sustainability reporting guidelines have been published so far. The latest guidelines, called 'GRI Standards', were developed in 2016 and updated in 2020. The set of GRI Standards is characterised by a modular structure and consists of three universal standards applicable to each organisation preparing a non-financial statement or a sustainable development report and detailed thematic indicators divided into economic (200 series), environmental (300 series) and social (400 series) parts.

Table 4 presents indicators according to the GRI Standards related to environmental issues. All indicators except one group (disclosure 201-2) belong to the environmental part. When assigning environmental policy

assessment criteria to particular types of disclosures, the author took into account detailed explanations and guidelines contained in the GRI standards.

Table 4. Disclosure of environmental information according to the GRI Standards and its reference to the criteria for assessing environmental policy

Disclosure topic	Environmental information recommended for disclosure	Reference to the environmental policy evaluation criteria
201-2 Financial implications and other risks and opportunities due to climate change	Risks and opportunities posed by climate change that have the potential to generate substantive changes in operations, revenue, or expenditure, including: <ul style="list-style-type: none"> • a description of the risk or opportunity and its classification as either physical, regulatory, or other • the financial implications of the risk or opportunity before action is taken • the costs of actions taken to manage the risk or opportunity 	Environmental efficiency in a broad sense Cost effectiveness Implementation feasibility
301-1 Materials used by weight or volume	Total weight or volume of materials that are used to produce and package the organization's primary products and services during the reporting period	Environmental efficiency in the strict sense
301-2 Recycled input materials used	Percentage of recycled input materials used to manufacture the organization's primary products and services	
301-3 Reclaimed products and their packaging materials	Percentage of reclaimed products and their packaging materials for each product category	
302-1 Energy consumption within the organization	Total fuel consumption within the organization from non-renewable and renewable sources, in joules or multiples, and including fuel types used. In joules, watt-hours or multiples, electricity, heating, cooling and steam consumption Total energy consumption within the organization, in joules or multiples	
302-2 Energy consumption outside of the organization	Energy consumption outside of the organization, in joules or multiples	Environmental efficiency in a broad sense
302-3 Energy intensity	Energy intensity ratio for the organization	
302-4 Reduction of energy consumption	Amount of reductions in energy consumption achieved as a direct result of conservation and efficiency initiatives, in joules or multiples	
302-5 Reductions in energy requirements of products and services	Reductions in energy requirements of sold products and services achieved during the reporting period, in joules or multiples	Environmental efficiency in the strict sense
Disclosure 303-1 Interactions with water as a shared resource	A description of how the organization interacts with water, including how and where water is withdrawn, consumed, and discharged	
303-2 Management of water discharge related impacts	A description of any minimum standards set for the quality of effluent discharge (beyond regulatory requirements), and how these minimum standards were determined	Environmental efficiency in a broad sense

Disclosure topic	Environmental information recommended for disclosure	Reference to the environmental policy evaluation criteria
303-3 Water withdrawal	Total water withdrawal from all areas in megaliters, including areas with water stress	Environmental efficiency in the strict sense
303-4 Water discharge	Total water discharge to all areas in megaliters, including areas with water stress	
303-5 Water consumption	Total water consumption from all areas in megaliters, including areas with water stress	Environmental efficiency in the strict sense
304-1 Operational sites owned, leased, managed in, or adjacent to, protected areas and areas of high biodiversity value outside protected areas	For each operational site owned, leased, managed in, or adjacent to, protected areas and areas of high biodiversity value outside protected areas, the information on geographic location, and type of operation (office, manufacturing or production, or extractive). Biodiversity value characterized by the attribute of the protected area or area of high biodiversity value outside the protected area (terrestrial, freshwater, or maritime ecosystem) Biodiversity value characterized by listing of protected status	
304-2 Significant impacts of activities, products and services on biodiversity	Nature of significant direct and indirect impacts on biodiversity with reference to e.g. reduction of species Significant direct and indirect positive and negative impacts with reference to the species affected, extent of areas impacted, and duration of impacts	
304-3 Habitats protected or restored	Size and location of all habitat areas protected or restored, and whether the success of the restoration measure was or is approved by independent external professionals	
304-4 IUCN Red List species and national conservation list species with habitats in areas affected by operations	Total number of IUCN Red List species and national conservation list species with habitats in areas affected by the operations of the organization	
305-1 Direct (Scope 1) GHG emissions	Gross direct (Scope 1) GHG emissions in metric tons of CO ₂ equivalent Gases included in the calculation Biogenic CO ₂ emissions in metric tons of CO ₂ equivalent.	
305-2 Energy indirect (Scope 2) GHG emissions	Gross location-based energy indirect (Scope 2) GHG emissions in metric tons of CO ₂ equivalent The gases included in the calculation	
305-3 Other indirect (Scope 3) GHG emissions	Gross other indirect (Scope 3) GHG emissions in metric tons of CO ₂ equivalent The gases included in the calculation. Biogenic CO ₂ emissions in metric tons of CO ₂ equivalent Other indirect (Scope 3) GHG emissions categories and activities included in the calculation	
305-4 GHG emissions intensity	GHG emissions intensity ratio for the organization. Gases included in the calculation	
305-5 Reduction of GHG emissions	GHG emissions reduced as a direct result of reduction initiatives, in metric tons of CO ₂ equivalent Gases included in the calculation	

Disclosure topic	Environmental information recommended for disclosure	Reference to the environmental policy evaluation criteria
305-6 Emissions of ozone-depleting substances (ODS)	Production, imports, and exports of ODS in metric tons of CFC-11 equivalent Substances included in the calculation	Environmental efficiency in the strict sense
305-7 Nitrogen oxides (NO _x), sulfur oxides (SO _x), and other significant air emissions	Significant air emissions, in kilograms or multiples, for NO _x , SO _x , volatile organic compounds, hazardous air pollutants, particulate matter and other	
306-1 Waste generation and significant waste-related impacts	For the organization's significant actual and potential waste-related impacts, a description of the inputs, activities, and outputs that lead or could lead to these impacts	Environmental efficiency in the strict sense Implementation feasibility
306-2 Management of significant waste-related impacts	Actions, including circularity measures, taken to prevent waste generation in the organization's own activities and upstream and downstream in its value chain, and to manage significant impacts from waste generated The processes used to collect and monitor waste-related data	Environmental efficiency in a broad sense Cost effectiveness (indirectly)
306-3 Waste generated	Total weight of waste generated in metric tons, and a breakdown of this total by composition of the waste	Environmental efficiency in the strict sense
306-3a Significant spills	Total number and total volume of recorded significant spills The following additional information for each spill that was reported: location of spill, volume of spill, and material of spill Impacts of significant spills	
306-4 Waste diverted from disposal	Total weight of waste (total), hazardous and non-hazardous waste diverted from disposal in metric tons	
306-5 Waste directed to disposal	Total weight of waste (total), hazardous and non-hazardous waste directed to disposal in metric tons	
308-1 New suppliers that were screened using environmental criteria	Percentage of new suppliers that were screened using environmental criteria	Environmental efficiency in a broad sense
308-2 Negative environmental impacts in the supply chain and actions taken	Number of suppliers assessed for environmental impacts and identified as having significant actual and potential negative environmental impacts Significant actual and potential negative environmental impacts identified in the supply chain Percentage of suppliers identified as having significant actual and potential negative environmental impacts with which: improvements were agreed upon as a result of assessment relationships were terminated as a result of assessment	

Source: author's own work based on GRI (2022a).

The vast majority of the recommended disclosure topics (25 out of 33 groups of indicators) concerns environmental efficiency in the strict sense. These indicators make it possible to assess the level and effects of the company's impact on the environment in the area of the use of materials, energy,

water, biodiversity, emissions (GHG, ozone-depleting substances, nitrogen oxides, sulfur oxides, and other significant air pollutants), waste, spills and environmental impacts in the supply chain. Environmental information recommended for disclosure related to environmental efficiency in the strict sense is non-financial, mostly quantitative or, to a lesser extent, descriptive.

Seven groups of indicators concern environmental efficiency in a broad sense. The following information may be used in assessing the stimulus function of the environmental policy instruments already implemented:

- the percentage of capital expenditure that is allocated to investments in climate change mitigation,
- initiatives aimed at reducing greenhouse gas emissions,
- efficiency initiatives aimed at reductions in energy consumption,
- minimum standards set by an enterprise for the quality of effluent discharge that go beyond regulatory requirements, actions taken to prevent waste generation in the enterprise's own activities and in its value chain,
- actions taken to reduce or eliminate the negative impact on the environment in the supply chain.

According to the GRI (2022a) standards, companies are recommended to disclose information on the costs of actions taken to manage the climate risk, which may help in assessing the cost effectiveness of instruments related to the transition to a low-carbon economy (disclosure 201-2). In addition, information on processes used to collect and monitor waste-related data (disclosure 306-2) may indirectly enable the calculation of transaction costs, but only for waste-related environmental policy instruments.

Information on inputs, activities, and outputs that could lead to significant waste-related impacts (disclosure 306-1) can help assess the implementation feasibility of more restrictive environmental policy instruments related to waste reduction. Similarly, information on the financial implications of the climate risk (i.e. substantive changes in companies' operations, revenue, or expenditures) may enable the assessment of implementation feasibility of more stringent instruments related to climate policy.

It should be noted that the previous version of the guidelines developed by the GRI (G4) included financial information (environmental protection expenditures and investments by type and the monetary value of fines) and the total number of non-financial sanctions for non-compliance with environmental laws, which was abandoned in the GRI Standards. In the current version of the GRI standards, the only financial information is information related to financial implications due to climate change (disclosure 201-2).

The TCFD published its recommendations in 2017 and updated them in 2021. These recommendations focus on climate-related disclosures that would be useful, especially for investors and other financial market participants, in pricing the climate risks and opportunities. They are organised

around four disclosure topics that relate to the basic elements of the company's operations: governance, strategy, risk management, as well as metrics and targets. Within these four thematic areas, eleven requirements on what should be reported in companies' main financial filings are specified (cf. Table 5).

Table 5. Disclosure of environmental information according to the TCFD recommendations and its reference to the criteria for assessing environmental policy

Disclosure topic	Environmental information recommended for disclosure	Reference to the environmental policy evaluation criteria
Governance	Information on the organization's governance around climate-related risks and opportunities, including: <ul style="list-style-type: none"> • a description of the board's oversight of climate-related risks and opportunities (e.g. how the board monitors and oversees progress against goals and targets for addressing climate-related issues) • a description of management's role in assessing and managing climate-related risks and opportunities (e.g. processes by which management is informed about climate-related issues) 	Possibly and indirectly cost effectiveness
Strategy	Information on the actual and potential impacts of climate-related risks and opportunities on the organization's businesses, strategy, and financial planning where such information is material, including: <ul style="list-style-type: none"> • a description of the climate-related risks and opportunities the organization has identified over the short, medium, and long term • a description of the impact of climate-related risks and opportunities on the organization's businesses, strategy, and financial planning (e.g. in product and services, investment in research and development) • a description of the resilience of the organization's strategy, taking into consideration different climate-related scenarios, including a 2°C or lower scenario 	Possibly feasibility implementation
Risk management	Information on how the organization identifies, assesses, and manages climate-related risks, including: <ul style="list-style-type: none"> • a description of the organization's processes for identifying and assessing climate-related risks • a description of the organization's processes for managing climate-related risks • a description of how processes for identifying, assessing, and managing climate-related risks are integrated into the organization's overall risk management 	Possibly and indirectly cost effectiveness
Metrics and targets	The metrics and targets used to assess and manage relevant climate-related risks and opportunities where such information is material, including: <ul style="list-style-type: none"> • the metrics used by the organization to assess climate-related risks and opportunities in line with its strategy and risk management process • Scope 1, Scope 2 and, if appropriate, Scope 3 GHG emissions and the related risks • the targets used by the firm to manage climate-related risks and opportunities and performance against targets 	Environmental efficiency in the strict and broad sense

Source: author's own work based on TCFD (2021).

Information on the firm's governance around climate-related risks and opportunities (i.e. the role of the board and management in this area) and information on processes of identifying, assessing and managing climate-related risks may indirectly be useful in assessing transaction costs incurred by enterprises in connection with state climate policy.

Disclosures on the actual and potential impacts of climate-related risks and opportunities on the firm's operations, strategy, and financial planning may help analyse the acceptability of firms regarding the introduction of new or tightening of existing climate policy instruments.

Metrics concerning Scope 1, Scope 2 or Scope 3 GHG emissions may be undoubtedly useful in evaluating the environmental efficiency in the strict sense in terms of achieving climate policy goals. On the other hand, information on the adopted targets regarding managing climate-related risks and opportunities and performance against targets may enable the assessment of environmental efficiency in a broad sense.

Conclusions

The conducted analysis of applicable EU legal regulations on sustainability reporting, the Global Reporting Initiative standards and the TCFD recommendations provide insights into the usefulness of corporate external environmental reporting in evaluating the state environmental policy. It can be concluded that the above-mentioned regulations and guidelines make the information disclosed in corporate reports useful in the policy evaluation mainly in terms of environmental efficiency, primarily in the strict sense and to a lesser extent in a broad sense. It should be underlined that information enabling the assessment of the incentive function of environmental policy instruments is particularly important, as such information is usually not readily available to public decision-makers, researchers and other interested parties. On the other hand, information on the impact of enterprises on the environment is also collected as part of the state environmental monitoring. Therefore, their disclosure by enterprises is of supplementary importance in terms of environmental policy evaluation.

There are very few required or recommended corporate environmental disclosures that could be useful, even indirectly, in assessing cost-effectiveness (e.g. 'the processes used to collect and monitor waste-related data') and implementation feasibility of environmental policy instruments (e.g. a description of the targets related to sustainability matters set by the undertaking and of the progress the undertaking has made towards achieving those targets). The analysed UE regulations, the GRI standards and the TCFD

recommendations do not contain any environmental disclosures that could be related to distributive justice.

It should be noted that the assessment of the usefulness of environmental information from corporate reporting is based on the assumption that enterprises strictly comply with the requirements of EU regulations and GRI and TCFD guidelines and disclose high-quality environmental information. However, the results of empirical research by other authors indicate that this is not always the case and that the quality of disclosures is not satisfactory but has been gradually improving (e.g. Piřacik, 2017; Tiscini et al., 2022; Gerged et al., 2023).

Considering the importance of environmental policy evaluation in the EU (as evidenced, among others, by the substantial resources devoted to it (Schoenefeld & Jordan, 2019)) and the development of mandatory and voluntary environmental corporate reporting, it would be worth considering extending the currently required and recommended disclosures for information other than that which allows only to hold companies accountable for their environmental responsibility, especially the information that is not collected by regulatory institutions in the environmental protection. An example of such information is information on transaction costs incurred by enterprises related to specific environmental policy instruments, information on compliance costs (such as costs related to the abatement of pollutant emissions incurred by the firms) and information allowing to assess the extent to which environmental costs are passed on to product buyers. It is also recommended for standard-setters in the area of corporate external environmental reporting to provide requirements to disclose more detailed information.

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