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Sustainability Assessment Framework for Hungarian Energy Companies in the Context of European Taxonomy Regulation

István Vokony [*+]
Kristóf Péter Juhász [**]
Mária Szalmáné Csete [***]

Abstract: *The EU aims to reduce net emissions by at least 55% by 2030 from 1990 levels and become the first climate-neutral continent by 2050. The EU Taxonomy Regulation mandates large companies to disclose their sustainability activities in reports starting 2023. This study examines major Hungarian energy companies (MVM, E.ON, ALTEO, MOL), which represent over 80% of the national energy sector, assessing their sustainability through a framework that evaluates the reliability, accuracy, and clarity of their sustainability reports. It analyzes their key performance indicators (Turnover, CAPEX, OPEX) and sustainable activities as defined by EU Taxonomy. Findings suggest that mandatory sustainability reporting is vital for achieving EU targets, but additional indicators are necessary for enhanced accuracy and comparability.*

Keywords: Sustainability; EU Taxonomy Regulation; Assessment Framework; Energy Industry; Fit For 55

JEL Classification: Q56

Introduction

In terms of sustainability, we have reached the point where if we don't act now, we won't be able to act later. The European Union has committed itself to becoming a climate neutral continent by 2050, with the first Climate Law, the European Green

[*] Budapest University of Technology and Economics, Budapest, Hungary.
[+] Corresponding Author E-Mail: vokony.istvan@vik.bme.hu
[**] Budapest University of Technology and Economics, Budapest, Hungary.
[***] Budapest University of Technology and Economics, Budapest, Hungary.

Deal, that defines the blueprint for this transformational change ('Fit for 55' European Comission et al., 2021). In order to achieve this ambitious target, they pledged to reduce emissions by at least 55% by 2030, compared to 1990 levels, with the adoption of this EU Taxonomy. The EU taxonomy is a keystone of the EU's sustainable finance framework and a vital market transparency tool. It supports direct investments in the economic activities most needed for the transition, in line with the European Green Deal objectives.

However, to achieve the 2030 reduction, higher shares of renewable energy and greater energy efficiency are required (European Green Deal European Comission et al., 2021). To gain a higher percentage, the EU is encouraging Member States and has set a 40% target at the European level. In this light, we will be able at EU level to achieve an overall reduction of 36-39% for final and primary energy consumption by 2030.

Member States can support the green transformation through various support tax systems (D-G for Taxation European Comission et al., 2021), but companies will make the real change with significant emissions, such as the energy sector. Companies contribute to sustainability to varying degrees through their activities. To benchmark these, the EU Taxonomy Regulation has made it mandatory for companies to publish the extent to which their business is considered sustainable.

The role of the key performance indicators (KPIs) in the EU Taxonomy (Commission Delegated Regulation et al., 2021) would be objective comparability, but in the light of the main profile of the company, this may be misleading and not necessarily reflective of reality. In this paper, large energy companies in Hungary were compared on the basis of their sustainability reports and KPIs, and the extent to which the objective KPI values reported are unbiased was investigated.

In addition to the regulatory background, recent literature (2023–2026) highlights increasing challenges in the practical application of the EU Taxonomy, particularly regarding comparability and sector-specific biases. While taxonomy-aligned KPIs (Turnover, CAPEX, OPEX) provide a standardized framework, several studies emphasize that they may distort performance evaluation across heterogeneous energy business models, especially when comparing asset-heavy fossil-based companies with network-oriented operators (Barker et al., 2023; Schoenmaker & Schramade, 2024). The introduction of the Corporate Sustainability Reporting Directive (European Commission, 2024) and the European Sustainability Reporting Standards (EFRAG, 2023) significantly enhances transparency and data availability, but also increases reporting complexity. Recent research also underlines the importance of integrating ESG metrics with financial indicators to ensure decision-useful reporting (Boffo & Patalano, 2023; Krueger et al., 2023). Furthermore, global transition analyses (IEA, 2024; NGFS, 2025) suggest that static KPI-based assessments are insufficient to capture dynamic transition pathways. These findings support the argument that while the EU Taxonomy is a critical step forward, further methodological refinement is necessary.

Content of the EU Taxonomy indicators

The EU taxonomy lets financial and non-financial companies have a common standard definition of economic activities that can be considered environmentally friendly. With the adoption of this EU Taxonomy Regulation, large companies will be required to publish the extent to which their business is considered sustainable. According to Point 1.2 of Annex I of Delegated Regulation (EU) 2021/2178 (Commission Delegated Regulation et al., 2021), companies are required to present the following EU Taxonomy relevant financial key performance indicators: Turnover KPI, CAPEX (capital expenditure) KPI, OPEX (operating expenditure) KPI.

- The content of the turnover KPI (Turnover KPI) according to the given international accounting standards:
  - IFRS 15 – Revenue from contracts with customers;
  - IFRS 16 – Leases;
  - Other revenue.
- Content of the capital expenditure KPI (CAPEX KPI) according to the international accounting standards provided:
  - IAS 16 – Property, plant and equipment;
  - IAS 38 – Intangible assets;
  - IFRS 16 – Leases;
  - IAS 40 – Investment property;
  - IAS 41 – Agriculture.
- Content of the operating expenditure KPI (OPEX KPI):
  - R&D expenditure;
  - Building renovation measures;
  - Direct non-capitalised costs related to maintenance and repair;
  - Any other direct expenditure relating to the day-to-day servicing of assets, including property, plant and equipment, by the enterprise or, in the case of outsourcing, by a third party carrying out the activities, which is necessary to ensure the continuous and effective operation of such assets;
  - Short-term leasing.

According to article (Brühl et al., 2023), the different KPIs are illustrated with formulas, which we have reproduced for better understanding. The first KPI is shown in equation (1), the second in equation (2) and the third in equation (3).

$$\text{Turnover KPI} = TA/T \tag{1}$$

$$\text{CAPEX KPI} = CTA/C \tag{2}$$

$$\text{OPEX KPI} = OTA/O \tag{3}$$

The turnover-related KPI can be calculated as the ratio of the share of net turnover, as derived from products or services, including intangible goods, related to taxono-

my-adjusted economic activities (TA), divided by net turnover (T). The net turnover is defined in Point 5 of Article 2 of Directive 2013/34/EU (European Comission et al., 2013), where 'net turnover' refers to the total revenue generated from product sales and service provision, with sales rebates, value-added tax, and other turnover-related taxes deducted.

The KPI for capital expenditure is the fraction referred to in point (b) of Article 8(2) of Regulation (EU) 2020/852 (European Parliament et al., 2020). The denominator includes all company capital expenditures (C), meaning all investments in tangible and intangible assets during the company's financial year, including depreciation, amortization, revaluation, and impairment before any impairment losses. Any additions related to business combinations must be included.

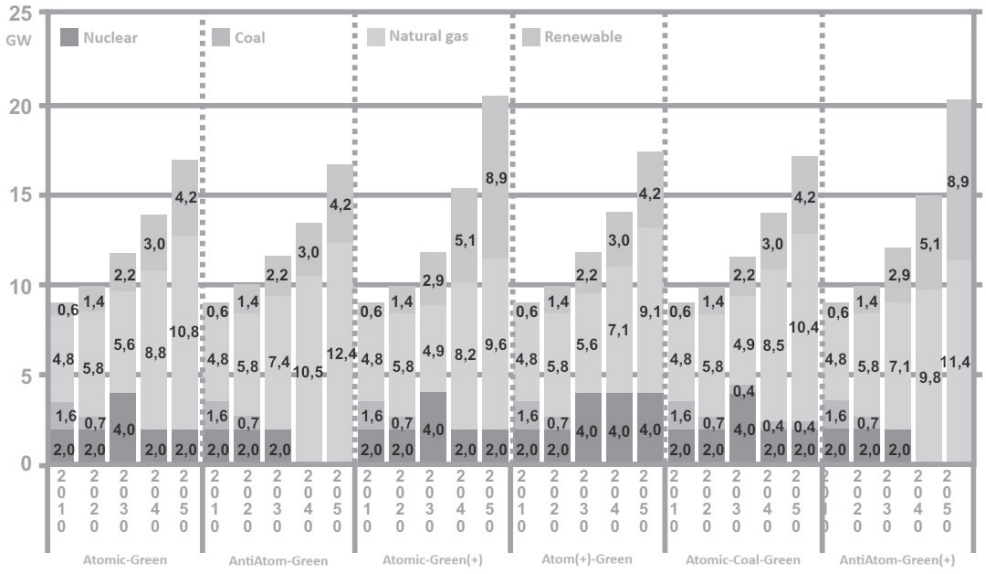
The KPI for operational expenditure is the share referred to in Point (b) of Article 8(2) of Regulation (EU) 2020/852 (European Parliament et al., 2020). The denominator (O) must encompass direct, non-capitalized costs related to research and development, building renovation measures, short-term leasing, maintenance, and repairs, as well as any other direct expenses associated with the daily maintenance of properties, machinery, and equipment inventories by the business or a third party to whom the activities have been outsourced, and that are necessary to ensure the continuous and efficient operation of such assets. The numerator is defined as the portion of the operating expenditure included in the denominator that falls into any of the following categories: expenses associated with assets or processes related to Taxonomy-aligned economic activities, which may include training, human resource adaptation needs, and direct non-capitalized research and development costs; expenses that are part of the capital expenditure plan aimed at expanding Taxonomy-aligned economic activities or facilitating the transformation of Taxonomy-eligible economic activities into Taxonomy-aligned ones; costs related to the procurement of output from Taxonomy-aligned economic activities and individual measures promoting low-carbon practices or greenhouse gas reductions, as well as specific building renovation initiatives. It's important to note that research and development costs already considered within the CAPEX KPI should not be included in the OPEX calculation.

With the adoption of this EU Taxonomy Regulation (Commission Delegated Regulation et al., 2021), large companies will be required to publish the extent to which their business is considered sustainable from 2023. Companies report on the percentage of their financial indicators that come from activities that contribute to sustainability according to the EU Taxonomy. Thanks to these well defined KPIs, different companies can be compared. Due to the relative percentages (Turnover KPI, CAPEX KPI, OPEX KPI), this comparability is theoretically unbiased for all participants. In the next chapter, we look at the activities and KPIs of large energy companies in Hungary.

Major participants in Hungary's Energy Sector

The current National Energy Strategy 2030 (NES) for Hungary (Ministry of National Development et al., 2012) was published in 2020, placing clean, smart, and affordable energy at its core. Thus, the most important strategic objectives include strengthening energy sovereignty and security, maintaining the results of reducing utility costs, and decarbonizing energy production through the combined use of nuclear energy and renewable energy sources. The strategy outlines the transformation of the domestic energy sector by 2030 based on the proposed energy mix. By using solar and nuclear energy in tandem, by 2030, 90% of electricity production in Hungary can be carbon-free, contributing to the climate neutrality of the European continent.

Figure 1: Hungary's expected power generation capacity by different energy mixes



Source: Ministry of National Development et al., 2012

Hungary has set the goal in the National Energy and Climate Plan (NECP) not to exceed its final energy consumption of 785 PJ from 2005 by 2030. To achieve this, an annual energy saving rate of 0.8% and an additional 7 PJ of new savings, assuming lifetime policy measures covering the entire period, are required from 2021 to the end of 2030. Energy efficiency programs and measures introduced during the 2014–2020 period resulted in approximately 3-4 PJ of final energy savings annually, so in the period starting from 2021, roughly double the current savings are needed. Therefore, on January 1, 2021, the introduction of the Energy Efficiency Obligation

Scheme (EEOS) in line with the energy efficiency directive began. The essence of the scheme is that obligated parties must implement programs and measures that result in verified energy savings on the consumer side.

In the following subsection, we present the major energy companies in Hungary and what actions are considered sustainable. The previously discussed EU Taxonomy KPIs for each company are also presented.

MVM in the pursuit of sustainability

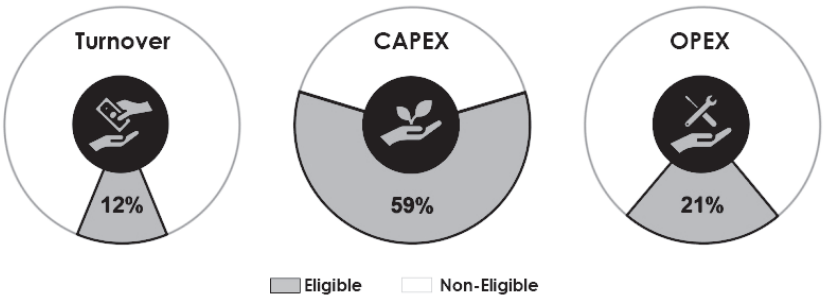
The parent company of the MVM Group is MVM Zrt. (MVM Energy Ltd.), which is 100% state-owned. The group covers almost the entire energy sector, from electricity generation (nuclear, fossil, renewable), transmission, system management, distribution, universal service and gas storage to competitive electricity and gas trading. In addition, some companies of the MVM Group provide technical, IT and telecommunications services as well as business services. The MVM Group's strategic objective is to strengthen the Group's international presence and visibility. The MVM Group's vision is to become the leading energy and infrastructure provider in the Central European region by 2030, based on carbon-neutral solutions (MVM et al., 2022).

In summary, the collective efforts against climate change, the dynamics of urbanization, advancements in mobility, evolving customer preferences, the pervasive influence of digitalization, technological progress spanning various industries, and the escalating demand for energy collectively serve as the primary forces molding the future trajectories of nearly all economic entities (IPCC et al., 2023). The main interrelated megatrends affecting the MVM Group are decarbonization, electrification, the convergence of energy systems, decentralization, digitalization and increasingly democratic energy systems. The energy regulatory environment impacts the MVM Group's strategy in many respects.

Decarbonization efforts have significant implications for grid development and flexibility and may enhance price volatility. The reliability of renewable generation forecasting, and the speed of system balancing will be enhanced. A significant part of the future power plant capacity to be installed across Europe for decarbonization purposes will be renewable (industrial and domestic), but with the acceleration of decarbonization programs, nuclear capacity will also play an important role in the European, and in particular the Hungarian, energy system.

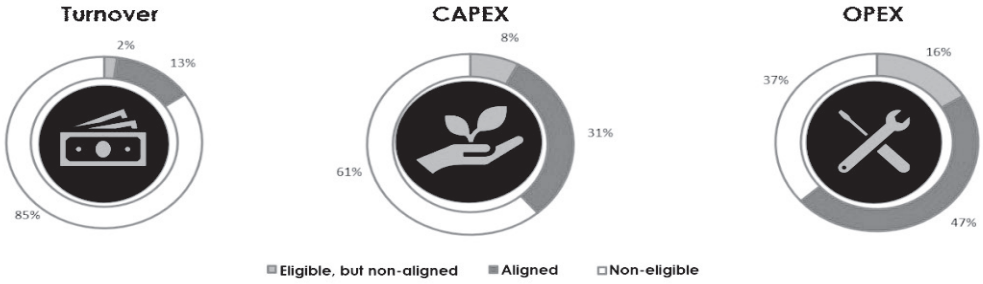
The MVM Group's Integrated ESG (Environmental, Social and Governance) Report included an assessment of all relevant activities carried out by the MVM Group to determine whether they contribute significantly to climate change mitigation and meet the EU Taxonomy criteria. For the financial year 2022, the analysis has been performed considering the significant contribution to the environmental objective of climate change mitigation, no activities that contribute significantly to climate change adaptation have been identified.

Figure 2: EU Taxonomy KPI values for the MVM Group for the financial year 2021



Source: MVM et al., 2022

Figure 3: EU Taxonomy KPI values for the MVM Group for the financial year 2022



Source: MVM et al., 2022

According to the MVM Group, the **Table 2** shows the activities that are considered to fit the EU Taxonomy criteria. In the light of the activities carried out, the EU taxonomic KPIs have been defined by the MVM Group and these are shown in the **Fig. 2** and **Fig. 3**.

ALTEO in the pursuit of sustainability

ALTEO is a Hungarian-owned energy services and trading company with a modern approach. Its business activities include the production and trade of energy based on renewable energy sources and natural gas, as well as energy services and developments tailored to individual corporate needs. The company provides a reliable, environmentally responsible energy supply to its customers based on the sustainable use of renewable energy, which range from small and medium-sized domestic enterprises to large corporations. It provides its partners with the highest quality and most innovative services thanks to its own optimally designed assets and its control centre. In

recent years, these have included innovative business areas such as e-mobility, waste management and scheduling, which are steps forward a circular economy (ALTEO et al., 2022).

ALTEO quantified the share of turnover of taxonomy-adjustable activities by taking into account the net turnover from products or services, including intangible assets of the business activities. For electricity generating activities, turnover was determined according to the mode of generation. The calculation of the taxonomy-adjustable turnover ratio was based on the electricity sold to MAVIR, guarantees of origin sold to third parties for activities related to electricity generation and the turnover data for the activity related to the installation of electric vehicle charging stations.

For the taxonomy-adjustable activities, ALTEO took into account direct CAPEX costs, which exclude central management activities and the costs of maintenance and upkeep of central office buildings. Investments that have not yet generated revenue in 2021 have also been taken into account. CAPEX costs of taxonomy-adjustable activities consist of property, plant and equipment.

For the taxonomy-adjustable electricity generation (OPEX), ALTEO considered the direct costs of the relevant power plants, including primarily but not exclusively costs related to operation and decommissioning, possible insurance proceeds and non-income tax type charges (ALTEO et al., 2021).

According to the ALTEO Group, the **Table 2** shows the activities that are considered to fit the EU Taxonomy criteria.

MOL in the pursuit of sustainability

The MOL Group is an integrated, Budapest-based international oil and gas company with a dynamic international workforce of 25,000 employees in more than 30 countries and an industry history of more than 80 years. The relatively low proportion of MOL's activities aligned to the taxonomy is due to the conservative approach taken in reporting the respective KPIs and the fact that the taxonomy framework is not yet finalized.

In the year 2022, taxonomy-adjusted activities accounted for 9.0% of group turnover, 5.3% of OPEX and 15.4% of CAPEX. The relatively low compliance is mainly due to the fact that a significant part of the MOL Group's activities are still related to the oil and gas industry, the taxonomy framework has not yet been finalized, and a conservative approach has been taken in the analysis and reporting process (MOL et al., 2022). The activities that aligned to the taxonomy or can be eligible with the taxonomy but are not aligned are summarized in **Table 2**.

E.ON Hungary in the pursuit of sustainability

E.ON Hungary is a member of the international E.ON Group. The international E.ON Group is one of Europe's largest energy network and infrastructure operators, providing innovative solutions to more than 50 million customers. In 2021, the international E.ON Group will begin to assess what percentage of its operations fall under the definition of sustainable activities under the European Union's Taxonomy Regulation and what percentage of its assets, investment amounts and revenues are considered sustainable under this definition. E.ON Hungary has its own Sustainability Report (E.ON et al., 2021), but this document does not specifically include the KPIs defined under the EU Taxonomy. E.ON has defined the following values for the entire international E.ON Group in the (E.ON et al., 2022) Integrated Annual Report.

- EU taxonomy aligned CAPEX: 97% and 98% in 2021 and 2022;
- EU taxonomy aligned OPEX: 98% and 97% in 2021 and 2022;
- EU taxonomy aligned sales: 99% and 97% in 2021 and 2022.

EU taxonomy KPIs of Hungarian companies

In this chapter, we have seen how the indicators defined in the EU Taxonomy compare for energy companies with different profiles. It can be seen that the roles of the core functions (e.g. DSO) determine these KPIs by default. Energy companies engaged in traditional energy production and generation are at a disadvantage compared to system operators that manage themselves in a more "flexible" way.

The KPI calculation method defined in the EU Taxonomy allows different companies to be compared. These indicators can be observed in the table below.

Table 1: Comparative table of EU taxonomy KPIs of Hungarian companies

		2021		2022	
		aligned	eligible. non-aligned	aligned	eligible. non-aligned
MVM	EU Taxonomy turnover	12.00%		13.00%	2.00%
	EU Taxonomy CAPEX	59.00%		31.00%	8.00%
	EU Taxonomy OPEX	21.00%		47.00%	16.00%
ALTEO	EU Taxonomy turnover	13.68%		5.60%	2.00%
	EU Taxonomy CAPEX	29.37%		17.50%	0.00%
	EU Taxonomy OPEX	4.08%		2.20%	0.00%
MOL	EU Taxonomy turnover	14.50%		0.20%	8.80%
	EU Taxonomy CAPEX	15.50%		4.80%	10.60%
	EU Taxonomy OPEX	5.10%		1.20%	4.20%
E.ON	EU Taxonomy turnover	99.00%		97.00%	
	EU Taxonomy CAPEX	97.00%		98.00%	
	EU Taxonomy OPEX	98.00%		97.00%	

The highest numbers can be found at E.ON. This can be explained by the fact that investments and operations in the distribution role can be easily linked to sustainable activities. In contrast, MOL, whose main profile is oil refining and consumption, has lower KPIs. This may be explained by the relatively low proportion of MOL's activities aligned to the taxonomy, due to the conservative approach to reporting the relevant KPIs and the fact that the taxonomic framework has not yet been finalized.

Table 2: Summary table of activities (aligned and eligible, but non-aligned)

Activity	Code	MVM						ALTEO						MOL					
		Turn.		CAPEX		OPEX		Turn.		CAPEX		OPEX		Turn.		CAPEX		OPEX	
		ali.	eli.	ali.	eli.	ali.	eli.	ali.	eli.	ali.	eli.	ali.	eli.	ali.	eli.	ali.	eli.	ali.	eli.
Production of renewable energy technologies	3.1		x																
Manufacturing of energy efficiency equipment for buildings	3.5	x		x		x													
Iron and steel production	3.9		x																
Hydrogen production	3.10				x											x			
Production of organic chemicals	3.14														x	x	x		x
Production of plastic raw material	3.17													x	x	x	x	x	x
Production of electricity using photovoltaic solar energy technology	4.1	x	x	x	x	x	x	x		x		x		x		x		x	
Production of electricity from wind energy	4.3	x				x		x		x		x					x		
Production of electricity from hydropower	4.5		x		x		x	x		x		x							
Production of electricity from geothermal energy	4.6				x														
Electricity generation from non-fossil renewable gaseous and liquid	4.7				x														
Production of electricity from bioenergy	4.8				x														
Transmission and distribution of electricity	4.9	x	x	x	x	x	x										x		
Storage of electricity	4.10				x				x				x						
Transport and distribution networks for renewable and low-carbon gases	4.14															x	x		
District heating/distribution of district cooling	4.15		x		x		x												
Cogeneration of heat/cooling energy and electricity from bioenergy	4.20		x																
Production of thermal/cooling energy from bioenergy	4.24		x				x												
Production of thermal/cooling energy from waste heat	4.25		x				x												
Production of electricity from nuclear energy in existing installations	4.27		x																
Production of electricity from nuclear energy in existing installations	4.28	x		x	x	x													

Production of electricity from fossil gaseous fuels	4.29		x		x		x								x		x		x
High efficiency cogeneration of heat or cooling energy and electricity from fossil gaseous fuels	4.30		x		x		x								x				x
Production of heating or cooling energy from fossil gaseous fuels in efficient district heating and cooling systems	4.31				x														
Construction, extension and operation of water collection, treatment and supply systems	5.1																x		
Construction, extension and operation of waste water collection and treat-ment plants	5.3																x		
Renovation of wastewater collection and treatment systems	5.4																x		
Collection and transport of non-hazardous waste at source in separate fractions	5.5							x				x							
Composting of bio-waste	5.8				x														
Material recovery of non-hazardous waste	5.9								x				x	x				x	
Operation of infrastructure for landfill gas capture and use in landfill cells	5.10							x		x		x							
Operation of personal mobility equipment, bicycle logistics	6.4													x				x	
Transport by motorcycles, passenger cars and light commercial vehicles	6.5		x											x	x	x	x	x	x
Road freight transport	6.6															x			
Rail transport infrastructure	6.14		x																
Low CO2 transport and collective transport infrastructure	6.15	x	x	x		x	x							x		x		x	
	7.3															x			
Installation, maintenance and repair of charging stations for electric vehicles inside buildings and in parking areas adjacent to buildings.	7.4							x				x							
Installation, maintenance and repair of renewable energy technologies	7.6		x																
Market-oriented research, development and innovation	9.1															x			

Comparison of sustainability reports

The Deloitte Central European Sustainability Report Award, also known as the Green Frog Award (GFA), recognizes outstanding sustainability reports. This competition seeks to acknowledge and incentivize excellence in non-financial corporate reporting within the Central European region. The Green Frog Award was initially

introduced in Hungary in 2000 and gradually extended its reach to other Central European countries, with the Balkans joining in 2009, the Czech Republic in 2012, and the Baltics in 2013.

The GFA scoring table for the 2019 sample (Deloitte et al., 2019) assessed sustainability reports according to the following criteria: Reliability and Accuracy, Reporting Principles for Defining Content, Reporting Principles for Defining Quality, Standard disclosures on profile and clarity, Impact measurement, Financial and non-financial data integration. Based on these criteria, the following results were obtained.

Introduction of the principles

Reliability and Accuracy

Establishing sustainability goals and assessing their attainment demonstrates a company's ongoing commitment to enhancing its performance. For these organizations, a sustainability report serves not only as a means of disclosing pertinent information but also as a record of the progress made in enhancing their performance. A well-crafted report not only highlights achievements but also lays out transparent objectives for the future.

Reporting Principles for Defining Content

The reporting process motivates the organization to interact actively with its internal and external surroundings, helping it evaluate which sustainability matters hold significance for the organization and where strategic focus should be directed. It is essential to consider whether the report truly mirrors the company's actual impact or if it is lengthy but lacks sufficient description of pertinent issues.

Performance disclosure should be grounded in indicators that not only pertain to industry-specific concerns but are also tailored to the company's unique risks and opportunities. The reporting should encompass all significant subjects that reflect the company's economic, environmental, and social impacts, demonstrating how the organization affects its stakeholders.

Reporting Principles for Defining Quality

The report must offer current and dependable information to ensure its reliability. The information's quality empowers stakeholders to evaluate the company, its sustainability efforts, and make informed decisions such as investments, purchases, or employment choices. The content should possess attributes like comparability, accuracy, a well-defined timeframe, clarity, reliability, and balance, effectively reflecting both positive and negative aspects of the company's performance.

Standard disclosures on profile and clarity

Through the report, stakeholders acquire insights into the company, its operations, and sustainability achievements. The report's organization should be clear and logical, presenting information in a concise and comprehensible manner. Crucial matters should be readily accessible to stakeholders, and the use of charts and figures can aid in conveying key messages effectively. Incorporating various levels of personalization and features can engage different readers and capture the attention of diverse stakeholder groups, ultimately enhancing the clarity of the content.

Impact measurement

Evaluating and articulating the impact of a company's operations demonstrates a level of maturity and a willingness to communicate a broader narrative beyond its products and services. It involves measuring the company's contribution to the local community and illustrating how it generates value for its stakeholders. This impact description should encompass both positive and negative consequences and, ideally, be rooted in both qualitative and quantitative data. Furthermore, the final results and calculations should be situated within a broader economic and social context, providing a comprehensive view of the company's overall impact.

Financial and non-financial data integration

Reporting should evolve to emphasize strategic perspectives and future orientation, rectifying the current disconnect between reported information and the factors that truly influence value. A report that seamlessly integrates both financial and non-financial data ensures that matters critical to value receive the necessary attention. This integration allows investors to access the information they require to gain a comprehensive understanding of the company's long-term prospects.

Comparison of Hungarian energy companies' sustainability reports

Based on the above criteria, MVM, ALTEO, MOL and E.ON were scored, with a maximum score of 3 in all criteria. These scores are not objective like the EU Taxonomy KPIs, we have relied on expert based evaluation to determine the scores. The results are shown in the table below. Different dots indicate different depths in different aspects. This is illustrated through the example of the Reliability and Accuracy aspect:

- 1 pt: Clear description of company's responsibilities and its sustainability areas
- 2 pts: Reporting on progress of the sustainability strategy
- 3 pts: Communication regarding the sustainability strategy, plans for the future and key risks.

Table 3: Comparison table of Hungarian energy companies' sustainability report

Framework Aspects	MVM	ALTEO	MOL	E.ON
Reliability and Accuracy	2	2.5	2.5	3
Reporting Principles for Defining Content	3	2.5	3	1.5
Reporting Principles for Defining Quality	3	3	3	3
Standard Disclosures on Profile and Clarity	2.5	2	2	2.5
Impact Measurement	2	2	2	1.5
Financial and Non-financial Data Integration	2.5	2	2	1.5
In Total	15	14	14.5	13

Sustainability reports can be extensive, up to 300 pages long. The similarity of content and length makes objective assessment difficult. The scoring is based on the criteria explained above considering experts related evaluation. To assess the effectiveness of sustainability reporting and regulation in achieving the EU's ambitious climate targets, it's crucial to understand the interplay between the UN's Environmental, Social, and Governance (ESG) targets and the Corporate Sustainability Reporting Directive (Corporate Sustainability Reporting European Comission et al., 2023) (CSRD). The CSRD mandates large companies to disclose sustainability reports, which are instrumental in tracking progress towards ESG targets. These reports include Taxonomy-defined actions and Key Performance Indicators (KPIs) related to Turnover, Capital Expenditures (CAPEX), and Operational Expenditures (OPEX). The energy sector's role is particularly significant in influencing the evolution of these KPIs. However, for traditional operators, the current KPIs may be less representative, suggesting a need for further refinement. Overall, mandatory reporting and regulation are vital for achieving sustainability, but enhancing KPIs with additional indicators could improve accuracy and comparability in measuring progress towards the EU's targets.

Conclusion

With ambitious climate targets, the EU aims to become the first climate-neutral continent by 2050, setting an example to the world. In this context, thanks to EU Taxonomy Regulation, large companies will be required to publish the extent to which their business is considered sustainable.

For the sake of transparency, the taxonomy defines which actions are considered sustainable and which of these KPIs are required to be included in the sustainability report. These KPIs are the Turnover KPI, the CAPEX KPI and the OPEX KPI. The calculation of these indicators is tightly defined, not flexible.

In this study, MVM, ALTEO, MOL and E.ON as major Hungarian energy companies, are compared based on the indicators defined in the taxonomy and the green

frog comparative criteria. This article also discusses the different actions that companies have managed to put into the sustainable category. It can be seen that the role played in the energy sector has a significant impact on how each of the key performance indicators evolves. In the case of traditional operators, such as MOL, it may provide less representative values, encouraging further consideration and refinement of the taxonomy.

These findings are consistent with recent literature (2023–2026), which emphasizes the limitations of static taxonomy-based KPIs and the need for more dynamic, sector-specific evaluation frameworks. And highlight the need to complement static EU Taxonomy indicators with dynamic, strategy-oriented performance frameworks.

In summary, mandatory reporting by large companies and the EU regulation are essential for enhancing sustainability transition and their presence helps to achieve the EU's targets, but additional indicators to the current KPIs would be needed for more accurate coverage and comparability.

Limitations of the study

This study has several limitations that should be acknowledged. First, the analysis relies on publicly available sustainability and integrated reports, which may contain biases due to differences in reporting practices, interpretation of EU Taxonomy criteria, and potential strategic disclosure behavior. Second, the expert-based evaluation applied in the Green Frog framework introduces a degree of subjectivity, despite the use of structured criteria. Third, the comparability of EU Taxonomy KPIs across companies is inherently limited by differences in business models, particularly between fossil-based producers and network-oriented operators. Fourth, the analysis focuses on a limited sample of Hungarian energy companies, which, although representative in national context, may restrict the generalizability of the findings to other regions or sectors. Finally, the regulatory framework itself is evolving, meaning that the results reflect a transitional state of sustainability reporting rather than a fully mature system.

Future research directions

Future research should focus on developing sector-specific sustainability indicators that better capture the transition pathways of different energy business models. In particular, integrating dynamic metrics such as decarbonization trajectories, flexibility provision, and system-level contributions could enhance the explanatory power of current KPI frameworks. Further studies could also explore the application of advanced evaluation methods, such as Data Envelopment Analysis (DEA) or multi-criteria decision-making approaches, to improve objectivity in benchmarking sustain-

ability performance. Additionally, expanding the analysis to a broader international sample would allow for cross-country comparison and validation of the findings. Finally, the interaction between EU Taxonomy KPIs and corporate strategic management tools, such as Balanced Scorecard-based sustainability frameworks, represents a promising direction for future research.

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Conflicts of interest/Competing interests

There is no conflict of interest/Competing interests

Availability of data and material

The data supporting the findings of this study were obtained exclusively from publicly available online sources. The analysed datasets and reports are available on the official websites of MVM, ALTEO and MOL, as referenced in the manuscript. No additional non-public datasets were used in this study.

Code Availability

This study did not involve the development or use of custom computer code. Accordingly, no code is available for this manuscript.

Authors' Contributions

István Vokony: Conceptualization, Methodology, Writing – Original Draft.
Kristóf Péter Juhász: Formal Analysis, Writing – Original Draft.
Marika Csete: Writing – Review & Editing, Supervision.

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