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THE SCOPE OF EBITDA UTILISATION IN SELECTED DOMAINS OF CORPORATE FINANCIAL MANAGEMENT

Maria SIERPIŃSKA

University Vizja in Warsaw; msierpinska@o2.pl, ORCID: 0000-0002-5371-6008

Purpose: The paper aims to present selected areas of EBITDA (Earnings Before Interest, Taxes, Depreciation and Amortization) use in corporate financial management, particularly its use in assessing companies' profitability and debt-servicing capacity.
Design/methodology/approach: The paper is theoretical and analytical in nature. A critical analysis of pertinent literature focuses the structure of EBITDA, its advantages and disadvantages, and how it is used to evaluate profitability and debt-servicing capacity. A comparative analysis of profitability based on EBITDA and operating profitability was conducted in energy companies to determine the impact of depreciation and amortisation on the level of EBITDA and its use to assess these companies' ability to service debt. Based on 2014-2024 data, ratios showing the differences between EBITDA Margin and Operating Margin were calculated, as was the level of energy companies' debt, and their ability to repay the debt were determined based on the Net Debt to EBITDA ratio.
Findings: The research has established that the difference between EBITDA Margin and Operating Margin in Polish energy companies is caused by the amount of depreciation charged. Depreciation also affects companies' capacity to service debt and it is high in energy companies. Their average debt repayment period is just over two years, and the average time to complete an investment in the energy sector is 3-5 years. This also indicates the possibility of timely completion of investments and elimination of delays in their implementation given a lack of other financing sources.
Research limitations/implications: The energy transition of the Polish economy requires extensive investments. Further research should determine whether energy companies will be able to take more debt and whether a higher than current ratio of Net Debt to EBITDA in these companies will be accepted by external capital providers. The research presented in the paper is based on historical data from published sources. Further research may attempt to compare the forecast values. Polish companies must implement a number of investments around renewable energy sources, modernisation of power transmission networks and construction of nuclear power plants.
Practical implications: The results of the study can be of use to the management of Polish energy companies by assisting them in the selection of financing sources, considering the criterion of repayment time and the relationship between this time and the ratio of net debt to EBITDA. The results of the study can also be used to support doctoral and other researchers in their studies and theses.

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Social implications: The results of the study may raise awareness of what is the rational level of debt for energy companies in relation to their ability to repay liabilities, so as not to prolong ongoing investments due to a shortage of financing sources.
Originality/value: The results of the study show those interested in the energy sector how depreciation impacts profitability. EBITDA reflects a company's capacity to service debt and its ability to raise external capital for investments. The question of whether Polish energy companies will be able to restructure according to EU requirements is the focus of widespread public interest.
Keywords: energy companies, Operating Margin, EBITDA Margin, debt level, Net Debt/EBITDA.
Category of the paper: Research paper on corporate finance.

1. Introduction

During financial decision-making processes, a number of economic ratios are used. Recently, EBITDA has gained wide application. It is widely used in companies, banks and partnering entities. Companies use it to assess their operational efficiency, determine executive bonuses, valuate companies using the multiplier method, evaluate the possibilities and potential outcomes of restructuring, and assess the attractiveness of companies for acquisition. EBITDA can be used periodically to ensure liquidity as profit and depreciation can cover current liabilities. The broadly defined category of "potential' EBITDA" profit is used for cross-country or cross-industry efficiency comparisons in a given country, as well as between classes of individual industrial groups.

Research into the use of EBITDA in selected areas of business operations was conducted in Polish energy companies. Their EBITDA level depends on the amount of depreciation charged. The energy sector, like the chemical, metallurgical and mining industries, is capital-intensive, having more long-term than current assets.

The paper aims to assess the use of EBITDA to evaluate the economic efficiency and debt repayment capacity of economic entities. The research conducted in energy capital groups in Poland aims to verify the following research hypotheses.

H1. Significant differences between EBITDA Margin and Operating Margin result from depreciation of tangible assets and amortisation of intangible assets.

H2. The direction of changes in the share of debt in the liabilities plus equity of energy companies is the same as the direction of changes in the debt service coverage ratio calculated from generated EBITDA.

Energy sector companies may pursue different financial strategies affecting their financial results. They also have different asset bases. Some energy companies have a larger share of long-term assets tied to coal-based energy. This leads them to favour higher depreciation write-offs due to planned CO_2 emission restrictions on coal-based energy production.

These are topical issues which are particularly relevant in the context of urgent energy sector restructuring and required huge capital expenditure. Moreover, one of the conditions justifying public aid for the restructuring of the sector involves the efficiency of the entities in this sector, typically measured by Operating and EBITDA Margins.

2. The concept, advantages and disadvantages, and areas of application of EBITDA in companies

2.1. EBITDA structure

EBITDA (Earnings Before Interest, Taxes, Depreciation and Amortisation) is calculated as the operating result (profit/loss) plus depreciation and amortisation of tangible and intangible assets, respectively. Operating profit concisely reflects the level of results of operating activities, excluding the strategy used for selecting financing sources. The level of operating profit is strongly affected by the characteristics of the sector/industry, funding policy for core activities, the risk level of the company's operations, and related factors. However, attention should be given to what constitutes operating profit. According to the profit and loss account, operating profit comprises core activity results (profit/loss on sales) and other operating results. Other operating activities include risk mitigation operations: receivable write-offs and their settlement, employment restructuring provisions, warranty provisions, income tax provisions, received and paid penalties/fines/damages, non-culpable long-term and current asset shortages, overdue, lost, or uncollectible liabilities and receivables. Subsidies, grants and direct payments related to operating activities under preferential policies of the relevant authorities may also be significant. Operations related to social activities, disposal of non-financial long-term assets, transfer or receipt of assets free of charge (including donations) and the revaluation of tangible fixed assets are also included. Other operating items may also include recording of depreciation-related operations: depreciation write-offs of tangible fixed assets, amortisation of intangible assets received free of charge, negative goodwill amortisation, above-standard depreciation/amortisation, and adjustment for lease payments exceeding the leased asset depreciation.

EBITDA adds depreciation and amortisation to operating profit. Depreciation/amortisation allocates the asset’s value over its useful life, writing it off as a cost to recover acquisition expenditure and create a replacement fund. "American standards stress the need for rational depreciation write-offs, using a well-considered (logical) formula for allocating depreciable value, acceptable to another accountant following objective criteria. Literature also views depreciation as a cost arising from a subjective reduction in fixed assets value" (Sigidov et al., 2016; Maruszewska, 2018, p. 138).

Depreciation starts when a fixed asset is placed for use and ends when its accumulated depreciation equals the initial value or when the asset is marked for sale, liquidation, or declared missing, considering the expected net sale price of the remainder of the fixed asset upon liquidation. When determining the depreciation period and the annual depreciation rate, the useful life of the fixed asset is taken into account, which is influenced by:

- asset usage frequency (number of shifts),
- rate of technical and economic progress,
- asset productivity, measured in operating hours, or number of units manufactured or by other appropriate metrics,
- legal or other regulatory usage restrictions,
- expected net sale price of the fixed asset upon liquidation.

The accuracy of the depreciation periods and rates applied to fixed assets should be periodically reviewed by the entity, resulting in a suitable adjustment of depreciation write-offs in subsequent financial years (Accounting Act..., Article 32). In the event of a change in production technology, intended liquidation, withdrawal from use or other reasons causing a permanent loss of a fixed asset's value, an appropriate write-down of its value is made – charged to other operating costs. Low-value fixed assets may be depreciated using simplified methods: collective write-offs for similar asset groups or one-off write-offs expensed.

Micro and small entities can apply depreciation write-offs on fixed assets following tax regulation rules. This option is not available to public finance sector entities, capital companies, or limited joint-stock partnerships, general partnerships and limited partnerships (Accounting Act... Article 28, paragraph 7).

Depreciation write-offs are calculated based on the fixed asset's original value. The basis may be the purchase price or, for in-house assets, the production/construction cost of the fixed asset. For inherited, donated, or gratuitously transferred assets, depreciation is based on fair market value, and for assets received as a contribution in kind, the valuation-determined value is used, for leased assets, depreciation is based on the lease-determined value (Aleszczuk, 2012, p. 148). Over time, a fixed asset's initial value may change due to improvements, modernisation, or official revaluation. The amount of depreciation depends on asset valuation, chosen method, useful life, and residual value estimates.

However, depreciation can be distorted by one-off write-offs and above-standard depreciation aimed at quickly recovering acquisition costs. Corporate and personal taxpayers may deduct one-off depreciation of up to PLN 100,000 as taxable costs, irrespective of income, pursuant to Article 22k(14)-(21) of the PIT Act and Article 16k(14)-(21) of the CIT Act. In accordance with these provisions, all business taxpayers can use preferential depreciation, writing off newly purchased fixed assets in groups 3-6 and 8 in the fiscal year they are registered (Kuchta, 2025). The PLN 100,000 limit covers both depreciation write-offs and purchase payments considered tax-deductible.

2.2. Advantages and disadvantages of the EBITDA metric

Because EBITDA has shortcomings—especially regarding intangible asset amortisation — some literature recommends using EBITD, which excludes such amortisation. Reporting profits excluding intangible amortisation but including tangible depreciation has become increasingly popular, though it is not a new practice (Heflin, Hsu, 2008; Kolev et al., 2008; Zhang, Zheng, 2011). Excluding intangible amortisation is justified mainly by the differing treatment of acquired versus internally developed intangible assets. Acquired intangibles are capitalised and amortised; internally developed intangibles are usually expensed immediately or recognised over time through accruals. Such differences can distort results and reduce comparability across companies and periods (Nissan, 2024a).

The increased share of intangible assets in long-term assets and of their amortisation is a result of the transition from an industrial economy to a knowledge-based economy. While some of these changes have occurred across all industries, the growth in intangible assets is mainly due to companies in knowledge-intensive sectors, including business services, communications, pharmaceuticals, healthcare and computers (e.g. Fama, French, 2004; Srivastava, 2014). Over the past two decades, intangible assets, excluding goodwill, have grown and are amortised, unlike goodwill. Consequently, amortisation has become a major expense (Nissan, 2024b). Finally, companies can avoid recognising write-offs and depreciation/amortisation by classifying assets as ‘under construction’ or ‘held for sale’. Flexibility in depreciation/amortisation measurement enables profit management, which may reduce the informational value of reported earnings. Morevover, the degree of such earnings management differs across firms and periods, limiting comparability of profits.

A third issue related to depreciation is that depreciation may also include costs of financing asset acquisition. For assets with long construction periods, such as buildings and structures, the asset’s acquisition cost, depreciated once in use, may include interest on construction debt. Interest is capitalised when three criteria are met: construction has started, construction costs are incurred, and interest costs are incurred. The amount of capitalised interest depends on the timing and scale of construction expenditure and financing costs or issuing bonds. Interest expense will be capitalised in future years, as the benefits of borrowing are realised in future periods when the asset is in use. Consequently, in accordance with the matching principle, the cost of external financing is incorporated into the asset’s cost and depreciated when the asset is in use. This accounting approach makes EBIT a distorted measure of operating profitability, as it blends operating and financing activities. Companies building similar assets may report significantly different asset values and depreciation depending on whether financing is via debt or equity. Companies often have considerable flexibility regarding the timing of cash outflows for asset replacement or may not need significant capital expenditures for extended periods, making EBITDA a better short-term indicator of cash available to service debt. However, for assessing long-term profitability and free cash flow – key determinants of equity value – depreciation and amortisation should not be ignored.

Another limitation of EBITDA arises in manufacturing companies, where it may be subject to a substantial margin of error. EBITDA is computed by adding depreciation and amortisation from the cash flow statement to EBIT. The cash flow statement shows total depreciation/amortisation for fixed and intangible assets in a given period. In manufacturing companies, most depreciation is embedded in the cost of goods sold (COGS), while the remainder is included on the final balance sheet as work in progress and finished goods inventories. This means that the cash flow statement includes depreciation amounts that have been capitalised in the final balance of inventories reported on the balance sheet, rather than recognised in costs. Consequently, including the full depreciation and amortisation from the cash flow statement overstates EBITDA, as it counts depreciation already capitalised in inventory.

Finally, EBITDA is more sensitive than EBIT to earnings management through excessive capitalisation of expenses. Companies can increase current period income by designating period costs as directly related to the acquisition of an asset or its preparation for use, thereby capitalising these costs on the balance sheet rather than recognising them in the profit and loss account. This is common for both tangible and intangible assets subject to depreciation/amortisation.

Companies enjoy considerable discretion in classifying expenditures as improvements, additions, or replacements, which enhance an asset or extend its useful life and capitalise them, unlike repairs, maintenance or other operating expenditures which enable the asset to function as originally expected and are therefore considered period costs. Most internally generated investments in intangible assets are expensed when incurred, which means that the reported assets and equity understate their fair values. However, profits may not be understated, since excluding amortisation offsets investment expenditure in intangible assets.

2.3. The use of EBIDTA in assessing a company's profitability and its ability to repay debts

A high EBITDA level indicates a company’s stable operational foundations, which is why it is referred to as an indicator of the company's financial health. Operating profit in the profit and loss account can be assessed in the measurement of efficiency in two ways: unadjusted and adjusted. Companies adjust this category to determine its value and changes over time. It is of interest not only to shareholders, but also to other stakeholders and managers, for whom value growth is the basis for calculating long-term bonuses. The adjustment system must be adapted to the company's internal records and the availability of information for its preparation. The consistency of this system will ensure the comparability of EBITDA changes over time and accurate calculation of the variable component of managers' remuneration.

Considering the structure of EBITDA, it should be noted that depreciation and amortisation in EBIDTA are generally treated as a non-cash expense for asset replacement but can occasionally be used to repay debt. Banks use EBITDA-based ratios in covenants to assess the risk associated with an entity's ability to repay debt (Sierpińska-Sawicz, 2018). However,

they adjust operating profit to reflect all incidental, non-recurring operations that affected the level of operating profit and are unlikely to recur. After the adjustments, the remaining elements of the result that reflect deliberate management actions and that can serve as a basis for forecasting future financial results are used to assess the entity's ability to repay its debts (Sierpińska, 2021).

The Net Debt to EBITDA ratio shows the number of years required to repay debt using operating profit plus depreciation/amortisation, assuming EBITDA remains constant (Mosiejko, Bernardelli, 2021). Operating profit plus depreciation/amortisation approximate operating cash flow. In capital-intensive industries, high depreciation can dominate EBITDA calculations, so that a company may report positive EBITDA even during a loss. This situation occurred in some companies during the energy sector crisis (Sierpińska-Sawicz et al., 2020, pp. 5-20).

It is assumed that a ratio of one means that the company can generate sufficient cash flow during the year to cover its interest-bearing debt. Calculating the ratio in reverse (EBITDA to Net Debt) indicates the percentage of debt the company could repay annually from its EBITDA. These ratios are indicative, as an investment financed with debt should generate additional profit and increase the level of depreciation. Higher EBITDA at a given debt level shortens the repayment period. Banks sometimes determine this ratio based on projected EBITDA. It is also commonly included as a covenant in loan and bond agreements (Sierpińska-Sawicz, 2018, p. 168).

3. Research methods

To analyse operating profitability and EBITDA-based profitability, as well as debt levels and the Net Debt to EBITDA ratio, the author selected four Polish capital groups from the energy sector. The groups – Energa, Enea, PGE and Tauron – are listed on the Warsaw Stock Exchange. They produce and supply energy to customers throughout Poland. Only a small share of customers, mostly in Warsaw, receive energy from Stoen. The basic parameters of the energy sector in Poland are presented in Table 1.

Table 1.
Share of analysed energy companies in the Polish energy sector in 2024

Breakdown	Enea	Tauron	Energa	PGE	Poland total	Share of companies in national totals, %
Customers, M	2.82	5.98	3.4	5.79	19.1	94.2
Distribution, Thw	19.9	50.8	22.7	36.3	137	94.7
Area, thousand km²	58.0	57.0	75.0	122.0	312.0	99.9
Line ength, thousand km	112.0	203.0	172.0	304.0	808	97.9
Investments, billion PLN	1.9	3.2	3.0	3.8	12.5	95.2

Source: The Largest Electricity Distributors in Poland in 2024, Polish Society for Transmission and Distribution of Electric Power (PTP REE), 20 August 2025, https://wysokienapiecie.pl

As shown by the data presented in Table 1, the entities included in the study supply energy to nearly 95% of consumers in Poland. Their territorial coverage spans the entire country, and the length of their power lines accounts for almost 98% of the total power line length in Poland.

The calculations were based on the companies' financial statements and calculations published on their websites. These companies publish basic economic ratios on their investor relations websites. The data contained therein is comparable, as the financial statements are prepared in accordance with IFRS and the requirements of the Warsaw Stock Exchange. Using a uniform method to calculate economic ratios allows for meaningful comparisons between companies and supports robust conclusions.

On the Warsaw stock market, there are a dozen or so small energy sector companies. These companies publish individual financial statements, the data from which are not comparable with those from consolidated statements. They are primarily specialized in generating energy from renewable sources. The companies included in the study have diversified operations, producing energy from various carriers — coal, gas, and renewables. This results in a similar structure of tangible assets, and depreciation is calculated using comparable rates. Depreciation is an important component of EBITDA, which is used to calculate the economic ratios under study.

To verify the hypotheses presented in the introduction use was made of several indicators. EBITDA Margin and Operating Margin ratios were employed to evaluate the profitability of companies in the energy sector. EBITDA Margin indicates what percentage of the revenue generated by the sale of products, goods and services plus depreciation of tangible fixed assets and amortisation of intangible assets constitutes operating profit. To determine the extent to which depreciation/amortisation affects the margin calculated on the basis of EBITDA, operating profitability was calculated as the ratio of operating profit to revenue from the sale of products, goods and services.

In the study of the consistency of changes in the level of debt and the debt service ratio based on EBITDA, the following ratios were employed: company debt as the ratio of debt to liabilities and equity and the ratio of Net Debt to EBITDA. The power sector is highly capital-intensive. The production and distribution of electricity requires significant capital investment in tangible fixed assets, financed through liabilities to financial institutions—mainly banks and bondholders—and, to some extent, trade credit from subsidiaries. For this reason, the debt level of companies was calculated on the basis of the companies' total debt. In their annual reports, companies indicated that EBITDA could be used periodically to maintain liquidity. These issues were not addressed in the paper.

4. Research results

Table 2 presents the EBITDA Margin and Operating Margin ratios in 2014-2024 in the energy companies examined in the study. The companies listed on the stock market at different times, so the study period was limited to eleven years, during which all companies prepared financial statements under the same accounting principles. Since 2009, listed companies have been required to prepare their financial statements in accordance with IFRS, while unlisted companies may prepare theirs in accordance with the Accounting Act.

Table 2.
EBITDA Margin and Operating Margin in Polish energy companies in 2014-2024, (%)

Company	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Avg	Medn
EBITDA Margin													
Enea	19.5	21.5	20.8	23.5	18.4	17.5	17.8	16.5	7.4	13.1	20.6	19.5	18.4
Energa	23.2	21.6	20.5	21.0	18.8	16.8	16.5	18.1	13.2	10.4	18.9	18.1	18.9
PGE	30.0	29.3	26.2	33.5	24.9	19.2	12.6	12.6	11.7	11.1	14.5	20.5	19.2
Tauron	9.8	(10.4)	4.5	20.3	18.6	18.4	20.3	16.2	10.8	13.0	19.9	12.8	16.2
Average	20.6	15.5	18.0	24.6	20.2	18.0	16.8	15.9	10.8	11.9	18.5	-	-
Median	30.0	29.3	26.2	33.5	24.9	19.2	20.3	18.1	13.2	13.1	20.6	-	-
Standard deviation	7.31	15.3	8.1	5.3	2.7	0.9	2.8	2.0	2.1	1.2	2.6	-	
Operating Margin													
Enea	12.0	(4.2)	9.9	13.0	8.2	10.5	(10.9)	9.2	2.0	2.2	9.3	5.6	9.2
Energa	13.7	11.8	4.8	11.5	11.4	3.8	5.3	9.3	6.7	6.4	6.1	8.3	6.7
PGE	16.8	(12.5)	12.9	15.1	9.5	(11.1)	3.1	9.6	5.8	(3.6)	(0.1)	4.5	5.8
Tauron	8.1	(12.0)	2.9	10.8	4.4	4.0	(7.3)	5.4	2.9	6.5	8.1	3.2	4.4
Average	12.7	(4.2)	7.6	12.6	8.4	1.8	(2.5)	8.4	4.4	2.9	5.9	-	-
Median	12.9	(8.1)	7.4	12.3	8.9	3.9	(2.1)	9.3	4.4	4.3	7.1	-	-
Standard deviation	3.1	9.8	4.0	1.6	2.6	7.9	6.8	1.7	2.0	4.1	3.6		

Source: own work based on data taken from websites Informacje finansowe | TAURON https://www.tauron.pl/tauron/relacje-inwestorskie, Dane finansowe i operacyjne | Serwis Relacji Inwestorskich Grupy Enea, Relacje inwestorskie | PGE Polska Grupa Energetyczna, Dane finansowe | Serwis relacji inwestorskich ENERGA SA, 20.06.2025; Financial Information | TAURON: https://www.tauron.pl/tauron/relacje-inwestorskie, Financial and Operational Data | Investor Relations Service, Enea Group, Investor Relations | PGE Polska Grupa Energetyczna, Financial Data | Investor Relations Service, ENERGA SA, 20.06.2025.

Profitability calculated on the basis of EBITDA during the study period reveals that the EBITDA Margin grew steadily until 2017, after which it became highly volatile across all companies in the subsequent years. It was most volatile in Tauron. In 2015, the EBITDA-based deficit reached 10.4%. This means that the losses on operating activities were higher than the calculated depreciation, which resulted in a negative result. In 2020, the EBITDA Margin stood at 20.3%, only to drop to 10.8% in 2022. PGE's EBITDA Margin reached 33.5% in 2017, dropping to 11.1% in 2023, a threefold decrease". At Enea, the ratio fell from 17.8% in 2020 to 7.4% in 2022. The average EBITDA margin in the Polish industry that year was 28.3%, while the Operating Margin was 20.5%. For energy companies, these ratios were significantly lower than the industry averages.

For example, in the U.S. company NextEra, which invests in modern energy infrastructure, the EBITDA margin was 43.6% in 2023, up from 41.4% the previous year. The Operating Margin was 19.5%, compared to 17.1% in the prior year. In the U.S. company SSE PLC, the EBITDA margin was 0.7% in 2023, down from 45.7% the previous year, while the Operating Margin was negative at -1.2%, compared to 43.7% a year earlier. The average margins for the U.S. industry in 2023 were 18.4% and 10.2%, respectively.

In the U.K. company Xcel Energy Inc., which uses renewable energy sources for electricity generation, the EBITDA Margin was 32.5% in 2023, compared to 33.2% the previous year, against an industry average of 31.3%. The Operating Margin was 15.8%, down slightly from 16.4% the previous year, while the industry average was 17.5% (Reuters). The margins in the U.K. company were very close to the industry averages.

In summary, EBITDA and Operating Margins in Polish energy companies are broadly similar to those of foreign entities, and changes over time are largely influenced by fuel market conditions and the energy mix used by the company.

A comparison of operating profitability with EBITDA Margin shows that Operating Margin ratios are consistently lower than EBITDA-based ratios. This means that the EBITDA Margin level is significantly influenced by the level of depreciation and amortisation. Three companies reported an operating deficit in 2015 and two in 2020. In 2015, Enea's EBITDA Margin reached 21.5% and its operating margin was negative at 4.2%. Likewise, at PGE, the EBITDA Margin totalled 28.5% that year, and at the operating level, the company made a loss of 12.5%. However, it should be noted that depreciation and amortisation, which are included in the EBITDA Margin, were included to the cost. Therefore, the higher the depreciation/amortisation charged, the higher the difference between the presented profitability ratios. At PGE, in the years 2016-2019, large impairment write-downs of utilised assets affected the ratios calculated using this measure (PGE investor relations).

Over the last three years of the period under review, operating profitability of Polish energy companies declined considerably. This was the result of rising costs due to higher prices of energy carriers and high CO_2 emission charges. At the same time, high inflation prompted successive governments to apply measures aiming to protect consumers and to maintain fixed energy prices despite increasing production costs. This worsened the financial results of energy companies. In addition, high interest rates somewhat slowed down investment in renewable energy sources, which would reduce CO_2 emission charges. Companies made high depreciation write-offs, especially on assets used to produce electricity from coal. In the coming years, coal-based generation capacities are expected to be shut down. Higher depreciation charges can be used periodically to finance new investments and investments in natural gas-based capacity. Its burning is less harmful to the environment than coal burning.

In 2023, the industry's median EBITDA Margin was 28.3%, while the operating margin was 20.5%. In energy companies, the median EBITDA Margin that year reached 13.1% versus a 4.3% Operating Margin. The EBITDA Margin was more than three times higher than the

Operating Margin, indicating that depreciation and amortisation had a substantial effect on financial results. This is further corroborated by data from previous years. In 2024, the median EBITDA Margin increased significantly compared to the previous year and amounted to 20.6%, while the Operating Margin stood at 7.1%, with the ratio difference being nearly threefold. This means that the first hypothesis has been confirmed. The differences in profitability levels are the result of depreciation of tangible assets and amortisation of intangible assets. It should be added that profitability in traditional, capital-intensive industries, is generally lower than in modern industries.

It is also worth noting the standard deviation of the profitability ratios. It provides information about the dispersion of data around the mean. In the case of EBITDA Margin, only in the first three years analysed was the standard deviation relatively high, which means that profitability ratios differed significantly from the mean. In 2014, the EBITDA Margin ratio reached 30% at PGE and 9.8% at Tauron. In 2015, at PGE the ratio reached 29.3%, while Tauron reported a negative margin of 10.4%. The low ratios in subsequent years indicate that the data is concentrated around the average. For the Operating Margin ratio, the standard deviation exhibited high volatility during the analysed period. In several years, it was high, which was the result of changes in the operating results of energy companies. In 2015, all companies incurred operating losses. In 2020, Enea and Tauron reported operating deficits, and in 2023-2024, only PGE generated losses.

The debt level of Polish energy companies calculated on the basis of balance sheet data is shown in Table 3. The average share of debt in liabilities and equity was calculated both vertically, across the four companies in each year, and horizontally, as the average share in individual companies in the analysed period (2014-2024).

Table 3.
Debt ratios of the analysed energy companies in 2014-2024, (%)

Company	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Avg	Medn
Enea	33.7	50.7	50.4	53.8	56.0	56.7	59.5	59.5	60.3	60.5	58.6	54.2	56.7
Energa	53.0	52.5	53.1	55.3	52.3	55.9	55.4	52.9	59.7	60.7	62.6	55.8	55.9
PGE	32.4	34.2	36.7	37.3	38.4	45.5	47.9	46.6	49.4	57.8	56.2	43.9	45.5
Tauron	48.0	50.1	50.2	49.6	50.7	56.6	60.6	58.8	63.4	64.7	51.2	54.9	56.6
Average	41.8	46.9	47.4	49.0	49.4	53.7	55.9	54.5	58.2	60.9	57.2	-	-
Median	40.8	50.4	50.3	51.7	51.5	56.2	57.5	55.8	60.0	60.6	57.4		

Source: own work based on data taken from websites Informacje finansowe | TAURON https://www.tauron.pl/tauron/relacje-inwestorskie, Dane finansowe i operacyjne | Serwis Relacji Inwestorskich Grupy Enea, Relacje inwestorskie | PGE Polska Grupa Energetyczna, Dane finansowe | Serwis relacji inwestorskich ENERGA SA, 20.06.2025; Financial Information | TAURON: https://www.tauron.pl/tauron/relacje-inwestorskie, Financial and Operational Data | Investor Relations Service, Enea Group, Investor Relations | PGE Polska Grupa Energetyczna, Financial Data | Investor Relations Service, ENERGA SA, 20.06.2025.

Prior to 2023, the debt levels of all analysed companies increased steadily. While in 2014 almost 42% of liabilities and equity represented debt, by 2023 this figure had risen to as much as 60.9%. PGE debt grew at a similarly rapid pace. At Energa and Tauron, the increase was

slower. In 2024, Tauron's debt fell by as much as 13.5 percentage points compared to the previous year. At Energa, debt increased from 53% to 62.6% during the period in question.

In three companies, the average share of liabilities in total liabilities and equity was very similar, with PGE alone having an average debt level of almost 44% in the period under review. In 2014, PGE's debt was the lowest relative to the other companies and increased by as much as 23.8 percentage points. At Enea, debt increased by 26.8 percentage points from 2014 to 2023, at Tauron by 16.4 percentage points, and at Energa by a mere 7.7 percentage points. Interestingly, in 2021, the debt of several international corporations was higher than that of Polish energy companies, ranging between 63% and 93%. For example, in 2022, the debt ratio was 75.3% in NextEra, 64.5% in SSE PLC, and 72.7% in Xcel Energy Inc. Foreign companies can make greater use of debt financing than their Polish counterparts, as interest rates on loans are lower there than in Poland, and they also have more opportunities to tap into the debt market (Sierpińska, 2023).

In the entities in this study, the median – the value above and below which an equal number of observations occur – does not differ significantly from the average. The horizontally calculated median for all four companies was higher than the average. In the first five years (2014-2018), debt grew faster than in 2020-2024. The vertically calculated median for the four companies varied: it was below the average in 2014 but exceeded it in subsequent years, reflecting differences in the indebtedness of individual energy companies.

Table 4 presents the Net Debt/EBITDA ratios, indicating the companies' ability to service their debt from EBITDA generated in the individual years under review.

Table 4.
Net Debt/EBITDA ratio in selected energy companies in 2014-2024 (multiple)

Company	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Avg	Medn
Enea	1.56	1.16	1.75	1.85	2.38	2.22	2.00	1.29	1.38	0.85	0.46	1.53	1.56
Energa	1.21	1.47	2.03	2.30	1.40	1.80	2.30	1.60	1.80	1.90	3.30	1.92	1.80
PGE	-	0.07	0.66	0.90	1.31	1.41	1.37	0.85	0.07	1.14	0.81	0.86	0.88
Tauron	1.61	2.00	2.45	2.45	2.54	2.81	2.51	2.44	2.93	2.10	1.70	2.32	2.45
Average	1.46	1.18	1.72	1.88	1.91	2.06	2.05	1.55	1.55	1.50	1.57	-	
Median	1.21	1.32	1.89	2.08	1.89	2.01	2.15	1.45	1.49	1.52	1.26	-	

Source: own work based on data taken from websites Informacje finansowe | TAURON https://www.tauron.pl/tauron/relacje-inwestorskie, Dane finansowe i operacyjne | Serwis Relacji Inwestorskich Grupy Enea, Relacje inwestorskie | PGE Polska Grupa Energetyczna, Dane finansowe | Serwis relacji inwestorskich ENERGA SA, 20.06.2025; Financial Information | TAURON: https://www.tauron.pl/tauron/relacje-inwestorskie, Financial and Operational Data | Investor Relations Service, Enea Group, Investor Relations | PGE Polska Grupa Energetyczna, Financial Data | Investor Relations Service, ENERGA SA, 20.06.2025.

The average ratios of the companies' ability to repay debt calculated on the basis of EBITDA were relatively low, as was the median. The highest average ratios of slightly over 2 years occurred in 2019-2020, driven by fluctuations in global energy commodity prices. Tauron needed an average of 2.3 years to repay its debt, while the other companies needed less than two years. Energa had the highest ratio in 2024 at 3.3 years, while PGE had the lowest repayment period at 0.81 years. These ratios indicate significant potential for financing

restructuring, expected to accelerate due to EU climate policy requirements. At Enea, the ratio was higher than two years only in 2018-2020. At Energa, with an increase in debt in 2020-2023, the Net Debt to EBITDA ratio decreased. PGE had the lowest ratio and the lowest debt compared to the other energy companies, but changes in the ratio did not correspond to changes in its level of debt. n the foreign companies included in the comparison, the net debt-to-EBITDA ratios vary. For example, in NextEra the ratio was 6.44 in 2023, compared with 7.15 the previous year. In SSE PLC, it was 2.01, down from 7.84 the year before, while in Xcel Energy Inc. the ratio stood at 4.82 in 2023, compared with 4.92 a year earlier.

In none of the companies reviewed, did changes in debt levels affect the Net Debt to EBITDA ratio, which exhibited high volatility in the subsequent years. Therefore, the second hypothesis was not confirmed. The direction of changes in the share of debt within the capital structure of energy companies does not correspond to the changes in the debt service coverage ratio derived from generated EBITDA. The excess depreciation – both from impairment of coal-based assets and depreciation of assets put into operation as a result of investments made in previous years – increased EBITDA, contributing to lower debt servicing ratios.

5. Summary

EBITDA is a measure of a company's financial health. A review of pertinent literature has shown that EBITDA can be used to make decisions in many areas of a company's operations. EBITDA-based metrics are widely used to evaluate companies' current and future financial positions and their capacity to service debt. EBITDA can be used for intra-industry and international comparisons of profitability. However, international comparisons require that companies report results under the same accounting standards (IFRS or GAAP). Differences in accounting standards used may render international results non-comparable. This is important for subsidiaries of large international capital groups located in different countries, where the achievement of the target EBITDA level is often used to reward managers.

This empirical research involving data from Polish energy companies has allowed verification of the research hypotheses presented in the introduction. The first hypothesis assumed that depreciation/amortisation has a significant impact on the differences between EBITDA Margin and Operating Margin. In recent years, the amount of depreciation, particularly above-standard depreciation reflecting revaluation of tangible fixed assets, has been on the rise. This trend reflects energy sector restructuring, the shift from coal to gas and renewable sources, and the need to modernize energy networks. Higher CO_2 emission charges for coal-based energy increase production costs and are further compounded by rising energy prices and wages.

The second hypothesis concerning the relationship between debt level and the Net Debt to EBITDA ratio has not been confirmed. Changes in debt servicing capacity ratios of the energy companies differed from changes in debt's share of total liabilities and equity over time. Meanwhile, the companies' debt rose steadily, and Net debt/EBITDA ratios were highly volatile, influenced by both operating results and depreciation, including write-downs of tangible assets.

The energy companies under review pursued a similar financial strategy regarding debt, using bank loans and bond issues, including green bonds. The increase in their debt is the result of accelerated restructuring of the energy sector. The pace of debt increases in energy companies in 2014-2023 varied. Enea's debt increased by 26.8 percentage points over the analysed period, PGE's by 23.8, Tauron's by 16.4, and Energa's by 7.7 percentage points. In 2024, debt increased only at Energa. The highest (13.5 percentage points) decrease in debt in 2024 was reported by Tauron. In the other three companies included in this study, the average share of debt in liabilities and equity, like the median, was similar only at PGE, where it amounted to 44%, but in 2014 the company reported the lowest debt level.

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