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ESG in the public sector

Abstract

Research background and purpose: The article aims to draw attention to ESG issues in the public sector.
Design/methodology/approach: Analysis of the relevant literature, legal acts, ESG research in the public sector.
Findings: The considerations presented, but also the literature review presented in the field of ESG research in the public sector, indicate that the public sector, on the one hand, is beginning to implement ESG into its activities, and on the other hand, this sector also faces significant challenges in the future. According to the authors, ESG activities should be further intensified.
Value added and limitations: The article introduces the reader to ESG in the public sector, pointing out the most important issues that require attention.

Keywords: *ESG, non-financial disclosure, public sector*

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1. Introduction

The term ESG (Environmental, Social, Governance) refers to issues related to the environment, social responsibility and corporate governance. These are key areas of information for any stakeholder. The activities of entities in these areas generate significant risks and opportunities and are subject to evaluation by investors and other stakeholders.

Given the timeline according to which more and more entities will be subject to this obligation, an important practical and research question is whether public companies are prepared for ESG reporting. In the public sector (state and local government), we should also talk about ESG, and not just apply this scope of regulation to commercial enterprises, as we are already starting to talk about compliance or CSR in the public sector.

Regulatory focus on the environment, including its protection and the side effects of economic activity, growing public awareness of these issues, and increasingly restrictive legislation are all contributing to new efforts aimed at reducing the negative impact of companies' activities on the environment and, where possible, eliminating them altogether. As mentioned above, we are used to talking about ESG in the context of commercial enterprises (business). However, the concept of ESG is not limited to commercial entities. Using similar criteria, ESG risks can also be assessed in local government units or state-owned enterprises. It is also worth noting that ESG has been a topic for many years and is not something new. This is due to the fact that the activities of local governments in social and environmental issues are based on applicable laws. In the environmental area, local governments can mitigate climate change by ensuring the energy efficiency of buildings or investing in green energy sources. They ensure water purity through sewage treatment plants or adapt the municipality to future climate change, e.g. through a series of measures to reduce the risk of flooding or support the development of green areas. From a social perspective, Polish local governments also have tools to act, but also responsibilities to fulfill. They support marginalized or excluded groups, such as the elderly, people with disabilities, and the economically inactive. They ensure the proper functioning of health care and education by providing social services. Their tasks include the closely integrated element of social integration and caring for all residents (Sarycyn, 2023). Although the ESG framework has not yet been widely adopted in the public sector, it can create opportunities for municipalities and public utilities by attracting direct investment. Authors in this area also see a number of challenges for the future in relation to public sector entities.

The main research question posed by the authors is whether the public sector is ready to implement ESG regulations in full disclosure. The main research objectives include: first, to identify and discuss the most important environmental indicators that would be implementable in the public sector. Secondly, to present the concept of the carbon footprint. Thirdly, to indicate the benefits for the public sector of implementing ESG reporting. Fourthly, to indicate the results of research in the literature on ESG reporting by the public sector.

2. Review of literature on ESG and non-financial disclosure reporting

The ESG concept defines the scope of non-financial reporting, which a growing group of European companies are required to do, estimated to be about 50.000 companies from 2026. ESG defines specific areas and risk groups that should be included in a non-financial report. EU legal acts that create the regulatory context for the ESG concept include:

- Regulation of the European Parliament and of the Council (EU) 2020/852 of June 18, 2020, on establishing a framework to facilitate sustainable investments, amending Regulation (EU) 2019/2088 ((European Union, 2020),
- Regulation of the European Parliament and of the Council (EU) 2019/2088 of November 27, 2019, on disclosure of information related to sustainable development in the financial services sector (European Union, 2019),
- Directive of the European Parliament and of the Council (EU) 2022/2464 of December 14, 2022, on the amending Regulation (EU) No. 537/2014, Directive 2004/109/EC, Directive 2006/43/EC and Directive 2013/34/EU with regard to reporting companies with regard to sustainable development (European Union, 2022),
- European Sustainability Reporting Standards (United Nations, 2024a).

The EU's taxonomy distinguishes six main environmental goals, the achievement of which allows the assessment of activities economic activity as sustainable (Zieliński, 2023):

- climate change mitigation (reducing greenhouse gas emissions),
- climate change adaptation (offsetting the harmful effects of climate change on people and nature),
- protection of water and marine resources,
- transition to a closed-loop economy,
- pollution prevention,
- protection of ecosystems and biodiversity.

It should be noted that, within the EU structures, additional specific steps are being taken, in addition to the regulations mentioned above, to ensure an even smoother transition to a greener economy. One of the most prominent initiatives in recent years is the adoption of the European Green Deal program, which aims to achieve climate neutrality by 2050 (Krawczyńska et al., 2024). Many proposed and existing EU policies aim to achieve sustainable development goals even if they are not explicitly formulated in terms of Sustainable Development Goals (Krasodomska et al., 2023).

The standards established by the EU in the field of sustainability provide the basis for the public sector to choose and prioritize relevant sustainability topics as part of an integrated strategy.

A source of information on the company's sustainability efforts is the ESG report. The acronym refers to three factors analysed by investors and considered in investment strategies: environmental (E), social (S) and sustainability and corporate governance (G). The report primarily targets key stakeholders such as investors, financial institutions, customers, employees or local communities. ESG reporting obligation applies to:

- for 2024 - large public entities and companies with more than 500 employees and meeting 1 of 2 financial criteria: balance sheet total above €20 million and/or revenues above €40 million,
- for 2025 - all large companies (including private companies) meeting 2 of the 3 criteria: employment of more than 250 employees in a given fiscal year; balance sheet total of more than €25 million and/or annual revenues of more than €50 million,
- for 2026 - small and medium-sized companies (SMEs), with the option to postpone data collection and reporting until 2028 and 2029, respectively, meeting 2 of 3 criteria: average number of employees in the fiscal year of more than 10; balance sheet total of more than €350,000 and/or revenues of more than €700.000.

Applicability to non-EU Companies broadly, the CSRD will apply to non-EU companies (Norman et al., 2023):

- that have securities listed on an EU-regulated market (excluding EU multilateral trading facilities) or,
- that exceed one or both of two revenue thresholds (Turnover Test):
  - annual net turnover in the EU at the consolidated or individual level exceeding €150 million for each of the last two consecutive financial years and/or,
  - a qualifying EU subsidiary or branch that generated annual net turnover in excess of €40 million in the preceding financial year.

Non-EU companies caught by the first test must report starting in 2025, 2026 or 2027, depending on their size. Non-EU companies that satisfy the Turnover Test must report starting in 2029.

The concept of ESG referring to three main aspects, i.e. environmental, social and corporate governance (ESG) first appeared in the "Who Cares Wins" report in 2004 (Jain & Tripathi, 2023). The development of reporting, in particular with regard to non-financial reporting, is being widely discussed. The reasons for this are the growing criticism of traditional financial reporting, the interest of stakeholders in all resources and achievements of an entity, and the evolution of the approach to value creation (Bek-Gaik & Krasodomska, 2018).

Information is a key element of the modern world and plays a crucial role in all areas of life, including business, public and private. It is no longer just about financial information, but increasingly stakeholders are looking for so-called non-financial information about a company or public institution. Non-financial information is a term that is increasingly common in financial and accounting literature. Samelak states that non-financial information is presented in the annual report alongside financial information and relates, among other things, to economic risk, the impact of activities on the natural environment and intellectual capital (Samelak, 2013). Sobańska indicates that non-financial information can be numerical (e.g. number of employees), relative (e.g. earnings per share) or descriptive (e.g. description of operations during discontinuation) (Sobańska, 2007). The usefulness of non-financial information for the recipients of information generated by the business sector, but also by the public sector, remains an important and current issue. On the one hand, more and more attention is being paid to the fact of 'information overload', while on the other hand, it is pointed out that the information is still insufficient for a proper assessment of the entity's performance (Bek-Gaik & Krasodomska, 2018).

Research suggests that government entities inherently have a more direct connection to sustainable development goals than their private sector counterparts (Ball & Bebbington, 2008). The social value and public policy base of public organizations distinguishes them from private companies, which complicates the straightforward application of private sector sustainability disclosure practices within public organizations (Williams, 2015).

For many commercial enterprises, including state-owned enterprises and the public sector, the area of environmental reporting seems to be important among ESG indicators. In this area, the most important issue is the entity's impact on the environment and the potential challenges that environmental issues may pose to the company. The scope of reporting in this area mainly concerns greenhouse gas emissions, greenhouse gas emission intensity, energy consumption and sources, and environmental policies. Climate change reporting is suggested as a mechanism to mitigate the impact of companies on climate change, in particular carbon dioxide emissions (Baboukardos et al., 2024).

ESG risks are particularly relevant to local authorities, which manage public funds and carry out public tasks without which local communities would not be able to function. Local authorities are currently in the process of adapting to ESG risks, which are at different stages of progress. The risks of climate change, energy transition and an ageing society are just a few examples of ESG risks affecting local authorities (Zioło et al., 2024).

The issue of public sector efficiency is also becoming crucial. The performance of public organizations can be viewed from different perspectives: performance as production, performance as competencies/capacity, performance as good results and performance as sustainable results (Dubnick, 2005).

It should also be noted that the so-called European Green Deal is part of the ESG implementation strategy throughout the European Union. The key issue of the Green Deal is the significant emphasis placed on the fight against climate change, but this also has financial implications. This creates an opportunity for businesses and local authorities to intensify their investment in environmentally friendly technologies or to introduce cleaner, cheaper and healthier forms of public transport, as well as for better administration.

3. Key environmental indicators of ESG

As already mentioned, climate change is one of the greatest challenges of our time, creating both significant risks and opportunities for companies and the public sector. Regulatory changes therefore contribute in practice to the growing market demand for information and indicators to assess how companies and public sector entities manage climate-related issues. Among other things, stakeholders want to know whether companies (GWP, 2023):

- whether this could be jeopardized by a tightening of regulations and CO_2 emissions trading prices, for example as a result of regulatory penalties or asset impairments,
- taking physical climate risks into account as part of processes aimed at ensuring business continuity and increasing an entity's resilience to external risks,
- exploiting opportunities associated with climate change, such as investing in innovative technologies or developing new products and services.

Table 1 shows and discusses environmental indicators directly related to climate change, which the public sector should also pay attention to.

Table 1. **Environmental indicators directly linked to climate change**

Environmental indicators directly linked to climate change:		
Indicator	**Definition**	**The minimum disclosure applies to:**
E-P1 Managing climate change issues	In preparing climate-related disclosures, companies should make use of materials such as TCFD recommendations, ESRS standard E1 Climate Change and/or IFRS S2	Climate-related disclosures that provide detailed explanations for aspects such as governance, strategy, risk management, and targets and indicators.

E-P2 Greenhouse gas emissions	Greenhouse gas emissions represent the total sum of direct and indirect greenhouse gas emissions. They can be divided into Scope 1, Scope 2 and Scope 3 emissions.	• Methods and assumptions used in calculating emissions. • Scope 1, 2, and 3 emissions (if relevant) for the last 3 years to allow evaluation of the trend over time. • A relevant explanation if there has been a significant change in the value of the issue (both increase and decrease). • It is recommended that companies use international standards for calculating and disclosing greenhouse gas emissions, such as the GHG Protocol or the ISO 14064-1:2018 standard.
E-P3 Intensity of greenhouse gas emissions greenhouse gases	Greenhouse gas intensity is the amount of greenhouse gas emissions per unit of economic activity.	• Methods and assumptions used in the calculations. • The ratio of greenhouse gas emissions intensity to revenue.
E-P4 Energy consumption and its sources	Energy consumption is the total amount of energy used in an organization. It includes both energy purchased from suppliers and generated internally.	• Methods and assumptions used in calculating energy consumption. • Total energy consumption in the organization (in MWh). • Percentage (%) of energy consumed by energy type (i.e., renewable and non-renewable sources, energy).
Environmental indicators directly linked to climate change:		
Indicator	**Definition**	**The minimum disclosure applies to:**
E-P5 Environmental policy	An environmental policy is a formal document that sets out a company's commitments and approach to managing environmental aspects	• Has the company adopted an environmental policy. • Compliance with relevant environmental laws and regulations. • Commitment to manage and mitigate adverse environmental impacts. • Implementation of a management system for environmental issues. • Monitoring of results. • The company's expectations of suppliers and business partners in managing environmental issues.
E-D1 Water consumption	Water consumption means the total amount (in m3) of water used in the enterprise.	• The total amount of water used in the enterprise (in m3). • Percentage of water recycled and reused in relation to total water withdrawal.

E-D2 Water resources management	Water stewardship refers to the process a company has implemented to optimize water consumption and thereby minimize its environmental impact. It includes measures to reduce water consumption, increase water circulation (through reuse and recycling) and conserve water resources.	• Whether the company has adopted and implemented a water management program and what activities comprise it. • Companies operating in water-scarce areas should also disclose how they are identifying and mitigating the associated risks.
E-D3 Impact on biodiversity	Biodiversity, according to the United Nations Convention on Biological Diversity, is defined as "a term for the diversity of life forms on Earth in their natural shape and form." It includes species, genetic and ecosystem diversity.	• Does the company's operations negatively impact biodiversity (directly or indirectly through the supply chain) and what are the main reasons for this. • Has the company implemented a policy to protect and restore biodiversity and counter deforestation, and does it extend to suppliers.
E-D5 Waste management	Waste management refers to a range of activities to monitor, manage and reduce waste (including reuse or recycling) generated within a company.	• Amount of hazardous waste and other waste produced (in tons). • Percentage of waste (%) by disposal method (e.g., recycled, landfilled). • A description of the measures taken to manage waste and comply with relevant regulations.

Source: authors' work based on GPW (2023)

The concept of carbon footprint originated in 2005 during the debate on monitoring and controlling greenhouse gas emissions. The origin of the term carbon footprint (CF) is related to ecological footprint (Zarczuk & Klepacki, 2021). The ecological footprint indicates how much of the planet's resources are being consumed (Popławski & Rutkowska, 2017).

It should be noted that the technical and scientific aspects of greenhouse gas accounting are complex. It is a fairly new area of research. The Greenhouse Gas Protocol (GHG Protocol), which is used in practice, stands out as the most commonly used standard for calculating and reporting carbon dioxide emissions. GHG is a carbon footprint calculation standard that contains requirements and guidelines for estimating greenhouse gas emissions according to the following scopes:

- **Scope 1 Emissions** (direct emissions resulting from):
  - combustion of fuels in stationary installations,
  - combustion of fuels in vehicles belonging to the organization's fleet.
- **Scope 2 Emissions** (indirect emissions resulting from):
  - generation of electricity and heat supplied to the company by an energy supplier.

- **Scope 3 Emissions** (other indirect emissions resulting from):
  - extraction or production of raw materials or products,
  - production of capital goods,
  - employee commuting or business travel,
  - management of production waste,
  - use of products produced by companies,
  - final use of packaging or products.

Figure 1 shows the concept of a company's total GHG emissions, which make up the GHG methodology.

In terms of disclosures regarding the management of climate change issues (E-P1), managers of state-sector companies and local government companies should, as a rule, include statements from the management boards that managers are aware of the impact of the climate on the companies' activities, as well as the impact of the risks associated with climate change on the companies' activities. Managers should also gear non-financial reports towards stakeholders' expectations regarding reporting the impact of the company's operations on the environment itself.

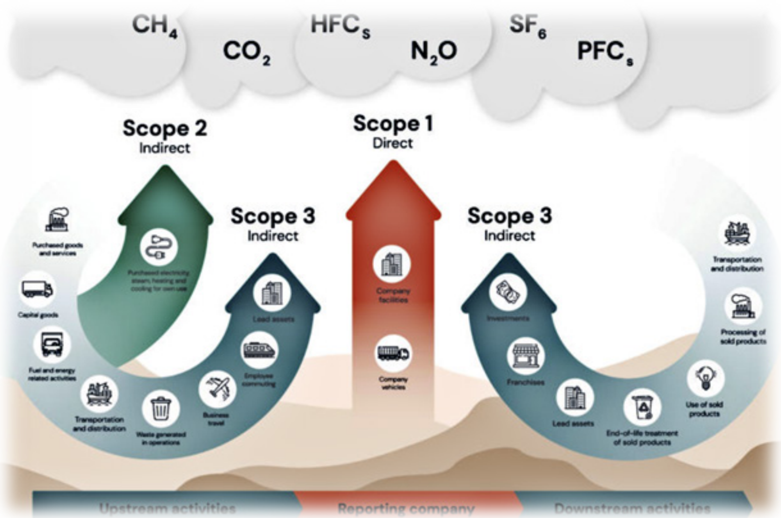

Figure 1. **Concept of a company's total GHG missions**

Source: Doeing (n.d.)

The energy consumption of state-owned and local government companies should, in principle, also be an important area of environmental reporting. These companies should also implement strategies to reduce energy consumption or activities aimed at reducing energy intensity, while reporting hard figures to confirm this.

4. What ESG means for the public sector

Nowadays, when sustainability and responsible management are at the forefront of global discussions in public debates, the public sector, as already mentioned, is not free from reporting increasing expectations related to environmental, social and corporate governance (ESG) principles coming from this sector. Environmental, social, and governance (ESG) risk is becoming increasingly important in conditions of ongoing environmental and social change. This has specific implications for risk management in the public sector .

State and local government entities play a key role in implementing and supporting the concept of sustainable financing, but they also recognize the special role of non-financial risks (so-called ESG - Environmental, Social, Governance risk), which include environmental, social and corporate governance risks (Filipiak & Zioło, 2021. The literature on the subject indicates that ESG factors are linked to the three main pillars of sustainable development (Kates et al., 2005). The public sector has been given the power to achieve sustainable development goals and has become a kind of change maker (Report from the international conference on financing development).

Traditionally, ESG reporting has been associated with the corporate world, but it can be seen that public sector entities are also increasingly recognizing the importance of demonstrating their commitment to sustainable development. It can also be argued that the ability to measure, report and audit sustainability data should focus on the most significant impact of the public sector on ESG.

ESG covers a wide range of topics, including:

1. Environmental: climate change, emission of greenhouse gases, energy and water consumption, environmental pollution, waste management, biodiversity.
2. Social: human rights, labor relations, diversity and inclusion, community involvement, public health, education
3. Management: transparency and accountability, financial management, risk management, anti-corruption.

ESG in local government means (Ludwiczak, 2021):

- in terms of the environment - low-carbon public transportation, sewage treatment plants, clean air, environmental zoning plans, waste management, etc.,
- in social responsibility – involving citizens in the implementation of projects, participatory budgeting, creating good practices in employment, smart cities, health services, etc.,

- in corporate governance – sustainable financing, corporate governance of municipal companies, diversity in the composition of management boards, combating corruption, transparency, etc.

Nevertheless, the challenges of ESG reporting for the public sector must be addressed, and these challenges can and do relate to many issues. The primary challenge in the public sector is often the lack of financial resources. But the deficit can also be attributed to a lack of specialized staff and expertise.

Another key issue is the current lack of standardized information reporting, for example, there is a lack of standardized ESG reporting. This can make it difficult to compare ESG performance with that of others.

There may also be a lack of awareness among employees or management about the importance of ESG reporting.

The public sector has a unique role and responsibility in addressing global challenges through ESG. The authors believe that the public sector, as the largest spender (for example, in terms of infrastructure investment), employer (in Poland, nearly 20% of the total workforce works for the public sector), but also as a key service provider for society and business, the public sector has the potential to influence and shape the behavior and expectations of other sectors and stakeholders.

A very crucial issue that cannot be overlooked, also in the public sector, is the financing and raising of funds for investments, including, above all, infrastructure investments. In this context, the so-called Paris Agreement or the so-called Green Deal should be mentioned, which constitute a kind of path to achieving climate neutrality of the European economy, including zero emissions for the EU by 2050. To realize these goals, the flow of capital needs to be redirected towards more sustainable investments. This is reflected in regulatory requirements and guidelines for the European financial sector in the area of ESG, which put pressure on the financial sector to play a leading role in financing the 'green transformation'.

In this regard, a report by the auditing firm PricewaterhouseCoopers (2024) entitled 'Green finance the Polish way' provides very interesting conclusions, among which the following should be mentioned:

- Implementation of regulatory and supervisory guidelines and development of a green product range are the priority areas on which banks plan to focus their activities in 2024 (75% and 67% of respondents, respectively). In third place is the implementation of the adopted ESG strategy (58%).
- Banks take ESG risk assessment into account in key areas of their operations and where required by current regulations, i.e. in credit processes (100%), strategy or business model updates (83%) and new product approval processes (67%).
- Banks play an important role in redirecting financing from high-emission sectors to more sustainable ones, not only through an appropriate product offering or raising customer awareness, but also by actively supporting the transformation

of their customers. The vast majority of the surveyed entities (75%) declare that they have introduced additional services to support the transformation of their customers.

As indicated by Filipak and Zioło (2021), the public sector, including the public pillar of the financial system, fulfils several key functions in the field of ESG, including:

- functions of a creator of new values – changes through legal regulations, publication of good practices, as well as organizational and regulatory activities, approach, understanding and practice related to perception, analysis, mitigation and preparation for ESG risks;
- the classic allocation function – the state influencing the allocation of resources in the economy, taking into account the policy of sustainability and social responsibility, through the imposition of tax burdens or the distribution of production factors (labor and capital) among various tasks, enabling an increase in the level of social awareness in the field of social responsibility, but also the wealth of society;
- a stimulating function – influencing the economy, including the market pillar of the financial system, in terms of adjusting to the sustainable development policies implemented by each Member State;
- a stabilizing function – based on influencing the economic situation through the use of public policies dedicated to balanced development, conducting policies to counteract economic fluctuations (stabilization of the economy) using new and already built-in automatic stabilizers of the economy;
- an informative function – by promoting and publishing information on the implementation of sustainability principles, social responsibility and good practices, as well as promoting the principles of social responsibility, principles resulting from 'good governance' and the promotion of human rights. Within the framework of this principle, it is also important to promote the measures already taken by governments, to point out their effects and the positive and negative consequences associated with the positive and negative external effects of ESG risks.

It is also worth mentioning the results of the research presented in the report of the Warsaw School of Economics (Gemra et al., 2024) concerning the maturity of ESG management in local government units. The research indicated, among other things, that:

1. Local governments are still not very focused on managing ESG aspects in the context of building urban resilience to the climate crisis.
2. In local government, the holistic approach to the development strategy and its links to sustainable development and other documents requires many changes.
3. Many activities carried out and related to sustainable development stem more from the need to implement laws than from the adoption of the implementation of goal 11 of sustainable development as a priority.

4. There is still a great need for education in local government units on sustainable development, highlighting the links between local government unit activities and sustainable development and ESG.
5. There is not much interest from local authorities in green financing.

The authors also want to point out key aspects of accounting policy in terms of managerial decisions (management), including key elements to be taken into account in the accounting policy of public sector enterprises:

- defining the scope of ESG reporting - the accounting policy should take into account which ESG areas are relevant to the entity and how data from these areas will be collected and analyzed;
- detailed rules for recording ESG-related costs and revenues - the accounting policy records should define the rules for allocating costs and revenues to individual sustainability activities. This may include, for example, separate accounts for expenses to reduce greenhouse gas emissions;
- definition of methods for measuring ESG impacts and risks - the accounting policy should define how the entity will measure ESG-related risks and opportunities, which may include, for example, greenhouse gas emissions and climate risks;
- the principle of 'double materiality' - the CSRD requires the reporting of data from the perspective of both the environmental impact of the activity and the financial impact on the entity. The accounting policy should take these principles into account and define the methods of recording them.

As indicated in the literature on the subject, the scope of ESG issues should be taken into account by the public sector, including in the scope of: evaluation of urban policies and accompanying projects, financing of public (national) projects, but also at the local level, ensuring inclusive public services (De Nicolo, 2021). As Wasiuta points out, in the sphere of limiting the effects of environmental risk, the dominant role in this respect is played by instruments that are also classified as economic instruments of environmental policy, and which the public sector should look into, i.e. eco-taxes and eco-fees, subsidies or environmental insurance (Wasiuta, 2015). Co istotne również, pomiar wyników odgrywa kluczową rolę w reformie sektora publicznego (Van Dooren et al., 2015; Bouckaert & Peters, 2002; Lapsley & Wright, 2004).

The considerations presented, but also the research results, indicate that the public sector, on the one hand, is beginning to implement ESG in its activities, and on the other hand, this sector also faces significant challenges in the future. In the authors' opinion, ESG activities should be intensified even more.

5. Conclusions

ESG reporting, including environmental reporting, is currently of great importance to stakeholders in both the private and public sectors. Environmental responsibility has become a key issue in today's world. Individuals should, above all, act in a way that minimizes their negative impact on the environment. Given current European Union policy, the provision of comprehensive and factual information on their environmental impact by private and public sector entities enables them, among other things, to access EU funds.

In the public sector (state and local government), we should also talk about ESG, and not just apply this scope of regulation to commercial enterprises, as we are already starting to talk about compliance or CSR in the public sector.

Using similar criteria, ESG risks can also be assessed in local authorities or state-owned enterprises. It is also worth noting that ESG has been a topic for many years and is not something new.

Although the ESG framework has not yet been widely adopted in the public sector, it can create opportunities for municipalities and public utilities by attracting direct investment.

The standards established by the EU in the field of sustainable development provide a basis for the public sector to select and prioritize relevant sustainable development topics as part of an integrated strategy.

ESG risks are particularly relevant for local authorities, which manage public funds and carry out public tasks, without which local communities would not be able to function. Local authorities are currently in the process of adapting to ESG risks, and are at different stages of progress.

The implementation of ESG principles and reporting as widely as possible creates an opportunity not only for companies, but also for the public sector, including local authorities, to intensify investment in environmentally friendly technologies or the introduction of cleaner, cheaper and healthier forms of public transport, as well as for better administration.

State and local government entities play a key role in implementing and supporting the concept of sustainable financing, but they also recognize the special role of non-financial risks.

The main challenge in the public sector with regard to ESG is often the lack of financial resources or full knowledge of ESG among the staff, especially the benefits of implementing ESG principles.

The considerations in the article indicate that the public sector, on the one hand, is beginning to implement ESG into its activities, and on the other hand, this sector also faces significant challenges in the future.

Authors' contribution

All authors participated in: article conception, theoretical content of the article, research methods applied, conducting the research, data collection, analysis and interpretation of results, draft manuscript preparation.

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