



Examining the financial health of state-owned enterprises within Europe's energy sector

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ABSTRACT

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Examining the financial health of state-owned enterprises with-in Europe's energy sector

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This thesis examines the financial health of State-Owned Enterprises (SOEs) within the energy sector in selected European countries. The primary objective is to determine their financial performance using publicly available data and financial statements, focusing on pre-selected key metrics such as Return on Assets (ROA), Return on Equity (ROE), Debt-to-Equity ratio, and Net debt-to-EBITDA over the period from 2020 to 2022.

The methodology involves thorough data collection, translation, and analysis of financial information from government websites and official SOE webpage investor-related information and financial statement sources. This study provides an in-depth comparative analysis across different European regions which were found to have the most comparable legislation systems and whose total SOE counts did not widely differ across different sources. The researched regions included the Baltic States, Nordic countries, and some countries from the Western and Southern Europe.

The findings reveal significant variations in the financial health of energy sector SOEs across Europe and examined regions, the performance measurement system highlighted countries, regions and individual SOEs with strong financial management, those that are in a need for some improvement, as well as those with average or normal performance. The research offers valuable insights for policymakers in EU nations and can help in guiding strategic decisions regarding the expansion or contraction of SOE portfolios, as well as be the start for finding ways to improve underperforming SOEs.

Key words: financial health, state-owned enterprises, energy sector, Europe, financial performance

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ABBREVIATIONS AND TERMS

SOE	State-owned Enterprise
ROA	Return on Assets
ROE	Return on Equity
D/E	Debt-to-Equity

1 INTRODUCTION

During the author's internship at PwC Latvia, the author was working within the business consulting unit's strategy and corporate finance team. Throughout the internship, the author learned about consulting Latvian enterprises on financial decisions and advising strategy development based on current and forecasted financial health, which was the most important aspect of every project. In most cases, this involved conducting financial analysis as a basis for the recommendations to improve the financial health of both privately-owned and state-owned enterprises.

Throughout the internship, the author received guidance on conducting research by gathering relevant and accurate data, performing in-depth financial analysis, and interpreting the results. This thesis topic arose following a 1.5-month internal research project focusing on financial data gathering, calculations, and analysis. After the calculations and analysis were finished, it was finally concluded that the findings were not suitable for the originally intended sales/marketing type of document, as the findings did not exactly portray what was desired and were not exactly suitable for new project offerings.

The motivation behind this research has come from the ever-changing business landscape in Latvia and Europe, and the never-ending pursuit of finding ways to improve country development progress by focusing on the effectiveness of the current financial management of state-owned enterprises. Some politicians in Latvia think that there is a scarcity of state-owned enterprises in critical sectors like manufacturing. The research also aimed to examine state-owned enterprises within Energy sector across various European countries.

This thesis is intended for Latvian government entities operating enterprises within the Energy sector and the goal is to help them understand whether the current quality of state-owned enterprises' financial management can be considered good enough to give the "green light" for state-owned enterprise portfolio expansion into different sectors. The goal was to find how well the current financial management of Latvia's state-owned enterprises is, compared to similar enterprises in Europe.

1.1 Objectives

The main goal is to determine the financial performance of State-Owned Enterprises (SOEs) in selected European countries. This will involve analysing the financial performance of Energy sector SOEs using publicly available government data and financial statements.

To achieve this, it was necessary to compile comprehensive data list on SOEs in the selected EU countries and collect as much of financial information as possible. This included creating a detailed list of SOEs, utilizing government websites and official sources for data collection, and addressing challenges related to incomplete or variable information in certain countries. This was done already during author's summer internship and now the author has a relatively large database with financial information regarding the Forestry, Telecommunications and Transportation sectors.

Identifying common financial metrics will be the next step. These metrics will include revenue, EBITDA, net profit, total assets, liabilities, total equity, cash, and debt.

An in-depth financial analysis will then be conducted on the financial data of SOEs over a specified period, which in this case will be from 2020 to 2022. This analysis will involve assessing the financial metrics to evaluate the overall financial health and performance of SOEs. The four financial metrics that the SOEs and regions will be compared with and benchmarked against will be Return on Assets, Return on Equity, Debt-to-Equity, and Net debt-to-EBITDA.

Ensuring data accuracy and reliability is the most important thing in this thesis. Accurate data collection will be conducted from company websites and financial reports. Translation tools, such as Google Translate and ChatGPT, will be utilized to accurately translate documents from local European languages to English when financial reports in English are not available. This will ensure a higher data accuracy and reliability allowing for a more comprehensive analysis and interpretation.

1.2 Significance

The significance of this research lies in its objective analysis of State-Owned Enterprises (SOEs) within the energy sector, across selected European countries. By investigating and comparing the financial health of SOEs within the Energy sector, this study seeks to identify the best, average, and worst performing SOEs based on 4 financial metrics on regional scales.

The findings from such a comparative study can showcase whether financial health is consistent among SOEs across various countries. Identifying a correlation, or a lack of it, can provide critical insights into the factors that contribute to SOE performance. Such an understanding is particularly timely and relevant for Latvia and other EU member states, as many countries are continuously assessing their SOE portfolio and perhaps are considering a strategic expansion or contraction of their SOE portfolio.

This thesis aims to equip Latvian and European policymakers with concise data and insights as a base for further findings, regarding state-owned assets and their financial performance. The next step would be to examine the financial performance of privately-owned enterprises within the Energy sector across the same countries examined in this analysis, which would help understand whether the private Energy sector enterprises are performing better or not, and then decide whether the SOE portfolio has a reasonable basis to be expanded or reduced.

Since such decisions have far-reaching implications for the economic landscape and sustainable regional development of Latvia and the welfare of its citizenry, this thesis aims to provide an error-free and in-depth examination of the Energy sector SOE performance, potentially serving as a blueprint for other EU nations grappling with similar strategic and economic decisions.

2 Literature review

2.1 Historical overview

The evolution of State-Owned Enterprises (SOEs) in the European Union (EU) reflects a complex interplay of economic, political, and social factors that have shaped their development over time. Initially, many European countries nationalized key industries in the post-World War II and post-Soviet Union era to rebuild economies, stabilize essential services, and assert greater control over strategic sectors.

During the late 20th century, particularly in the 1980s and 1990s, a significant shift occurred with the neoliberal wave of privatization, influenced by the belief that the private sector could offer more efficient and competitive services than public enterprises. This period saw a substantial reduction in the number of SOEs across Europe, particularly in sectors like telecommunications, transportation, and utilities (Böwer, Uwe. 2017).

The accession of Central and Eastern European countries to the EU brought another dimension to the SOE landscape. Post-communist transition economies had a high prevalence of SOEs, and EU accession requirements prompted significant restructuring, governance reforms, and further privatizations to align with the EU's competitive market principles (Böwer, Uwe. 2017).

The financial crisis of 2008 marked another turning point, challenging the consensus on privatization. In the wake of the crisis, some countries reevaluated the role of SOEs in critical sectors, recognizing them as instruments for public policy and economic stability. Recent years have witnessed a nuanced approach toward SOEs in the EU, focusing on improving governance, efficiency, and transparency rather than outright privatization (Böwer, Uwe. 2017).

The EU's stringent regulations on state aid and competition have shaped the operating environment for SOEs, ensuring that they compete on equal terms with private enterprises and do not distort the internal market. These regulations have

necessitated robust governance frameworks and operational efficiency among SOEs (Böwer, Uwe. 2017).

In the current context, SOEs in the EU play pivotal roles in strategic sectors like energy, transportation, and digital infrastructure, often aligning with broader EU objectives such as digital transformation, environmental sustainability, and regional development. The evolution of SOEs in the EU continues to be a dynamic process, reflecting broader economic policies, market conditions, and regional integration objectives.

2.2 Previous studies

Existing literature reveals notable variations in the quantity of State-Owned Enterprises (SOEs) across different countries. The 2017 IMF Working Paper titled "State-owned Enterprises in Emerging Europe: The Good, the Bad, and the Ugly" by Uwe Böwer provides a detailed information regarding the total amount of SOEs within each country, citing that there are 2,097 SOEs in Poland, 1,699 in Sweden, and descending numbers across other European nations, highlighting the diversity in state ownership scale. Böwer's study, only looked at the data from the Orbis database which looked at years 2012-2014, these numbers are quite contrast with more recent figures found during the data gathering of this thesis, which suggests that Böwer's study used faulty data, considering that Swedish government currently has listed just only about 3% of those 1,699 SOEs on their website. Another, less likely possibility is that Sweden has reduced the amount of SOEs by condensing the smaller SOEs within larger group company SOEs, but during the research process the author was unable to find confirmation of such fact.

Böwer's analysis further extends to the distribution of SOEs across various industries and their cumulative economic output, offering a more macroeconomic outlook of SOEs. This research, similarly, assesses the energy sector-specific revenue contributions of SOEs relative to each nation's GDP, aiming to highlight the nuanced economic roles these entities play to determine a more macroeconomic view and determine SOE importance.

As for the financial analysis, the IMF paper employs several metrics to evaluate SOE performance, including profitability (measured by the Return on Equity ratio), capital efficiency (measured by Return on Capital Employed ratio), labour efficiency, output quality, and associated economic risks. These dimensions provide a comprehensive framework for assessing SOE financial health against private counterparts.

While this thesis aligns with such an analytical approach, in terms of sharing Return on Equity as a measurement, it also uses additional financial metrics that examine the effectiveness of assets in terms of financial value generation, debt proportion, as well as capability to cover that debt using registered EBITDA values, which gives further insight into the general financial management capability and effectiveness.

2.3 Theoretical framework

The theoretical framework closely informs the reader of the details regarding the research process in terms of assessed values and ratios, it also helps the reader familiarise themselves with the meaning of the calculated value for each indicator. It will give the reader the possibility to assess the analytical approach of this thesis which should be helpful in identifying the strengths and weaknesses of this research process, particularly provide a playground of ideas for improvements and also help attain key-takeaways for own upcoming personal or institutional research processes.

2.3.1 Return on assets

Return on Assets or ROA for short, was selected as one of the key profitability metrics to measure state-owned enterprise financial performance since this ratio, expressed as a percentage, shows exactly how profitable a company is in relation to the company's 2-year average, total assets.

A higher ROA indicates better financial performance, however, the ROA values should only be compared to other companies in the same industry and in similar geographical locations, since companies operating in the same industry tend to have similar assets that are required for a company to operate efficiently, which is the reason why this thesis focuses on Energy sector SOEs and also examines country SOE performance of geographical region scale and benchmarks individual SOE performance to the determined regional performance scales.

Therefore, this was a crucial metric to determine and then benchmark to different companies across different European countries to understand which companies and countries are performing better in this aspect.

It is important to note that a higher ROA is also determined largely by the company's financial strategy in terms of acquisition and management of assets. An example would be when a company leases assets instead of acquiring them, which as a result does not increase the total amount of assets on the balance sheet, but the leased assets still generate additional revenue (which is not achieved by a proportionally significant increase or decrease in operating expenses) and therefore a company can increase their ROA. This study did not delve to such a depth that leased-out assets were examined, since the main problems during data collection were financial reports written in local languages, and data collection time constraints.

The following formula was used to calculate the Return on Assets:

$$\text{Return on Assets (ROA)} = \frac{\text{Net Income}}{\text{Average Total Assets}}$$

The Average Total Assets for this formula are calculated by adding together the Total Assets for the current period (year, t) and the previous period (year, t-1) (Hargrave, 2024)

2.3.2 Return on equity

Return on Equity or ROE for short uses average total equity to measure a company's profitability and how effective a company is at generating those profits using its equity as a means for financing operations and activities. It outlines a company's ability to convert equity capital into net profit.

A high ROE usually suggests more efficient management of financing activities focusing on continuous business growth and tends to result in more positive returns on investment for investors. On the flip side, a low ROE could signal potential mismanagement of funds, for example, by making an unsuccessful investment that does not meet expectations and is financially underperforming (not generating the forecasted revenues). Thus, it can be used as a measure of the effectiveness of financing activities.

It is important to note that a high ROE does not equal sound financial performance, since this metric can be significantly affected by the proportion of debt. For example, the Net Profit might have a margin of only 2%, while the industry average is 10%, but due to heavy amounts of funding coming from debt, the ROE might be high simply because of Equity being low. To counter such cases, it is important to assess the Debt-to-equity ratio and look for companies that have an ROE that is above the industry average and an optimal Debt-to-equity ratio, since a low Debt-to-equity ratio also suggests that a company is not utilizing the full extent of potentially available debt-based funding.

With all this in mind, there are still instances where a high ROE can be considered a potential red flag. Such cases would be share buybacks, high dividend payout ratios, or elevated debt levels. All of these could artificially increase the ROE. While the initial data collection included the Dividends Ratio, to understand dividends payout ratios, the thesis does not, simply due to the page and word count limitations.

The following formula was used to calculate the Return on Equity:

$$\text{Return on Equity (ROE)} = \frac{\text{Net Income}}{\text{Average Total Equity}}$$

The Average Total Equity for this formula is calculated by adding together the Equity for the current period (year, t) and the previous period (year, t-1). The Total Equity can be calculated by subtracting Total Liabilities from Total Assets found on the balance sheet. (Fernando, 2024)

2.3.3 Debt-to-equity (D/E) ratio

Debt-to-equity is a gearing ratio that evaluates a company's financial leverage and capital structure. It is calculated by dividing a company's total debt by total equity. This ratio tells how a company finances its operations using debt as opposed to only using its own resources – Equity.

A higher D/E ratio suggests that a company is more heavily financed by debt. This can mean that a company is taking on a higher financial risk, since by taking on more debt, a company also takes on more obligations, such as interest payments and loan principal repayment.

A lower D/E ratio means that the company uses more equity to finance its operations. Usually, this is seen as less risky, but there are instances where a company has such a low D/E ratio that it becomes clear that a company is not fully utilizing the potentially available resources, which can hinder the market expansion and growth of the company.

Like ROA and ROE, this ratio should be compared between companies operating in the same industry. Companies operating in more capital-intensive industries, such as those operating within the examined Energy sector, quite often have higher D/E ratios due to the larger amount of capital that is required for maintaining and expanding operations.

Using debt can be advantageous since interest expenses are tax deductible and borrowing allows shareholders to retain more control of the company since no equity is issued and therefore the ownership is not diluted. (Kenton, 2020)

The following formula was used to calculate the Debt-to-equity using Total Liabilities:

$$\text{Debt To Equity (D/E)} = \frac{\text{Total Debt}}{\text{Total Equity}}$$

2.3.4 Net debt-to-EBITDA

Net debt-to-EBITDA (Earnings Before Interest Taxes Depreciation and Amortization) ratio is a measurement of leverage. It is calculated by subtracting the cash and its equivalents from the total interest-bearing liabilities and then dividing the result by the EBITDA for the current period. (Kenton, 2020)

The result is a ratio that shows how many years it would take the company to pay back all its current debt if the EBITDA does not change at all. For example, if the result of the Net debt-to-EBITDA calculation is 3, then it can be assumed that all debt can be paid off in 3 years. A lower ratio would suggest that a company can pay off its debt quite quickly, which means more financial stability than, for example, a company in the same industry with a noticeably higher Net debt-to-EBITDA ratio.

In some cases, a company might have more cash than debt and then the ratio can be negative. Additionally, a higher Net debt-to-EBITDA ratio can be tolerable in industries in whom companies usually generate relatively stable cash flows. The more volatile a particular industry is, the smaller is the acceptable Net debt-to-EBITDA ratio.

The following formula was used to calculate the Net Debt-to-EBITDA:

$$\text{Net Debt to EBITDA} = \frac{\text{Total Debt} - \text{Cash \& Equivalents}}{\text{EBITDA}}$$

3 Methodology

3.1 Data collection

The data collection was conducted manually, starting with determining the total number of state-owned enterprises (SOEs) in the selected countries. This involved an exhaustive research process, in which the author utilized government websites and official sources. For Poland, Denmark, Slovakia, Slovenia, and Germany, there was incomplete or highly variable information which made the data collection impossible to be done accurately, and ultimately was the reason why these countries were skipped during this research process.

After compiling a list of SOEs in the selected countries, the next step was to research each SOE's industry. This process involved a thorough examination of publicly available information sources, including company websites and financial reports, to determine the industry in which each SOE operates. Industries were categorized based on their relevance to the study, with a focus on the Energy, Telecommunications, Transportation, and Forestry sectors, aligning with the expertise of PwC Latvia's Strategy and Corporate Finance team.

For this thesis, out of the 4 sectors with financial information available, only Energy sector SOEs were selected for further analysis, mainly due to the word and page count limitations, but also due to time constraints.

Financial metrics for assessment were then identified, including revenue, Earnings Before Interest Taxes Depreciation and Amortization (EBITDA), net profit, total assets, total liabilities, total equity, cash, total debt, interest-bearing liabilities, and dividends paid. Efforts were also made to gather data on additional financial metrics such as senior debt, subordinated debt, long-term notes/bonds, hybrid bonds, and convertibles, although availability varied among SOEs, which made these metrics inconclusive and inconsistent to be included in the thesis.

The data-gathering process involved accessing company websites and translating annual reports from the local language to English. The translations were done

using free translation methods such as Google Translate and ChatGPT. Using both methods allowed for a more accurate translation and eliminated more errors along the way. That said, if the translation is not being done by a native speaker, there will still be errors along the way.

3.2 Data analysis

Data analysis was done in Microsoft Excel using formulas to calculate different financial metrics. After collecting the financial data for all SOEs in all countries and assessing the amount of financial information for each metric, it was decided that the following financial ratios were to be calculated for every company – Return on Equity (ROE), Return on Assets (ROA), Debt-to-equity (Using Total Debt) and Net Debt-to-EBITDA.

After these ratios and metrics were calculated for every SOE in every country, the countries started to be compared. For comparison, the following calculations were used for every year, every country, and every one of the Energy sectors SOEs in every country – Average Return on Assets (ROA), Average Return on Equity (ROE), Average Debt-to-equity (D/E) and Average Net Debt-to-EBITDA.

The countries were first compared and analysed on an individual level and performance ranges for Energy sector SOEs were calculated. After that, the countries were sorted into 3 regions (The Baltic States, The Nordic countries, and Southwestern Europe) and further performance ranges for the regions were calculated. After these performance ranges were calculated, the SOEs belonging to each of the 3 regions were benchmarked on all 4 metrics to the values for calculated for each region. Finally, the same was done for all countries using value ranges calculated from all SOEs.

3.3 Limitations

The main limitation of this thesis is the availability of data. Since successful data gathering required research conducted in English as well as in the local languages of each researched country, and the main means of translation were

Google Translate and ChatGPT, there likely were some translation errors along the way, which might have affected the final ratio calculations and the final recommendations of this thesis. Both translation methods were used to limit the number of errors as much as possible, but it would be a stretch to claim that all errors were eradicated by simply using two means of translation.

In a scenario, where there were local language speakers, who were comfortable with reading and analysing financial statements who were available for consultation and translation, such errors might be minimized even further, but this research was not such a case.

In addition to the possible translation errors, there was also a lack of financial data for some SOEs. In most of these few cases the companies simply did not have accessible or searchable websites, no financial information on the websites, or financial information that was older than the year 2020, which was the cut-off year for this research. Due to this limitation Slovakia, Poland, and Slovenia were excluded from this financial performance assessment.

Germany's complex legislative ownership structure complicates the assessment of state-owned enterprises (SOEs). Because these enterprises are legally under different regional jurisdictions, there is no definitive list of SOEs for the entire country. This regional variation in laws, tax rates, and other regulations has negatively affected an accurate evaluation of the overall performance of Germany's SOEs.

On top of these considerations, we also need to consider the timing of this research. Since the financial data was gathered for the years 2020, 2021, and 2022, the COVID-19 effects must be still affecting the financial performance of the SOEs. Naturally, during a crisis like COVID-19 companies do take on more debt, the revenue might drop, and other important values can change rapidly, which might not provide the most accurate, long-term view of the SOE's financial health. This study should be extended to include financial statement figures recorded before 2020 and continue monitoring the financial performance after the year 2022, to accurately draw conclusions about which SOEs have been continuously under or over-performing.

The ongoing Russian war in Ukraine may have accelerated the profitability of companies in the Energy sector. To confirm this, it is necessary to conduct research comparing data from previous years with that from subsequent years. Given the geographical proximity of EU member states and the reduction in energy imports and exports among European countries before and after the war, it is highly likely that such an impact has occurred.

4 Country profiles

4.1 Importance of Energy sector SOEs in each country

The importance of SOEs in each country, by industry was calculated by comparing the sum of revenue of SOEs in a particular sector (Energy or Transportation) to the respective country's GDP for the year. It is important to note that the metrics might not be entirely accurate as for almost every country compared, there were some SOEs whose financial data was not publicly available, or at least, they were not found during the financial data gathering process.

4.1.1 Latvia

Currently, Latvia has a total of 74 to 77 State-Owned Enterprises. (Valsts Kanceleja, n.d.)

In the Energy sector, Latvia has a total of 4 SOEs, those being AS "Latvenergo" (State ownership of 100%), AS "Rīgas Siltums" (State ownership of 49%), AS "Augstsprieguma Tīkls" (State ownership of 100%) and AS "Sadales Tīkls" (State ownership of 100%).

The GDP for the year 2020 was €28.299 billion, for the year 2021, the GDP grew to €34.956 billion and for the year 2022, the GDP increased even further, to €39.371 billion. In the Energy sector of SOEs in Latvia, the total revenue for the year 2020 was €1.217 billion, therefore representing 4.3% of the total GDP for the year 2020. For the year 2021, the total revenue of SOEs in the Energy sector reached €1.496 billion and increased to 6.98% of the GDP. For the year 2022, the revenue in the Energy sector reached €2.440 billion and decreased to 6.2% of the total GDP for 2022.

Based on the increasing share of total revenue to the country's GDP in the Energy sector of Latvia, it can be assumed that due to increasingly better management of both the operations within companies and sound financial decision-making, the importance of SOEs in the Energy sector will keep growing.

The most important player, driving the rising revenues in Latvia is AS “Latvenergo”, whose revenues have increased from €773 million in 2020 to €1.841 billion in 2022, an increase of 138% in just 2 years. This is an entirely state-owned group company that owns various smaller companies within the Energy sector in Latvia, as well as Estonia and Lithuania, and is continuing to acquire and develop new projects and enterprises in the Baltic States. It is the most important player in Latvia’s Energy industry.

“Latvenergo” produces 70% of its electricity from renewable sources, by maintaining and operating hydropower stations on the river of Daugava. The other primary electricity and thermal energy sources are thermal power stations which use natural gas to supply the capital city with both electricity and heat energy. As “Latvenergo” is a group parent company, there are multiple smaller companies within, which specialize in things such as electricity grid development, establishing new renewable energy projects, and more.

4.1.2 Estonia

As of June 2023, when the data was gathered, Estonia had a total of 28 SOEs. (Rahandusministeerium, n.d.)

For the Energy sector, Estonia has a total of 4 SOEs – AS “A.L.A.R.A” (State ownership of 100%), AS “Eesti Energia” (State ownership of 100%), AS “Eesti Varude Keskus” (State ownership of 100%) and AS “Elering” (State ownership of 100%).

In Estonia, the GDP for 2020 stood at €25.655 billion, and it saw an increase to €32.731 billion in 2021, followed by a further rise to €35.549 billion in 2022. For the Energy sector’s State-Owned Enterprises (SOEs) in Estonia, the revenue for the year 2020 was €986 million, which accounted for 3.85% of the country’s GDP. The total revenue rose to €1.524 billion in 2021, representing an increase to 4.66% of the GDP. In 2022, the Energy sector’s SOEs continued to grow, reaching a revenue of €2.630 billion, amounting to 7.4% of the GDP.

Considering that Estonia's economy is like Latvia's economy, it is no surprise that the significance of SOEs is also similar in Estonia. The most important SOE in Estonia's Energy sector is AS "Eesti Energia" whose revenue has increased at an even more rapid rate than "Latvenergo" in Latvia and has gone from generating €833 million in 2020 to generating €2.218 billion in 2022, increasing by 166% in just 2 years. "Eesti Energia" is a public energy company in Estonia that specializes in electricity and heat production, sales, and distribution. It primarily generates power from oil shale, a significant national resource, but is increasingly focusing on renewable sources such as wind and solar energy to align with environmental goals. The company also offers innovative energy solutions and services, including electric vehicle charging and smart home technologies, to support Estonia's transition to a more sustainable energy future.

4.1.3 Lithuania

As of June 2023, when the data was gathered, Lithuania had a total of 47 SOEs. (Valdymo koordinavimo centras, n.d.)

For the Energy sector, Lithuania has a total of 4 SOEs - AB "Ignitis grupė" (State ownership of 73%), AB "Klaipėdos nafta" (State ownership of 73%), SE "Ignalinos atominė elektrinė" (State ownership of 100%), UAB "EPSO-G Group" (State ownership of 100%).

In Lithuania, the GDP for 2020 was €46.496 billion, which then grew to €58.471 billion in 2021, and further increased to €65.746 billion in 2022. The Energy sector's State-Owned Enterprises (SOEs) reported a revenue of €1.567 billion in 2020, making up 3.37% of the national GDP. In 2021, their revenue escalated to €2.297 billion, accounting for 3.93% of the GDP. By 2022, the Energy sector SOEs achieved a revenue of €5.047 billion, which constituted 7.68% of the GDP.

As Lithuania is in a similar economic position, as well as having close ties to both Estonia and Latvia, it is no surprise that the developments in the Energy and

Transportation sector have been quite similar in terms of SOE economic importance (Revenue-to-GDP). The largest revenue driver of Lithuania in the Energy sector is AB “Ignitis grupė”, whose revenues have increased substantially, even when compared to the other energy sector giants in Latvia and Estonia. The revenues of AB “Ignitis grupė” generated revenue of €1.215 billion in 2020, which increased almost 3 times over to €4.381 billion, which is an increase of 260% in just 2 years.

4.1.4 Sweden

As of June 2023, when the data was gathered, Sweden had a total of 41 SOEs. (Government Offices of Sweden, 2022)

For the Energy sector, Sweden has just 1 SOE – Vattenfall (State ownership of 100%).

In Sweden, the GDP for the year 2020 was €447.815 billion. In 2021, there was a substantial increase, with the GDP growing to €560.054 billion, but in 2022, the GDP slightly decreased to €546.271 billion. The Energy sector’s State-Owned Enterprises (SOEs) saw revenue of €15.773 billion in 2020, representing 3.52% of the GDP. The following year, the revenue for this sector increased to €17.507 billion, which was 3.13% of the GDP. In 2022, the revenue reached €21.424 billion, amounting to 3.92% of Sweden’s GDP.

When looking at the importance of Energy sector SOEs in Sweden and comparing them to both Finland and Norway, it is quite apparent that Sweden has a different approach to the Energy industry. Sweden may have more private companies operating within the private Energy sector than SOEs, as Sweden has just one Energy sector state-owned enterprise – Vattenfall. The revenues of Vattenfall have increased from €15.773 billion in 2020 to €21.424 billion in 2022. Vattenfall is an electricity provider in Sweden with energy sources obtained from wind power, hydropower, nuclear power, biomass, solar energy, waste, natural gas, and coal. Vattenfall is also developing its infrastructure to reduce CO₂ intensity to

reach near-zero values of grams of carbon dioxide equivalent per kilowatt-hour of electricity generated.

4.1.5 Finland

As of June 2023, when the data was gathered, Finland had a total of 70 SOEs. (Finnish Government, n.d.)

For the Energy sector, Finland has a total of 8 SOEs - – “Fortum” (State ownership of 50.8%), “Neste” (State ownership of 44.7%), “Fingrid” (State ownership of 28.2%), “Gasgrid Finland” (State ownership of 100%), “Gasum” (State ownership of 100%), “Kemijoki” (State ownership of 50.1%), “Motiva” (State ownership of 100%) and “Gasonia” (State ownership of 100%).

In Finland, the GDP experienced an increase from €222.389 billion in 2020 to €260.812 billion in 2021, followed by a slight rise to €262.023 billion in 2022. Within this economic context, the State-Owned Enterprises (SOEs) in the Energy sector reported revenues of €62.041 billion in 2020, which was 27.9% of the GDP. The revenue for the Energy sector decreased to €23.896 billion in 2021, constituting just 9.16% of the GDP. In 2022, it saw an increase to €38.336 billion, representing 14.63% of the nation's GDP.

The most important SOE within the Finnish Energy sector is “Neste”. “Neste” is a Finnish oil refining and marketing company that has notably shifted its focus towards renewable products to become one of the world's leading suppliers of renewable diesel. The company produces a wide range of petroleum products as well as renewable energy solutions, aimed at reducing climate emissions. “Neste” is committed to sustainable practices, driving significant innovations in the production of renewable fuels and chemicals from waste and residues. “Neste” revenues have increased by 119% in the 2 years. From €11.751 billion in 2020, to €25.707 billion in 2022.

4.1.6 Norway

As of June 2023, when the data was gathered, Norway had a total of 71 SOEs. (Norwegian Government, 2021)

For the Energy sector, Norway has a total of 11 SOEs - ASA "Akastor Group" (State ownership of 12.1%), ASA "Aker Solutions" (State ownership of 12.2%), SF "Enova" (State ownership of 100%), ASA "Equinor" (State ownership of 67%), AS "Gassco" (State ownership of 100%), ASA "Norsk Hydro" (State ownership of 34.3%), AS "Petoro" (State ownership of 100%), AS "Rosenkrantzgate 10" (State ownership of 3.1%), AS "Rygge 1" (State ownership of 100%), SF "Statkraft" (State ownership of 100%), SF "Statnett" (State ownership of 100%).

In Norway, the GDP expanded from €300.942 billion in 2020 to €431.161 billion in 2021 and experienced a further increase to €540.053 billion in 2022. Against this backdrop, the Energy sector's State-Owned Enterprises (SOEs) recorded a revenue of €55.443 billion in 2020, accounting for 18.42% of the GDP. In 2021, the Energy sector's revenue jumped significantly to €105.870 billion, making up 24.55% of the GDP. The upward trend continued in 2022 with a revenue of €179.945 billion, which was 33.32% of Norway's GDP.

The most important SOE within the Energy sector in Norway is "Equinor" ASA. "Equinor" recorded revenues of €37.435 billion in 2020, which more than doubled in 2021 and reached €78.041 billion. In 2022 the revenues of "Equinor" reached a staggering €138.916 billion. "Equinor" is the 5th largest Energy sector SOE (when looking at the Total Assets) examined in this research. "Equinor" ASA is a Norwegian multinational energy company primarily focused on the exploration, production, and development of oil, gas, and renewable energy sources. It is actively involved in the transition to sustainable energy, developing projects in wind power and carbon capture and storage to reduce environmental impact.

4.1.7 France

As of June 2023, when the data was gathered, France had a total of 57 SOEs. (Ministère de l'Économie et des Finances, n.d.)

For the “Energy” sector, France has a total of 5 SOEs – “Areva” (State ownership of 100%), “EDF” (State ownership of 84%), “Engie” (State ownership of 24%), “Orano” (State ownership of 80%), “TechnicAtome” (State ownership of 50%).

In France, the GDP for 2020 was €2.158 trillion, which increased to €2.601 trillion in 2021. In 2022, the GDP remained stable, at €2.596 trillion. Within this economic framework, the State-Owned Enterprises (SOEs) in the Energy sector generated revenues of €117.021 billion in 2020, contributing 5.42% to the nation's GDP. In 2021, this figure grew to €145.601 billion, representing 5.60% of the GDP. The year 2022 saw the Energy sector's revenue at €241.578 billion, constituting 9.31% of France's GDP. “Equinor” is the third largest SOE within the Energy sector, according to the revenues for the year 2022, based on author's analysis.

The most important SOE within French Energy sector is “Areva”. “Areva”, now rebranded as “Orano”, is a French multinational group specializing in nuclear power and renewable energy. The company is primarily involved in activities covering the entire nuclear fuel cycle, from mining and processing uranium to manufacturing nuclear fuel and recycling used fuel. “Areva” is also engaged in the design and construction of nuclear reactors as well as offering services for the operation, maintenance, and modernization of nuclear power plants, focusing on delivering technological solutions to promote low-carbon power generation. Over these 2 years, “Areva” has seen an increase of 107.8% in revenues, from €69.03 billion in 2020, to €143.48 billion in 2022.

4.1.8 The Netherlands

As of June 2023, when the data was gathered, Netherlands had a total of 49 SOEs. (Dutch Government, n.d.)

For the “Energy” sector, Netherlands have a total of 6 SOEs – “Energie Beheer Nederland (EBN)” (State ownership of 100%), “Gasunie” (State ownership of 100%), “Urenco Group” (State ownership of 33%), “Ultra Centrifuge Nederland”

(State ownership of 100%), “TenneT” (State ownership of 100%) and “GasTerra” (State ownership of 10%).

In the Netherlands, the GDP went up from €744.164 billion in 2020 to €891.289 billion in 2021, and further to €926.408 billion in 2022. The State-Owned Enterprises (SOEs) in the Energy sector followed this upward trend with revenues of €9.295 billion in 2020, contributing 1.25% to the national GDP. The revenue increased to €11.535 billion in 2021, which was 1.29% of the GDP, and then to €24.240 billion in 2022, representing 2.62% of the GDP.

The most important SOE within the Energy sector of the Netherlands is “GasTerra”. “GasTerra” is a Dutch natural gas trading and supply company that plays a key role in the procurement and sale of natural gas in the Netherlands and across Europe. The company acts as an intermediary between gas producers and a wide range of customers, including energy companies, industry, and government entities. “GasTerra” focuses on transitioning towards a sustainable energy supply, investing in innovative gas technologies and supporting the development of renewable energy sources to enhance energy security and reduce environmental impact. “GasTerra” has seen revenues increase by 550.9% over the 3 years, from €5.454 billion in 2020, to €35.500 billion in 2022.

4.1.9 Italy

As of June 2023, when the data was gathered, Italy had a total of 35 SOEs. (Ministero dell'Economia e delle Finanze, n.d.)

For the “Energy” sector, Italy has a total of 4 SOEs – “Enel S.p.A” (State ownership of 31%), “Eni S.p.A.” (State ownership of 4%), “Terna” (State ownership of 30%) and “GSE S.p.A.” (State ownership of 100%).

In Italy, the GDP grew from €1.552 trillion in 2020 to €1.861 trillion in 2021, with a marginal increase to €1.876 trillion in 2022. Within this economic landscape, the State-Owned Enterprises (SOEs) in the Energy sector had revenues of €113.329 billion in 2020, which accounted for 7.30% of the GDP. In 2021, the

revenue significantly increased to €166.025 billion, making up 8.92% of the GDP. By 2022, the Energy sector's revenue soared to €277.169 billion, representing a substantial 14.78% of Italy's GDP.

The most important SOE within the Energy sector of Italy is "Enel S.P.A". "Enel S.P.A." is an Italian multinational energy company and one of the largest players in the global power and renewable energy sector. The company primarily engages in the generation, distribution, and sale of electricity and gas across multiple countries. "Enel" is a leader in the transition to sustainable energy, heavily investing in renewable resources such as wind, solar, and hydroelectric power to drive innovation and achieve carbon neutrality. During the 2 years, "Enel" revenues have increased by 112.9%, from €66.004 billion in 2020 to €140.517 billion in 2022.

4.2 Interpretation

Using this data, we can understand the change in importance across all examined countries, as well as those countries where the importance of Energy sector SOEs is measured by the total SOE revenue to GDP of that year.

The country with the highest Energy sector importance to the GDP is Norway, with 2022 total revenue being around 33.32% of the total GDP for 2022. This high percentage is largely due to Norway's extensive oil extraction from its national resources, with many SOEs in Norway's Energy sector being heavily involved in the oil trade. In 2021, the importance stood at 24.55%, which was still the highest percentage of GDP among all examined countries. In 2020, the percentage of GDP was 18.42%, which ranked it in second place among all examined countries, trailing only Finland, which had 27.90% of GDP generated in revenues by all Energy sector SOEs. Thus, Norway consistently ranks first in 2022 and 2021, and second in 2020 for the importance of its Energy sector to GDP.

Italy shows an increasing trend in the Energy sector's contribution to GDP. In 2022, the Energy sector's revenue amounted to 14.78% of GDP, ranking Italy second among the examined countries. This figure is up from 8.92% in 2021 and

7.30% in 2020. Despite the increase, Italy has consistently maintained its ranking over the course of these 3 years, only giving second place to Finland in 2021 and Norway in 2020.

Finland experienced a significant decline in the Energy sector's contribution to GDP from 2020 to 2021. In 2020, the Energy sector accounted for 27.90% of Finland's GDP, the highest among the examined countries. However, in 2021, this figure dropped to 9.16%, placing Finland second. By 2022, the contribution of the Energy sector increased to 14.63%, just 0.15% less than Italy, making Finland third among the countries studied.

France's Energy sector's contribution to GDP has been rising steadily over the years, reflecting a growing importance of this sector in the French economy. In 2020, the Energy sector contributed 5.42% to the GDP, which increased slightly to 5.60% in 2021, indicating stable growth. The most notable rise occurred in 2022, where the contribution jumped to 9.31%. This significant increase underscores the expanding role of the Energy sector within France's economic framework. Despite this upward trend, France still ranks fourth in 2022 in terms of Energy sector importance to GDP among the examined countries.

Lithuania's Energy sector shows a growing contribution to GDP over the years, albeit at lower percentages compared to the top performers. In 2022, the contribution was 7.68%, ranking Lithuania fifth among the examined countries. This marks a substantial increase from 3.93% in 2021 and 3.37% in 2020. The consistent rise in these figures indicates a strengthening of Lithuania's Energy sector, reflecting improvements in energy production or favorable economic policies supporting the sector. Despite not reaching the top ranks, Lithuania's significant growth highlights its expanding energy industry's impact on the national economy.

Estonia shows an increasing trend in the Energy sector's contribution to GDP over the years. The contribution was 7.40% in 2022, ranking Estonia sixth among the examined countries. This figure is up from 4.66% in 2021 and 3.83% in 2020. This rising trend indicates a growing importance of the Energy sector in Estonia's

economy, reflecting perhaps increased energy production or favourable economic policies supporting the sector. The steady rise in percentages over these years highlights Estonia's expanding Energy sector's impact on its national GDP.

Latvia's Energy sector shows a varying contribution to GDP over the years, reflecting changes in its economic landscape. In 2022, the Energy sector contributed 6.20% to the GDP, ranking Latvia seventh among the examined countries. This marks a slight decline from 6.98% in 2021 but an increase from 4.30% in 2020. The decrease from 2021 to 2022 suggests some fluctuations in the sector, which could be due to changes in energy production, market conditions, or policy impacts. Despite this slight fall, the overall upward trend from 2020 indicates increasing importance of the Energy sector within Latvia's economy.

Sweden's Energy sector has shown a relatively low and fluctuating contribution to GDP over the years, which might be attributed to the presence of only one major Energy sector SOE, Vattenfall. In 2022, the Energy sector's contribution was 3.92%, ranking Sweden eighth among the examined countries. This percentage is a slight increase from 3.13% in 2021 but a decrease from 3.52% in 2020. The low percentage of GDP contribution could be due to Vattenfall's singular presence in the sector, limiting the overall impact compared to countries with multiple SOEs. Despite these fluctuations, Vattenfall remains a significant player in Sweden's energy market, reflecting the sector's stable yet limited role in the national economy.

The Netherlands' Energy sector has shown a steady but low contribution to GDP over the years, reflecting its relatively modest impact on the national economy. In 2022, the Energy sector contributed 2.62% to the GDP, ranking the Netherlands ninth among the examined countries. This figure is an increase from 1.29% in 2021 and 1.25% in 2020. The consistent yet low percentages indicate a stable but limited growth within the sector.

5 Comparative Analysis

This section will delve into the close examination of Energy sector SOE performance. During this examination of every one of the four calculated metrics, the author will find precise value ranges that will help classify every SOE and highlight its performance on every metric. The performance will be divided into five possible performance ratings – best (cells highlighted in dark green colour), above average (highlighted in light green), average (highlighted in yellow), below average (highlighted in orange), and worst (highlighted in dark red).

The results of this comparative analysis will determine the recommended financial measurement values that should be attained or improved by other SOEs operating within the Energy sector, as these value ranges will show the SOEs with good, average, and bad performance for each of the metrics. The author will focus on benchmarking SOE performance mainly from the regional perspective, where the author will calculate the value ranges for regions such as the Baltic States, The Nordic countries, and the rest of Europe. The individual countries will not get such a close-up examination because almost every country only has around 4 Energy sector SOEs with available financial data. Additionally, the author will also examine the SOE performance when benchmarked to the value ranges for all examined countries, to determine the best and worst performing SOEs on Europe's scale.

At the end of this analysis, the author will also determine the SOEs within the Energy sector that can be considered to have obtained good, average, and bad performance considering their results on every one of the four metrics for all three examined years. For a country to be considered the best performing, the coloured values for each of the years and each metric should be mostly dark green, light green, and yellow in rare cases. The country's performance will be judged by the colour of all cells and determining whether it is good or bad enough to be either labelled as well-performing or bad performing, with others being considered as average performing, in cases where the performance for each year and every metric does not visibly stand out from the rest of the SOEs.

5.1.1 Return on Assets (ROA)

All Energy sector SOEs within the regions (The Baltic States, Nordic countries, and Western Europe) were benchmarked to the ROA value ranges. Return on Assets (ROA) is a critical financial metric that measures how effectively a company utilizes its assets to generate profits. Higher ROA values indicate more efficient management of assets relative to income generation, making it a crucial indicator of operational efficiency.

The worst-performing SOEs were assigned a DARK RED colour and fell within the range between the lowest and second-lowest ROA values, which for most years was between the lowest (minimum) recorded values and first-quartile values. The below-average performance range SOEs were coloured in ORANGE and for most years were between the second lowest and third-lowest ROA values that were calculated for each year for each region, which for most years was between first quartile and median values. The optimal performance ROA range was coloured in BRIGHT YELLOW and for most years was between the median and average values. The above-average performance range for ROA was coloured in LIGHT GREEN and for most years was between the average and third-quartile values. The best performance for ROA values was coloured in DARK GREEN and for most years was between the third quartile and highest (maximum) values.

Baltic countries (Estonia, Latvia, and Lithuania)

In the Baltics, the average ROA values for the Energy sector were +2.13% for 2020, +3.17% for 2021, and +3.04% for 2022. The median ROA values were +2.04% in 2020, +2.53% in 2021, and +2.44% in 2022. Therefore, an Energy sector performance in the Baltics can be considered optimal, on a regional scale, if the ROA values fall in the range of +2.04-2.13% for 2020, +2.53-3.17% in 2021, and +2.44-3.04% in 2022. The lowest (minimum) ROA values were -4.41% for 2020, -0.41% for 2021, and -1.13% for 2022. First quartile (bottom 25%) ROA values were +0.38% for 2020, +0.58% for 2021, and +1.12% for 2022. The third quartile (upper 25%) ROA values were +4.83% for 2020, +4.56% for 2021, and

+4.53% for 2022. The highest (maximum) ROA values were +6.56% for 2020, +10.60% for 2021, and +8.90% for 2022.

Enterprise Name	Country	ROA		
		2022	2021	2020
AS Eesti Energia	EE	4.36%	2.76%	0.54%
AS Elering	EE	1.32%	0.45%	2.31%
AS Eesti Varude Keskus	EE	4.29%	0.58%	-0.71%
AS A. L. A. R. A	EE	8.90%	4.58%	-4.41%
AB Ignitis grupė	LT	6.16%	3.92%	4.74%
UAB EPSO-G Group	LT	3.56%	4.55%	5.32%
AB Klaipėdos nafta	LT	1.10%	10.60%	5.09%
SE Ignalinos atominė elektrinė	LT	1.13%	-0.41%	-0.11%
Latvenergo, AS (koncerns)	LV	5.01%	2.10%	3.22%
Sadales tīkls, AS	LV	-1.13%	0.57%	1.26%
Augstsprieguma tīkls, AS	LV	1.18%	6.04%	1.77%
Rīgas siltums, AS	LV	0.57%	2.30%	6.56%

Table 1: Baltic States SOE ROA performance benchmarked to the Baltic States calculated value ranges.

In terms of Return on Assets, the best performers within Baltic countries benchmarked to calculated ranges for SOEs within the Baltic states were AB “Ignitis grupė”, AS “A.L.A.R.A”, UAB “EPSO-G Group”, AB “Klaipėdos nafta” and AS “Latvenergo”.

The worst performers were SE “Ignalinos atominė elektrinė” and AS “Sadales Tīkls”.

The SOEs not mentioned in the list of best and worst performers fall somewhere in the middle of the ranges, which means that they are performing relatively decent, but at the same time not standing out from the rest of the SOEs.

Nordic countries (Finland, Sweden, and Norway)

In the Nordics, the average ROA values for the Energy sector were +3.63% for 2020, +5.54% for 2021, and +6.94% for 2022. The median ROA values were

+2.61% in 2020, +6.34% in 2021, and +6.77% in 2022. Therefore, an Energy sector performance in the Nordics can be considered optimal, on a regional scale, if the ROA values fall in the range of +2.61-3.63% for 2020, +5.54-6.34% in 2021, and +6.77-6.94% in 2022. The lowest (minimum) ROA values were -5.74% for 2020, -13.51% for 2021, and -3.58% for 2022. First quartile (bottom 25%) ROA values were +0.74% for 2020, +2.77% for 2021, and +0.71% for 2022. The third quartile (upper 25%) ROA values were +5.38% for 2020, +9.20% for 2021, and +12.69% for 2022. The highest (maximum) ROA values were +16.29% for 2020, +16.15% for 2021, and +19.37% for 2022.

Enterprise Name	Country	ROA		
		2022	2021	2020
Neste	FIN	14.41%	15.07%	8.06%
Fortum	FIN	1.17%	3.84%	4.49%
Gasum	FIN	5.00%	-13.51%	-0.89%
Fingrid	FIN	7.13%	6.17%	4.27%
Gasgrid Finland	FIN		12.93%	11.80%
Kemijoki	FIN	15.85%	16.15%	16.29%
Motiva	FIN			
Gasonia	FIN			
Equinor ASA	NOR	19.37%	6.51%	4.34%
Norsk Hydro ASA	NOR	12.80%	8.40%	0.98%
Statkraft SF	NOR	8.59%	6.66%	1.92%
Aker Solutions ASA	NOR	3.70%	0.91%	-4.93%
Statnett SF	NOR	6.77%	4.04%	3.30%
Akastor ASA (Group)	NOR	-3.58%	11.59%	-5.74%
Petro AS	NOR	0.25%	-0.13%	1.48%
Enova SF	NOR	12.58%	3.39%	11.24%
Gassco AS	NOR	0.00%	0.00%	0.00%
Rosenkrantzgate 10 AS	NOR			
Rygge 1 AS	NOR			
Vattenfall	SWE	0.00%	6.64%	1.43%

Table 2: Nordic country SOE ROA performance benchmarked to the Nordic country calculated value ranges.

In terms of Return on Assets, the best performers within Nordic countries benchmarked to calculated ranges for SOEs within the Nordic countries were “Neste” Oy, “Gasgrid Finland”, “Kemijoki” Oy, “Fingrid”, ASA “Equinor”, ASA “Norsk Hydro”, SF “Statkraft” and SF “Enova”.

The worst performers were “Gasum”, ASA “Aker Solutions”, AS “Petoro”, and AS “Gassco”.

The SOEs not mentioned in the list of best and worst performers fall somewhere in the middle of the ranges, which means that they are performing relatively decent, but at the same time not standing out from the rest of the SOEs.

Western and Southern Europe (France, The Netherlands and Italy)

In Western and Southern Europe, the average ROA values for the Energy sector were +1.15% for 2020, +2.67% for 2021, and +2.13% for 2022. The median ROA values were +1.11% in 2020, +1.93% in 2021, and +0.66% in 2022. Therefore, an Energy sector performance in Western and Southern Europe can be considered optimal, on a regional scale, if the ROA values fall in the range of +1.11-1.15% for 2020, +1.93-2.67% in 2021, and +0.66-2.13% in 2022. The lowest (minimum) ROA values were -5.86% for 2020, -1.17% for 2021, and -4.79% for 2022. First quartile (bottom 25%) ROA values were -0.33% for 2020, +1.39% for 2021, and -0.51% for 2022. The third quartile (upper 25%) ROA values were +3.08% for 2020, +2.99% for 2021, and +4.11% for 2022. The highest (maximum) ROA values were +7.68% for 2020, +9.59% for 2021, and +15.55% for 2022.

Enterprise Name	Country	ROE		
		2022	2021	2020
Areva	FR			
EDF	FR	-33.04%	8.72%	2.14%
Engie	FR	0.53%	9.65%	-2.48%
Orano	FR	-15.23%	49.21%	-1.78%
TechnicAtome	FR			
Enel S.p.A.	IT	6.92%	9.11%	8.11%
Eni S.p.A.	IT	27.99%	14.20%	-20.22%
Terna	IT	15.76%	17.33%	19.84%
GSE S.p.A.	IT			
GasTerra	NL		16.67%	16.67%
Energie Beheer Nederland (EBN)	NL	13.44%	91.11%	-62.38%
TenneT	NL	-11.61%	-4.37%	11.39%
Gasunie	NL	8.72%	4.87%	9.77%

Urenco Group	NL	46.27%	18.32%	26.83%
Ultra Centrifuge Nederland	NL			

Table 3: Western and Southern Europe country SOE ROA performance benchmarked to the Western and Southern Europe country calculated value ranges.

In terms of ROA, the best performers within Western and Southern Europe countries benchmarked to calculated ranges for SOEs within the Western and Southern Europe countries were “Gasunie”, and “Urenco Group”.

The worst performers were “EDF”, “Enel S.p.A”, and “TenneT”.

The SOEs not mentioned in the list of best and worst performers fall somewhere in the middle of the ranges, which means that they are performing relatively decent, but at the same time not standing out from the rest of the SOEs.

All countries

Overall, the average ROA for the SOEs in the Energy sector across all countries was +2.47% for 2020, +4.00% for 2021, and +4.32% for 2022. The median ROA was +1.92% for 2020, +2.99% for 2021, and +3.60% for 2022. The optimal ROA performance range therefore is +1.92-2.47% for 2020, +2.99-4.00% for 2021, and +3.60-4.32% for 2022. The lowest (minimum) ROA values were -5.86% for 2020, -13.51% for 2021, and -4.79% for 2022. The first quartile (bottom 25%) of ROA values were -0.04% for 2020, +1.09% for 2021, and +0.41% for 2022. The third quartile (upper 25%) of ROA values was +4.61% for 2020, +6.34% for 2022, and +6.62% for 2022. The highest (maximum) ROA values were +16.29% for 2021, +16.15% for 2021, and +19.37% for 2022.

Enterprise Name	Country	ROA		
		2022	2021	2020
AS Elering	EE	1.32%	0.45%	2.31%
AS Eesti Energia	EE	4.36%	2.76%	0.54%
AS A. L. A. R. A	EE	8.90%	4.58%	-4.41%
AS Eesti Varude Keskus	EE	4.29%	0.58%	-0.71%

Motiva	FIN			
Gasonia	FIN			
Kemijoki	FIN	15.85%	16.15%	16.29%
Fingrid	FIN	7.13%	6.17%	4.27%
Gasgrid Finland	FIN		12.93%	11.80%
Gasum	FIN	5.00%	-13.51%	-0.89%
Fortum	FIN	1.17%	3.84%	4.49%
Neste	FIN	14.41%	15.07%	8.06%
Areva	FR			
TechnicAtome	FR			
EDF	FR	-4.79%	1.53%	0.21%
Engie	FR	0.09%	1.93%	-0.57%
Orano	FR	-1.11%	2.99%	-0.09%
Eni S.p.A.	IT	4.59%	2.11%	-3.94%
GSE S.p.A.	IT			
Terna	IT	1.88%	1.77%	2.08%
Enel S.p.A.	IT	0.66%	0.93%	1.11%
UAB EPSO-G Group	LT	3.56%	4.55%	5.32%
AB Ignitis grupė	LT	6.16%	3.92%	4.74%
AB Klaipėdos nafta	LT	1.10%	10.60%	5.09%
SE Ignalinos atominė elektrinė	LT	1.13%	-0.41%	-0.11%

Table 4: SOE ROA performance benchmarked to the calculated value ranges for SOEs of all countries. (1 of 2)

Enterprise Name	Country	ROA		
		2022	2021	2020
Sadales tīkls, AS	LV	-1.13%	0.57%	1.26%
Latvenergo, AS (koncerns)	LV	5.01%	2.10%	3.22%
Rīgas siltums, AS	LV	0.57%	2.30%	6.56%
Augstsprieguma tīkls, AS	LV	1.18%	6.04%	1.77%
Gasunie	NL	5.14%	2.98%	5.85%
Energie Beheer Nederland (EBN)	NL	3.64%	9.59%	-5.86%
GasTerra	NL	0.35%	1.25%	2.79%
Ultra Centrifuge Nederland	NL			
TenneT	NL	-2.52%	-1.17%	3.36%
Urengo Group	NL	15.55%	5.43%	7.68%
Gassco AS	NOR	0.00%	0.00%	
Rosenkrantzgate 10 AS	NOR			
Rygge 1 AS	NOR			
Aker Solutions ASA	NOR	3.70%	0.91%	-4.93%

Akastor ASA (Group)	NOR	-3.58%	11.59%	-5.74%
Statkraft SF	NOR	8.59%	6.66%	1.92%
Norsk Hydro ASA	NOR	12.80%	8.40%	0.98%
Equinor ASA	NOR	19.37%	6.51%	4.34%
Statnett SF	NOR	6.77%	4.04%	3.30%
Enova SF	NOR	12.58%	3.39%	11.24%
Petoro AS	NOR	0.25%	-0.13%	1.48%
Vattenfall	SWE	0.00%	6.64%	1.43%

Table 5: SOE ROA performance benchmarked to the calculated value ranges for SOEs of all countries. (2 of 2)

In terms of ROA, the best performers among countries benchmarked to calculated ranges for SOEs within all countries were “Neste” Oy, “Fingrid”, “Gasgrid Finland”, “Kemijoki” Oy, ASA “Equinor”, “Ureco Group”, “Enova” SF and “Norsk Hydro” ASA.

The worst performers were AS “Sadales Tikls”, SE “Ignalinos atominė elektrinė”, “Gassco” AS, “Aker Solutions” ASA, “TenneT”, “EDF” and “Gasum”.

The SOEs not mentioned in the list of best and worst performers fall somewhere in the middle of the ranges, which means that they are performing relatively decent, but at the same time not standing out from the rest of the SOEs.

5.1.2 Return on Equity (ROE)

All Energy sector SOEs within the regions (The Baltic States, Nordic countries, and Western Europe) were benchmarked to the ROE value ranges. Return on Equity (ROE) is a key financial ratio that measures the profitability of a company in generating earnings from its equity. Since ROE reflects how effectively management is using a company’s assets to create profits, lower ROE values are indicative of less efficient use of equity capital.

The worst-performing SOEs were assigned a DARK RED colour and fell within the range between the lowest and second-lowest ROE values, which for most

years was between the lowest (minimum) recorded values and first-quartile values. The below-average performance range SOEs were coloured in ORANGE and for most years was between the second lowest and third-lowest ROE values that were calculated for each year for each region, which for most years was between first quartile and median values. The optimal performance ROE range was coloured in BRIGHT YELLOW and for most years was between the median and average values. The above-average performance range for ROE was coloured in LIGHT GREEN and for most years was between the average and third-quartile values. The best performance for ROE values was coloured in DARK GREEN and for most years was between the third quartile and highest (maximum) values.

Baltic countries (Estonia, Latvia, and Lithuania)

In the Baltics, the average ROE values for the Energy sector were +5.67% for 2020, +6.85% for 2021, and +8.16% for 2022. The median ROE values were +4.85% in 2020, +4.36% in 2021, and +6.09% in 2022. Therefore, an Energy sector performance in the Baltics can be considered optimal, on a regional scale, if the ROE values fall in the range of +4.85-5.67% for 2020, +4.36-6.85% in 2021, and +6.09-8.16% in 2022. The lowest (minimum) ROE values were -4.65% for 2020, -11.16% for 2021, and -2.07% for 2022. First quartile (bottom 25%) ROE values were +0.58% for 2020, +1.26% for 2021, and +3.92% for 2022. The third quartile (upper 25%) ROE values were +10.78% for 2020, +9.77% for 2021, and +10.68% for 2022. The highest (maximum) ROE values were +18.77% for 2020, +35.92% for 2021, and +26.14% for 2022.

Enterprise Name	Country	ROE		
		2022	2021	2020
AS Eesti Energia	EE	7.72%	4.98%	1.01%
AS Elering	EE	4.46%	1.33%	6.27%
AS Eesti Varude Keskus	EE	4.42%	0.59%	-0.72%
AS A. L. A. R. A	EE	9.33%	4.79%	-4.65%
AB Ignitis grupė	LT	14.74%	8.73%	10.67%
UAB EPSO-G Group	LT	17.03%	15.78%	18.77%

AB Klaipėdos nafta	LT	4.44%	35.92%	16.46%
SE Ignalinos atominė elektrinė	LT	26.14%	-11.16%	-2.93%
Latvenergo, AS (koncerns)	LV	8.19%	3.38%	5.31%
Sadales tīkls, AS	LV	-2.07%	1.04%	2.29%
Augstsprieguma tīkls, AS	LV	2.41%	12.90%	4.40%
Rīgas siltums, AS	LV	1.17%	3.92%	11.10%

Table 6: Baltic States SOE ROE performance benchmarked to the Baltic States calculated value ranges.

In terms of Return on Equity, the best performers within Baltic countries benchmarked to calculated ranges for SOEs within the Baltic states were AS “Eesti Energia”, AB “Ignitis grupė”, UAB “EPSO-G Group”, AB “Klaipėdos nafta”, and AS “Latvenergo”.

The worst performers were AS “Eesti Varude Keskus”, AS “Elering”, SE “Ignalinos atominė elektrinė” and AS “Sadales tīkls”.

The SOEs not mentioned in the list of best and worst performers fall somewhere in the middle of the ranges, which means that they are performing relatively decent, but at the same time not standing out from the rest of the SOEs.

Nordic countries (Finland, Sweden, and Norway)

In the Nordics, the average ROE values for the Energy sector were +16.45% for 2020, +21.02% for 2021, and +27.57% for 2022. The median ROE values were +12.99% in 2020, +19.97% in 2021, and +23.38% in 2022. Therefore, an Energy sector performance in the Nordics can be considered optimal, on a regional scale, if the ROE values fall in the range of +12.99-16.45% for 2020, +19.97-21.02% in 2021, and +23.38-27.57% in 2022. The lowest (minimum) ROE values were -15.88% for 2020, -55.30% for 2021, and -6.12% for 2022. First quartile (bottom 25%) ROE values were +1.50% for 2020, +6.06% for 2021, and +6.16% for 2022. The third quartile (upper 25%) ROE values were +14.54% for 2020, +24.71% for

2021, and +26.16% for 2022. The highest (maximum) ROE values were +154.01% for all three years, 2020, 2021, and 2022.

Enterprise Name	Country	ROE		
		2022	2021	2020
Neste	FIN	25.73%	25.94%	13.33%
Fortum	FIN	9.45%	27.26%	12.65%
Gasum	FIN	22.37%	-55.30%	-2.17%
Fingrid	FIN	30.12%	23.47%	14.42%
Gasgrid Finland	FIN		22.78%	23.06%
Kemijoki	FIN	154.01%	154.01%	154.01%
Motiva	FIN			
Gasonia	FIN			
Equinor ASA	NOR	63.31%	24.30%	13.97%
Norsk Hydro ASA	NOR	24.37%	17.16%	2.00%
Statkraft SF	NOR	23.38%	15.96%	3.45%
Aker Solutions ASA	NOR	13.39%	3.23%	-15.88%
Statnett SF	NOR	24.06%	16.71%	14.29%
Akastor ASA (Group)	NOR	-6.12%	24.28%	-14.09%
Petro AS	NOR	2.88%	-1.32%	14.92%
Enova SF	NOR	26.59%	7.00%	21.98%
Gassco AS	NOR	0.00%	0.00%	0.00%
Rosenkrantzgate 10 AS	NOR			
Rygge 1 AS	NOR			
Vattenfall	SWE	0.01%	30.90%	7.17%

Table 7: Nordic country SOE ROE performance benchmarked to the Nordic country calculated value ranges.

In terms of Return on Equity, the best performers within Nordic countries benchmarked to calculated ranges for SOEs within the Nordic countries were “Neste” Oy, “Fortum”, “Fingrid”, “Gasgrid Finland”, “Kemijoki” Oy, ASA “Equinor”, ASA “Norsk Hydro”, SF “Statkraft”, SF “Statnett” and SF “Enova”.

The worst performers were “Gasum”, ASA Aker Solutions, ASA “Akastor”, and AS “Gassco”.

The SOEs not mentioned in the list of best and worst performers fall somewhere in the middle of the ranges, which means that they are performing relatively decent, but at the same time not standing out from the rest of the SOEs.

Western and Southern Europe (France, The Netherlands, and Italy)

In Western and Southern Europe, the average ROE values for the Energy sector were +0.72% for 2020, +21.35% for 2021, and +5.97% for 2022. The median ROE values were +8.11% in 2020, +14.20% in 2021, and +7.82% in 2022. Therefore, an Energy sector performance in Western and Southern Europe can be considered optimal, on a regional scale, if the ROE values fall in the range of +0.72-8.11% for 2020, +14.20-21.35% in 2021, and +5.97-7.82% in 2022. The lowest (minimum) ROE values were -62.38% for 2020, -4.37% for 2021, and -33.04% for 2022. First quartile (bottom 25%) ROE values were -2.13% for 2020, +8.92% for 2021, and -8.58% for 2022. The third quartile (upper 25%) ROE values were +14.03% for 2020, +17.82% for 2021, and +15.18% for 2022. The highest (maximum) ROE values were +26.83% for 2020, +91.11% for 2021, and +46.27% for 2022.

Enterprise Name	Country	ROE		
		2022	2021	2020
Areva	FR			
EDF	FR	-33.04%	8.72%	2.14%
Engie	FR	0.53%	9.65%	-2.48%
Orano	FR	-15.23%	49.21%	-1.78%
TechnicAtome	FR			
Enel S.p.A.	IT	6.92%	9.11%	8.11%
Eni S.p.A.	IT	27.99%	14.20%	-20.22%
Terna	IT	15.76%	17.33%	19.84%
GSE S.p.A.	IT			
GasTerra	NL		16.67%	16.67%
Energie Beheer Nederland (EBN)	NL	13.44%	91.11%	-62.38%
TenneT	NL	-11.61%	-4.37%	11.39%
Gasunie	NL	8.72%	4.87%	9.77%
Urenco Group	NL	46.27%	18.32%	26.83%
Ultra Centrifuge Nederland	NL			

Table 8: Western and Southern Europe country SOE ROE performance benchmarked to the Western and Southern Europe country calculated value ranges.

In terms of ROE, the best performers within Western and Southern Europe countries benchmarked to calculated ranges for SOEs within the Western and Southern Europe countries were “Enel S.P.A”, “Terna”, “GasTerra”, and “Urenco Group”.

The worst performers were “EDF”, “Engie”, “Energie Beheer Nederland (EBN)”, and “TenneT”.

The SOEs not mentioned in the list of best and worst performers fall somewhere in the middle of the ranges, which means that they are performing relatively decent, but at the same time not standing out from the rest of the SOEs.

All countries

Overall, for the 47 Energy sector SOEs across the selected countries, the average ROE was +8.69% for 2020, +16.75% for 2021, and +15.44% for 2022. The median values for the ROE of all SOEs were +7.17% for 2020, +12.90% for 2021, and +9.33% for 2022. Therefore, the ROE range for European SOEs to be considered optimal would be +7.17-8.69% for 2020, 12.90-16.75% for 2021, and 9.33-15.44% for 2022. The lowest (minimum) values for ROE from all examined countries were -62.38% for 2020, -55.30% for 2021 and -33.04% for 2022. Considering that these values have been increasing towards more positive ROE values, it is possible that the main disruption was caused by COVID-19 rather than the ongoing Russian war in Ukraine, however, older, and newer financial statements would have to be analysed for confirmation. The first quartile (bottom 25% of all SOEs) ROE values were -0.36% for 2020, +3.65% for 2021, and +2.41% for 2022. The third quartile (upper 25% of all SOEs) ROE values were +14.36% for 2020, +23.13% for 2021, and +24.06% for 2022. These values also seem to be increasing throughout the 3 years. The highest (maximum values) were +154.01% for all 3 years. These values were recorded for “Kemijoki” Oy as reported net profit and equity have remained the same during the 3 years.

ROE

Enterprise Name	Country	2022	2021	2020
AS Elering	EE	4.46%	1.33%	6.27%
AS Eesti Energia	EE	7.72%	4.98%	1.01%
AS A. L. A. R. A	EE	9.33%	4.79%	-4.65%
AS Eesti Varude Keskus	EE	4.42%	0.59%	-0.72%
Motiva	FIN			
Gasonia	FIN			
Kemijoki	FIN	154.01%	154.01%	154.01%
Fingrid	FIN	30.12%	23.47%	14.42%
Gasgrid Finland	FIN		22.78%	23.06%
Gasum	FIN	22.37%	-55.30%	-2.17%
Fortum	FIN	9.45%	27.26%	12.65%
Neste	FIN	25.73%	25.94%	13.33%
Areva	FR			
TechnicAtome	FR			
EDF	FR	-33.04%	8.72%	2.14%
Engie	FR	0.53%	9.65%	-2.48%
Orano	FR	-15.23%	49.21%	-1.78%
Eni S.p.A.	IT	27.99%	14.20%	-20.22%
GSE S.p.A.	IT			
Terna	IT	15.76%	17.33%	19.84%
Enel S.p.A.	IT	6.92%	9.11%	8.11%
UAB EPSO-G Group	LT	17.03%	15.78%	18.77%
AB Ignitis grupė	LT	14.74%	8.73%	10.67%
AB Klaipėdos nafta	LT	4.44%	35.92%	16.46%
SE Ignalinos atominė elektrinė	LT	26.14%	-11.16%	-2.93%

Table 9: SOE ROE performance benchmarked to the calculated value ranges for SOEs of all countries. (1 of 2)

Enterprise Name	Country	ROE		
		2022	2021	2020
Sadales tīkls, AS	LV	-2.07%	1.04%	2.29%
Latvenergo, AS (koncerns)	LV	8.19%	3.38%	5.31%
Rīgas siltums, AS	LV	1.17%	3.92%	11.10%
Augstsprieguma tīkls, AS	LV	2.41%	12.90%	4.40%
Gasunie	NL	8.72%	4.87%	9.77%
Energie Beheer Nederland (EBN)	NL	13.44%	91.11%	-62.38%
GasTerra	NL		16.67%	16.67%
Ultra Centrifuge Nederland	NL			
TenneT	NL	-11.61%	-4.37%	11.39%
Urengo Group	NL	46.27%	18.32%	26.83%

Gassco AS	NOR	0.00%	0.00%	0.00%
Rosenkrantzgate 10 AS	NOR			
Rygge 1 AS	NOR			
Aker Solutions ASA	NOR	13.39%	3.23%	-15.88%
Akastor ASA (Group)	NOR	-6.12%	24.28%	-14.09%
Statkraft SF	NOR	23.38%	15.96%	3.45%
Norsk Hydro ASA	NOR	24.37%	17.16%	2.00%
Equinor ASA	NOR	63.31%	24.30%	13.97%
Statnett SF	NOR	24.06%	16.71%	14.29%
Enova SF	NOR	26.59%	7.00%	21.98%
Petro AS	NOR	2.88%	-1.32%	14.92%
Vattenfall	SWE	0.01%	30.90%	7.17%

Table 10: SOE ROE performance benchmarked to the calculated value ranges for SOEs of all countries. (2 of 2)

In terms of ROE, the best performers among countries benchmarked to calculated ranges for SOEs within all countries were “Kemijoki” Oy, “Equinor” ASA, “Ureco Group”, “Gasgrid Finland”, “Fingrid”, “Neste” Oy, AB “Klaipėdos nafta”, “Enova” SF, “Statnett” SF, “Terna”, UAB “EPSO-G Group” and “GasTerra”.

The worst performers were “Gasum”, “EDF”, “TenneT”, “Gassco AS”, “Aker Solutions” ASA, AS “Sadales Tīkls”, and “Akastor” ASA.

The SOEs not mentioned in the list of best and worst performers fall somewhere in the middle of the ranges, which means that they are performing relatively decent, but at the same time not standing out from the rest of the SOEs.

5.1.3 Debt-to-equity (D/E)

All Energy sector SOEs within the regions (The Baltic States, Nordic countries, and Western Europe) were benchmarked to the Debt-to-Equity ratio ranges. Considering that Debt-to-equity is a ratio that is like the Net debt-to-EBITDA ratio, in terms of how it’s judged, where lower values are preferable, the colour system was inversed when compared to ROA and ROE value percentages.

The best-performing SOEs were assigned a DARK GREEN colour and fell within the range between the lowest and second-lowest net debt-to-EBITDA ratios, which for most years was between the lowest (minimum) recorded values and first-quartile values. The above-average performance range SOEs were coloured in LIGHT GREEN and for most years was between the second lowest and third-lowest net debt-to-EBITDA ratios that were calculated for each year for each region, which for most years was between first quartile and median values. The optimal performance net debt-to-EBITDA ratio range was coloured in YELLOW and for most years was between the median and average values. The below-average performance range for net debt-to-EBITDA ratio was coloured in ORANGE and for most years was between the average and third-quartile values. The best performance for net debt-to-EBITDA ratio values was coloured in DARK RED and for most years was between the third quartile and highest (maximum) values.

Baltic countries (Estonia, Latvia, and Lithuania)

In the Baltics, the average Debt-to-equity ratios for the Energy sector were 0.32x for 2020, 0.39x for 2021, and 0.50x for 2022. The median Debt-to-equity ratios were 0.36x in 2020, 0.23x in 2021, and 0.55x in 2022. Therefore, an Energy sector performance in the Baltics can be considered optimal, on a regional scale, if the Debt-to-equity ratios fall in the range of 0.32-0.36x for 2020, 0.23-0.39x in 2021, and 0.50-0.55x in 2022. The lowest (minimum) Debt-to-equity ratios were 0.05x for 2020, 0.08x for 2021, and 0.06x for 2022. First quartile (bottom 25%) Debt-to-equity ratios were 0.12x for 2020, 0.16x for 2021, and 0.30x for 2022. The third quartile (upper 25%) Debt-to-equity ratios were 0.50x for 2020, 0.46x for 2021, and 0.66x for 2022. The highest (maximum) Debt-to-equity ratios were 0.57x for 2020, 1.47x for 2021, and 1.09x for 2022.

Enterprise Name	Country	Debt-to-Equity		
		2022	2021	2020
AS Eesti Energia	EE	0.09x	0.08x	0.08x
AS Elering	EE	0.57x	0.16x	0.13x
AS Eesti Varude Keskus	EE	0.06x	0.08x	0.05x
AS A. L. A. R. A	EE	0.68x	0.63x	0.57x

AB Ignitis grupė	LT	0.33x	0.24x	0.36x
UAB EPSO-G Group	LT	1.09x	0.15x	0.10x
AB Klaipėdos nafta	LT	0.52x	0.43x	0.24x
SE Ignalinos atominė elektrinė	LT	0.79x	1.47x	0.49x
Latvenergo, AS (koncerns)	LV	0.42x	0.38x	0.36x
Sadales tīkls, AS	LV	0.62x	0.58x	0.56x
Augstsprieguma tīkls, AS	LV	0.22x	0.21x	0.53x
Rīgas siltums, AS	LV	0.66x	0.23x	0.40x

Table 11: Baltic States SOE Debt-to-Equity performance benchmarked to the Baltic States calculated ratio value ranges.

In terms of Debt-to-Equity, the best performers within Baltic countries benchmarked to calculated ranges for SOEs within the Baltic states were AS “Eesti Energia”, AS “Elering”, AS “Eesti Varude Keskus”, and AS “Latvenergo”.

The worst performers were AS “A.L.A.R.A”, SE “SE Ignalinos atominė elektrinė”, and AS “Sadales Tīkls”.

The SOEs not mentioned in the list of best and worst performers fall somewhere in the middle of the ranges, which means that they are performing relatively decent, but at the same time not standing out from the rest of the SOEs.

Nordic countries (Finland, Sweden, and Norway)

In the Nordics, the average Debt-to-equity ratios for the Energy sector were 2.29x for 2020, 2.33x for 2021, and 5.73x for 2022. The median Debt-to-equity ratios were 0.23x in 2020, 0.35x in 2021, and 0.41x in 2022. Therefore, an Energy sector performance in the Nordics can be considered optimal, on a regional scale, if the Debt-to-equity ratios fall in the range of 0.23-2.29x for 2020, 0.35-2.33x in 2021, and 0.41-5.73x in 2022. The lowest (minimum) Debt-to-equity ratios were 0.01x for 2020, 0.02x for 2021, and 0.03x for 2022. First quartile (bottom 25%) Debt-to-equity ratios were 0.10x for 2020, 0.14x for 2021, and 0.20x for 2022. The third quartile (upper 25%) Debt-to-equity ratios were 0.74x for 2020, 0.66x for 2021, and 0.71x for 2022. The highest (maximum) Debt-to-equity ratios were 18.89x for 2020, 22.80x for 2021, and 76.89x for 2022.

Enterprise Name	Country	Debt-to-Equity		
		2022	2021	2020
Neste	FIN	0.15x	0.23x	0.25x
Fortum	FIN	0.51x	0.56x	0.15x
Gasum	FIN	0.37x	0.89x	0.01x
Fingrid	FIN	0.53x	0.15x	0.07x
Gasgrid Finland	FIN	0.22x	0.07x	0.32x
Kemijoki	FIN	0.13x	0.11x	4.97x
Motiva	FIN			
Gasonia	FIN			
Equinor ASA	NOR	0.29x	0.36x	0.20x
Norsk Hydro ASA	NOR	0.28x	0.26x	0.23x
Statkraft SF	NOR	0.45x	0.34x	0.11x
Aker Solutions ASA	NOR	0.67x	0.58x	0.40x
Statnett SF	NOR	0.09x	0.11x	0.06x
Akastor ASA (Group)	NOR	0.03x	0.02x	0.07x
Petoro AS	NOR	8.75x	9.16x	8.87x
Enova SF	NOR	1.41x	1.33x	1.74x
Gassco AS	NOR	76.89x	22.80x	18.89x
Rosenkrantzgate 10 AS	NOR			
Rygge 1 AS	NOR			
Vattenfall	SWE	0.83x	0.35x	0.23x

Table 12: Nordic country SOE Debt-to-Equity performance benchmarked to the Nordic country calculated ratio value ranges.

In terms of Debt-to-Equity, the best performers within Nordic countries benchmarked to calculated ranges for SOEs within the Nordic countries were “Neste” Oy, “Gasgrid Finland”, ASA “Equinor”, ASA “Norsk Hydro”, SF “Statkraft”, SF “Statnett”, and ASA “Akastor”.

The worst performers were AS “Petoro”, SF “Enova”, and AS “Gassco”.

The SOEs not mentioned in the list of best and worst performers fall somewhere in the middle of the ranges, which means that they are performing relatively decent, but at the same time not standing out from the rest of the SOEs.

Western and Southern Europe (France, The Netherlands and Italy)

In Western and Southern Europe, the average Debt-to-equity ratios for the Energy sector were 0.59x for 2020, 0.90x for 2021, and 0.55x for 2022. The median Debt-to-equity ratios were 0.33x in 2020, 0.33x in 2021, and 0.35x in 2022. Therefore, an Energy sector performance in Western and Southern Europe can be considered optimal, on a regional scale, if the Debt-to-equity ratios fall in the range of 0.33-0.59x for 2020, 0.33-0.90x in 2021, and 0.35-0.55x in 2022. The lowest (minimum) Debt-to-equity ratios were 0.00x for 2020, 0.01x for 2021, and 0.07x for 2022. First quartile (bottom 25%) Debt-to-equity ratios were 0.13x for 2020, 0.20x for 2021, and 0.24x for 2022. The third quartile (upper 25%) Debt-to-equity ratios were 1.01x for 2020, 0.50x for 2021, and 0.57x for 2022. The highest (maximum) Debt-to-equity ratios were 1.71x for 2020, 6.77x for 2021, and 2.31x for 2022.

Enterprise Name	Country	Debt-to-Equity		
		2022	2021	2020
Areva	FR			
EDF	FR	0.23x	0.16x	0.11x
Engie	FR	0.40x	0.33x	0.38x
Orano	FR	0.53x	0.66x	1.40x
TechnicAtome	FR			
Enel S.p.A.	IT	0.26x	0.21x	0.14x
Eni S.p.A.	IT	0.18x	0.19x	0.25x
Terna	IT	0.35x	0.33x	0.61x
GSE S.p.A.	IT			
GasTerra	NL	2.31x	6.77x	1.71x
Energie Beheer Nederland (EBN)	NL	0.61x	0.57x	1.53x
TenneT	NL	0.85x	0.43x	0.07x
Gasunie	NL	0.07x	0.01x	0.00x
Urenco Group	NL	0.25x	0.27x	0.33x
Ultra Centrifuge Nederland	NL			

Table 13: Western and Southern Europe country SOE Debt-to-Equity performance benchmarked to the Western and Southern Europe country calculated ratio value ranges.

In terms of Debt-to-Equity, the best performers within Western and Southern Europe countries benchmarked to calculated ranges for SOEs within the Western

and Southern Europe countries were “EDF”, “Enel S.P.A”, “Eni S.p.A”, and “Gasunie”.

The worst performers were “GasTerra” and “Energie Beheer Nederland (EBN)”.

The SOEs not mentioned in the list of best and worst performers fall somewhere in the middle of the ranges, which means that they are performing relatively decent, but at the same time not standing out from the rest of the SOEs.

All countries

In the Energy sector across all countries, the average debt-to-equity ratios were 1.20x for 2020, 1.33x for 2021, and 2.66x for 2022. The median debt-to-equity ratios were 0.25x in 2020, 0.33x in 2021, and 0.42x in 2022. Therefore, an Energy sector performance across all countries can be considered optimal, on a global scale, if the debt-to-equity ratios fall in the range of 0.25-1.20x for 2020, 0.33-1.33x in 2021, and 0.42-2.66x in 2022. The lowest (minimum) debt-to-equity ratios were 0.00x for 2020, 0.01x for 2021, and 0.03x for 2022. First quartile (bottom 25%) debt-to-equity ratios were 0.11x for 2020, 0.16x for 2021, and 0.23x for 2022. The third quartile (upper 25%) debt-to-equity ratios were 0.54x for 2020, 0.57x for 2021, and 0.66x for 2022. The highest (maximum) debt-to-equity ratios were 18.89x for 2020, 22.80x for 2021, and 76.89x for 2022.

Enterprise Name	Country	Debt-to-Equity		
		2022	2021	2020
AS Elering	EE	0.57x	0.16x	0.13x
AS Eesti Energia	EE	0.09x	0.08x	0.08x
AS A. L. A. R. A	EE	0.68x	0.63x	0.57x
AS Eesti Varude Keskus	EE	0.06x	0.08x	0.05x
Motiva	FIN			
Gasonia	FIN			
Kemijoki	FIN	0.13x	0.11x	4.97x
Fingrid	FIN	0.53x	0.15x	0.07x
Gasgrid Finland	FIN	0.22x	0.07x	0.32x
Gasum	FIN	0.37x	0.89x	0.01x
Fortum	FIN	0.51x	0.56x	0.15x
Neste	FIN	0.15x	0.23x	0.25x
Areva	FR			

TechnicAtome	FR			
EDF	FR	0.23x	0.16x	0.11x
Engie	FR	0.40x	0.33x	0.38x
Orano	FR	0.53x	0.66x	1.40x
Eni S.p.A.	IT	0.18x	0.19x	0.25x
GSE S.p.A.	IT			
Terna	IT	0.35x	0.33x	0.61x
Enel S.p.A.	IT	0.26x	0.21x	0.14x
UAB EPSO-G Group	LT	1.09x	0.15x	0.10x
AB Ignitis grupė	LT	0.33x	0.24x	0.36x
AB Klaipėdos nafta	LT	0.52x	0.43x	0.24x
SE Ignalinos atominė elektrinė	LT	0.79x	1.47x	0.49x

Table 14: SOE Debt-to-Equity performance benchmarked to the calculated ratio value ranges for SOEs of all countries. (1 of 2)

Enterprise Name	Country	Debt-to-Equity (Total Debt)		
		2022	2021	2020
Sadales tīkls, AS	LV	0.62x	0.58x	0.56x
Latvenergo, AS (koncerns)	LV	0.42x	0.38x	0.36x
Rīgas siltums, AS	LV	0.66x	0.23x	0.40x
Augstsprieguma tīkls, AS	LV	0.22x	0.21x	0.53x
Gasunie	NL	0.07x	0.01x	0.00x
Energie Beheer Nederland (EBN)	NL	0.61x	0.57x	1.53x
GasTerra	NL	2.31x	6.77x	1.71x
Ultra Centrifuge Nederland	NL			
TenneT	NL	0.85x	0.43x	0.07x
Urengo Group	NL	0.25x	0.27x	0.33x
Gassco AS	NOR	76.89x	22.80x	18.89x
Rosenkrantzgate 10 AS	NOR			
Rygge 1 AS	NOR			
Aker Solutions ASA	NOR	0.67x	0.58x	0.40x
Akastor ASA (Group)	NOR	0.03x	0.02x	0.07x
Statkraft SF	NOR	0.45x	0.34x	0.11x
Norsk Hydro ASA	NOR	0.28x	0.26x	0.23x
Equinor ASA	NOR	0.29x	0.36x	0.20x
Statnett SF	NOR	0.09x	0.11x	0.06x
Enova SF	NOR	1.41x	1.33x	1.74x
Petro AS	NOR	8.75x	9.16x	8.87x
Vattenfall	SWE	0.83x	0.35x	0.23x

Table 15: SOE Debt-to-Equity performance benchmarked to the calculated ratio value ranges for SOEs of all countries. (2 of 2)

In terms of Debt-to-Equity, the best performers among countries benchmarked to calculated ranges for SOEs within all countries were “Gasunie”, “Akastor” ASA, “AS Eesti Varude Keskus”, AS “Eesti Energia”, “Statnett” SF, and “EDF”.

The worst performers were “Gassco” AS, “Petoro” AS, “GasTerra”, “Kemijoki” Oy, “Enova” SF, “Energie Beheer Nederland (EBN)”, and Orano.

The SOEs not mentioned in the list of best and worst performers fall somewhere in the middle of the ranges, which means that they are performing relatively decent, but at the same time not standing out from the rest of the SOEs.

5.1.4 Net debt-to-EBITDA

All Energy sector SOEs within the regions (The Baltic States, Nordic countries, and Western Europe) were benchmarked to the Debt-to-Equity ratio ranges. Considering that Debt-to-Equity is a ratio that is like the Net debt-to-EBITDA ratio, in terms of how it's judged, where lower values are preferable, the colour system was inversed when compared to ROA and ROE value percentages. Lower values of the Debt-to-Equity ratio are more desirable because they indicate a company is using less debt relative to its shareholder equity to finance its assets, which suggests financial stability and less risk of financial distress. This lower leverage means the company is less dependent on external borrowings, which can enhance investor confidence and creditworthiness.

The best-performing SOEs were assigned a DARK GREEN colour and fell within the range between the lowest and second-lowest Debt-to-Equity ratios, which for most years was between the lowest (minimum) recorded values and first-quartile values. The above-average performance range SOEs were coloured in LIGHT GREEN and for most years were between the second lowest and third-lowest Debt-to-Equity ratios that were calculated for each year for each region, which for most years were between first quartile and median values. The optimal performance Debt-to-Equity ratio range was coloured in YELLOW and for most years was between the median and average values. The below-average performance

range for the Debt-to-Equity ratio was coloured in ORANGE and for most years was between the average and third-quartile values. The best performance for Debt-to-Equity ratio values was coloured in DARK RED and for most years was between the third quartile and highest (maximum) values.

Baltic countries (Estonia, Latvia, and Lithuania)

In the Baltics, the average Net debt-to-EBITDA ratios for the Energy sector were 2.93x for 2020, 0.52x for 2021, and 1.66x for 2022. The median Net debt-to-EBITDA ratios were 2.47x in 2020, 1.91x in 2021, and 1.60x in 2022. Therefore, an Energy sector performance in the Baltics can be considered optimal, on a regional scale, if the Net debt-to-EBITDA ratios fall in the range of 2.47-2.93x for 2020, 0.52-1.91x in 2021, and 1.60-1.66x in 2022. The lowest (minimum) Net debt-to-EBITDA ratios were -7.46x for 2020, -10.62x for 2021, and -6.74x for 2022. First quartile (bottom 25%) Net debt-to-EBITDA ratios were 1.26x for 2020, 0.59x for 2021, and 0.03x for 2022. The third quartile (upper 25%) Net debt-to-EBITDA ratios were 4.18x for 2020, 2.88x for 2021, and 3.13x for 2022. The highest (maximum) Net debt-to-EBITDA ratios were 16.36x for 2020, 5.39x for 2021, and 8.38x for 2022.

Enterprise Name	Country	Net Debt-to-EBITDA		
		2022	2021	2020
AS Eesti Energia	EE	1.83x	2.39x	3.97x
AS Elering	EE	1.25x	4.79x	3.90x
AS Eesti Varude Keskus	EE	-1.02x	-7.44x	-7.46x
AS A. L. A. R. A	EE	-6.74x	-10.62x	16.36x
AB Ignitis grupė	LT	1.74x	2.64x	1.19x
UAB EPSO-G Group	LT	5.67x	1.58x	2.57x
AB Klaipėdos nafta	LT	1.47x	2.24x	1.28x
SE Ignalinos atominė elektrinė	LT	-0.51x	-0.87x	-0.32x
Latvenergo, AS (koncerns)	LV	2.47x	3.60x	2.36x
Sadales tīkls, AS	LV	8.38x	5.39x	5.23x
Augstsprieguma tīkls, AS	LV	0.21x	1.45x	4.81x
Rīgas siltums, AS	LV	5.11x	1.07x	1.28x

Table 16: Baltic States SOE Net debt-to-EBITDA performance benchmarked to the Baltic States calculated ratio value ranges.

In terms of Net debt-to-EBITDA, the best performers within Baltic countries benchmarked to calculated ranges for SOEs within the Baltic states were AS “Eesti Varude Keskus”, AS “A.L.A.R.A”, AB “Klaipėdos nafta”, and SE “Ignalinos atominė elektrinė”.

The worst performers were AS “Eesti Energia”, UAB “EPSO-G Group”, and AS “Sadeles Tīkls”.

The SOEs not mentioned in the list of best and worst performers fall somewhere in the middle of the ranges, which means that they are performing relatively decent, but at the same time not standing out from the rest of the SOEs.

Nordic countries (Finland, Sweden, and Norway)

In the Nordics, the average Net debt-to-EBITDA ratios for the Energy sector were 5.21x for 2020, -27.39x for 2021, and -2.42x for 2022. The median Net debt-to-EBITDA ratios were 1.78x in 2020, 0.55x in 2021, and 0.88x in 2022. Therefore, an Energy sector performance in the Nordics can be considered optimal, on a regional scale, if the Net debt-to-EBITDA ratios fall in the range of 1.78-5.21x for 2020, -27.39 to 0.55x in 2021, and -2.42 to 0.88x in 2022. The lowest (minimum) Net debt-to-EBITDA ratios were -1.12x for 2020, -439.57x for 2021, and -54.43x for 2022. First quartile (bottom 25%) Net debt-to-EBITDA ratios were 0.17x for 2020, -0.44x for 2021, and 0.07x for 2022. The third quartile (upper 25%) Net debt-to-EBITDA ratios were 4.39x for 2020, 1.67x for 2021, and 2.01x for 2022. The highest (maximum) Net debt-to-EBITDA ratios were 48.49x for 2020, 17.45x for 2021, and 17.56x for 2022.

Enterprise Name	Country	Net Debt-to-EBITDA		
		2022	2021	2020
Neste	FIN	0.05x	0.01x	-0.02x
Fortum	FIN	2.10x	-1.19x	3.11x
Gasum	FIN	0.58x	-1.58x	5.45x

Fingrid	FIN	1.61x	3.31x	5.06x
Gasgrid Finland	FIN	8.25x	0.72x	0.98x
Kemijoki	FIN	17.56x	17.45x	3.72x
Motiva	FIN			
Gasonia	FIN			
Equinor ASA	NOR	0.08x	0.13x	-0.15x
Norsk Hydro ASA	NOR	0.42x	0.55x	0.23x
Statkraft SF	NOR	0.88x	0.98x	0.36x
Aker Solutions ASA	NOR	1.93x	2.36x	1.78x
Statnett SF	NOR	-0.21x	-0.52x	-1.12x
Akastor ASA (Group)	NOR	1.53x	-0.36x	2.54x
Petoro AS	NOR	-54.43x	-439.57x	48.49x
Enova SF	NOR	-19.41x	6.36x	7.54x
Gassco AS	NOR			
Rosenkrantzgate 10 AS	NOR			
Rygge 1 AS	NOR			
Vattenfall	SWE	2.68x	0.56x	0.10x

Table 17: Nordic country SOE Net debt-to-EBITDA performance benchmarked to the Nordic country calculated ratio value ranges.

In terms of Net debt-to-EBITDA, the best performers within Nordic countries benchmarked to calculated ranges for SOEs within the Nordic countries were “Neste” Oy, “Equinor” ASA, and “Statnett” SF.

The worst performers were “Fingrid”, “Gasgrid Finland”, “Kemijoki” Oy, ASA “Aker Solutions”, and “Vattenfall”.

Some serious fluctuations in the ratios were noticed both for “Petoro” AS and “Enova” SF.

The SOEs not mentioned in the list of best and worst performers fall somewhere in the middle of the ranges, which means that they are performing relatively decent, but at the same time not standing out from the rest of the SOEs.

Western and Southern Europe (France, The Netherlands and Italy)

In Western and Southern Europe, the average net debt-to-EBITDA ratios for the Energy sector were 3.37x for 2020, 4.33x for 2021, and 12.87x for 2022. The median net debt-to-EBITDA ratios were 2.80x in 2020, 3.07x in 2021, and 3.84x in 2022. Therefore, an Energy sector performance in Western and Southern Europe can be considered optimal, on a regional scale, if the net debt-to-EBITDA ratios fall in the range of 2.80-3.37x for 2020, 3.07-4.33x in 2021, and 3.84-12.87x in 2022. The lowest (minimum) net debt-to-EBITDA ratios were 0.41x for 2020, 0.13x for 2021, and 0.52x for 2022. First quartile (bottom 25%) Net debt-to-EBITDA ratios were 2.78x for 2020, 2.08x for 2021, and 1.80x for 2022. The third quartile (upper 25%) net debt-to-EBITDA ratios were 4.53x for 2020, 5.60x for 2021, and 15.45x for 2022. The highest (maximum) net debt-to-EBITDA ratios were 5.76x for 2020, 11.80x for 2021, and 51.24x for 2022.

Enterprise Name	Country	Net Debt-to-EBITDA		
		2022	2021	2020
Areva	FR			
EDF	FR	26.46x	5.09x	4.16x
Engie	FR	1.82x	2.57x	2.80x
Orano	FR	1.78x	1.58x	2.79x
TechnicAtome	FR			
Enel S.p.A.	IT	3.84x	3.07x	2.77x
Eni S.p.A.	IT			
Terna	IT	4.44x	6.10x	5.76x
GSE S.p.A.	IT			
GasTerra	NL			
Energie Beheer Nederland (EBN)	NL			
TenneT	NL	51.24x	11.80x	4.89x
Gasunie	NL			
Urenco Group	NL	0.52x	0.13x	0.41x
Ultra Centrifuge Nederland	NL			

Table 18: Western and Southern Europe country SOE Net debt-to-EBITDA performance benchmarked to the Western and Southern Europe country calculated ratio value ranges.

In terms of Net debt-to-EBITDA, the best performers within Western and Southern Europe countries benchmarked to calculated ranges for SOEs within the

Western and Southern Europe countries were “Engie”, “Orano”, and “Urenco Group”.

The worst performers were “EDF”, “Terna”, and “TenneT”.

The SOEs not mentioned in the list of best and worst performers fall somewhere in the middle of the ranges, which means that they are performing relatively decent, but at the same time not standing out from the rest of the SOEs.

All countries

In the Energy sector across all countries, the average net debt-to-EBITDA ratios were 4.02x for 2020, -11.01x for 2021, and 2.16x for 2022. The median net debt-to-EBITDA ratios were 2.67x in 2020, 1.51x in 2021, and 1.68x in 2022. Therefore, an Energy sector performance across all countries can be considered optimal, on a global scale, if the Net debt-to-EBITDA ratios fall in the range of 2.67-4.02x for 2020, 1.51--11.01x in 2021, and 1.68-2.16x in 2022. The lowest (minimum) net debt-to-EBITDA ratios were -7.46x for 2020, -439.57x for 2021, and -54.43x for 2022. First quartile (bottom 25%) Net debt-to-EBITDA ratios were 0.56x for 2020, 0.04x for 2021, and 0.26x for 2022. The third quartile (upper 25%) Net debt-to-EBITDA ratios were 4.65x for 2020, 3.25x for 2021, and 3.55x for 2022. The highest (maximum) net debt-to-EBITDA ratios were 48.49x for 2020, 17.45x for 2021, and 51.24x for 2022.

In terms of Net debt-to-EBITDA, the best performers among countries benchmarked to calculated ranges for SOEs within all countries were “Petoro” AS, “AS Eesti Varude Keskus”, “Enova” SF, “Statnett” SF, SE “Ignalinos atominė elektrinė” and AS “A.L.A.R.A”.

Enterprise Name	Country	Net Debt-to-EBITDA		
		2022	2021	2020
AS Eesti Energia	EE	1.83x	2.39x	3.97x
AS Elering	EE	1.25x	4.79x	3.90x
AS Eesti Varude Keskus	EE	-1.02x	-7.44x	-7.46x
AS A. L. A. R. A	EE	-6.74x	-10.62x	16.36x
Neste	FIN	0.05x	0.01x	-0.02x

Fortum	FIN	2.10x	-1.19x	3.11x
Gasum	FIN	0.58x	-1.58x	5.45x
Fingrid	FIN	1.61x	3.31x	5.06x
Gasgrid Finland	FIN	8.25x	0.72x	0.98x
Kemijoki	FIN	17.56x	17.45x	3.72x
Motiva	FIN			
Gasonia	FIN			
Areva	FR			
EDF	FR	26.46x	5.09x	4.16x
Engie	FR	1.82x	2.57x	2.80x
Orano	FR	1.78x	1.58x	2.79x
TechnicAtome	FR			
Enel S.p.A.	IT	3.84x	3.07x	2.77x
Eni S.p.A.	IT			
Terna	IT	4.44x	6.10x	5.76x
GSE S.p.A.	IT			
AB Ignitis grupė	LT	1.74x	2.64x	1.19x
UAB EPSO-G Group	LT	5.67x	1.58x	2.57x
AB Klaipėdos nafta	LT	1.47x	2.24x	1.28x
SE Ignalinos atominė elektrinė	LT	-0.51x	-0.87x	-0.32x

Table 19: SOE Net debt-to-EBITDA performance benchmarked to the calculated ratio value ranges for SOEs of all countries. (1 of 2)

Enterprise Name	Country	Net Debt-to-EBITDA		
		2022	2021	2020
Latvenergo, AS (koncerns)	LV	2.47x	3.60x	2.36x
Sadales tīkls, AS	LV	8.38x	5.39x	5.23x
Augstsprieguma tīkls, AS	LV	0.21x	1.45x	4.81x
Rīgas siltums, AS	LV	5.11x	1.07x	1.28x
GasTerra	NL			
Energie Beheer Nederland (EBN)	NL			
TenneT	NL	51.24x	11.80x	4.89x
Gasunie	NL			
Urenco Group	NL	0.52x	0.13x	0.41x
Ultra Centrifuge Nederland	NL			
Equinor ASA	NOR	0.08x	0.13x	-0.15x
Norsk Hydro ASA	NOR	0.42x	0.55x	0.23x
Statkraft SF	NOR	0.88x	0.98x	0.36x
Aker Solutions ASA	NOR	1.93x	2.36x	1.78x
Statnett SF	NOR	-0.21x	-0.52x	-1.12x
Akastor ASA (Group)	NOR	1.53x	-0.36x	2.54x
Petro AS	NOR	-54.43x	-439.57x	48.49x

Enova SF	NOR	-19.41x	6.36x	7.54x
Gassco AS	NOR			
Rosenkrantzgate 10 AS	NOR			
Rygge 1 AS	NOR			
Vattenfall	SWE	2.68x	0.56x	0.10x

Table 20: SOE Net debt-to-EBITDA performance benchmarked to the calculated ratio value ranges for SOEs of all countries. (2 of 2)

The worst performers were “Kemijoki” Oy, “EDF”, AS “Sadales Tikls”, “Terna”, “Fingrid”, “Gasgrid Finland” and AS “Elering”.

The SOEs not mentioned in the list of best and worst performers fall somewhere in the middle of the ranges, which means that they are performing relatively decent, but at the same time not standing out from the rest of the SOEs.

6 DISCUSSION

6.1 Key Findings

The major findings of this thesis are the individual performance of SOEs in every country, every region (The Baltic States, Nordic countries, and Western Europe), and among all countries because every region has performance ranges to which the SOEs can be benchmarked and therefore quite an accurate assessment of SOE performance for each year can be made on multiple scales that also include different geographical contexts. It is clear which SOEs are underperforming, performing optimally, and exceeding the contextual performance expectations.

The best performance across all four measurements (ROA, ROE, D/E, and Net debt-to-EBITDA), when benchmarked against value ranges for all country SOEs combined, was achieved by the following companies: “Norsk Hydro” ASA, “URENCO Group”, “Equinor” ASA, “Neste” Oy, and “Statnett” SF. Congratulations to these companies for excelling in this research “test” and outperforming the average SOE on all four metrics. These companies should be analyzed more closely, particularly by their industry competitors, as they are outperforming the average European Energy sector SOE.

The worst performance across all four metrics (ROA, ROE, D/E, and Net debt-to-EBITDA) was registered by the following SOEs: “TenneT”, AS “Sadales Tīkls”, “Enel” S.p.A, and “Petro” AS. These companies should conduct an in-depth assessment of their current financial situation to identify the reasons for their underperformance when compared to other similar SOEs examined in this research.

Policymakers and stakeholders should also consider supporting these companies with strategic initiatives or reforms aimed at enhancing their financial stability and performance, as it is within each country’s best interest to have the most well-performing SOEs, which are capable of boosting economy, and development and help reduce local citizen unemployment.

Ultimately, it seems that the Norwegian SOEs are better performing than SOEs from the other compared countries when looking at all 4 of the financial metrics.

That said, it is important to note that many of the countries are not performing good or bad across all 4 of the metrics over the course of the 3 years, so there is no clear winner or loser, in a sense. More examination would be needed that includes the previous year and coming year financial information, to be able to provide a clear recommendation on whether an SOE is truly performing worse than others. The outlined examples for good and bad performances are just one way of determining company performance, but since the measured performance ratios are quite basic, they still should give an indication that there is a problem within the financial management of a company.

6.2 Implications

The discovered implications indicate performance trends across countries. For example, the average SOE in Finland and Norway outperforms the average SOE in other European countries. Since author's knowledge of the reasons behind this noticeable difference is limited, The author can only call for additional research from those who closely follow the policy and regulatory environments across Europe.

The primary purpose of this thesis and the research was to determine whether it is advisable to recommend the Latvian government to invest more in developing local SOEs. There was no intention to highlight findings suggesting that Latvia (and the rest of Europe) is managing its SOEs less effectively than its Nordic neighbours.

While the findings generally advocate for improved financial management of SOEs in the Baltics, it does not imply that Nordic and Southwestern European SOEs are free from financial management issues. Instead, it highlights a lack of well-performing SOEs in the Baltic energy sector. This thesis should not be labeled as "everything is bad," but rather as "there are still areas for improvement, and we need to identify them."

6.3 Recommendations

As this is a more quantitative study, than qualitative, there are a limited number of recommendations that would be founded by this research. The main thing to bear in mind is that this research focused solely on accurate calculations that considered as many variables as possible, to ensure the accuracy of the calculations, and therefore provide a clear and objective performance assessment of SOEs within the Energy sector. It did not focus on the qualitative aspect of financial analysis due to the enormous amount of data, time constraints, and available human capital. A team of 4 analysts, with legislative framework knowledge, would be the minimum that would be required to make a more enunciated report that focuses more on the qualitative side, accurately determining comparable companies without sacrificing the accuracy of financial calculations.

While the author identified which SOEs are underperforming and overperforming and determined the desirable median and average values for these three years, the author did not delve into the reasons behind these discrepancies, which could be numerous. The energy sector is vast and diverse, and the companies examined in this research vary significantly. Energy can be generated from multiple sources, each requiring different industrial equipment, generating different types of energy, and ultimately impacting the bottom line differently.

For example, "Latvenergo" cannot be entirely accurately compared to "Eesti Energia" because the former relies more on hydroelectric power plants, while the latter uses significant amounts of oil shale, which "Latvenergo" might use only minimally. This results in different cost structures and asset bases, making these companies quite different. Consequently, "Eesti Energia" would likely not be included in a comparable company analysis by "Latvenergo" financial analysts unless there were no more similar companies available for comparison.

7 Conclusion

7.1 Summary

This thesis aimed to analyse the financial performance of State-Owned Enterprises (SOEs) within the energy sector across previously selected European countries. Using four key financial metrics (Return on Assets, Return on Equity, Debt-to-Equity ratio, and Net Debt-to-EBITDA), the study aimed to gather insights into the operational efficiency and financial health of Energy sector SOEs across Europe.

The findings revealed significant variation in the financial performance of energy sector SOEs across the examined countries. Norway and Italy, for instance, showcased high SOE revenues and therefore also high Energy sector SOE importance to their respective GDPs, with Finland following closely. Finland consistently exhibited the highest average ROA for its Energy sector SOEs, affected by Kemijoki Oy's results, which drove up the average ROA performance. For that reason, there were added performance ranges for each country, against which the individual SOEs were benchmarked across the 4 different regions. The ROE analysis revealed that Finnish, Lithuanian and Norwegian SOEs outperformed others, suggesting relatively robust equity management practices.

Debt management practices also varied widely, with some countries like Finland, Estonia, Netherlands, Italy, and France maintaining lower Debt-to-Equity ratios, which indicated a more conservative debt usage, but it is important to note that the differences across countries were relatively small in most cases, the listed countries had ever so slightly smaller debt ratios. Norway's energy sector SOEs displayed higher D/E ratios, which could mean a more aggressive strategy of leveraging debt to finance operations and expansions. The study period, covering the years 2020-2022, was marked by the COVID-19 pandemic and the ongoing geopolitical tensions in Europe, notably the Russian invasion of Ukraine. These events most likely significantly impacted the financial metrics, with observable fluctuations in revenues, debts, and profitability across most of the examined SOEs.

The comparative analysis across the Baltic States, Nordic countries, and Western Europe highlighted those Nordic countries, particularly Norway and Finland, maintained stronger financial health and operational efficiency in their energy sector SOEs. In contrast, the Baltic States exhibited more variability and generally lower financial performance metrics. This underscores the need for continuous monitoring and strategic management of SOEs, particularly in the energy sector, to ensure their contributions to national economies remain robust. Policy-makers in Latvia and other underperforming countries might consider adopting best practices from high-performing nations like Finland and Norway, including strategies for better asset management and balanced debt utilization.

The findings from this research highlight the importance of policy reforms aimed at improving the governance and operational efficiency of SOEs in order to enhance their financial performance. Ensuring the availability and transparency of financial data across all SOEs will also aid in more accurate and comprehensive performance assessments. Future research should extend the study to include more years of data and additional financial metrics to provide a deeper understanding of long-term trends and the impact of external economic shocks. This thesis contributes fresh insights into the financial dynamics of state-owned enterprises in the European energy sector, offering a foundation for future research and policy development aimed at enhancing the efficiency and economic contributions of these crucial entities.

7.2 Future Research

Overall, while this study does paint a quite detailed picture regarding the financial performance of SOEs across Europe's Energy sector, it does not focus on the qualitative part, which would identify the reasons behind differences across SOEs. Generally, it is much simpler to find that there is a problem, but much harder to understand what specifically is that problem. The most appropriate deduction that could be made from this thesis in terms of what the reason is, would still be a wild guess. There is a need for future research into the financial performance of SOEs and what constitutes better financial health.

Additional improvements to the reliability of data would be achieved by extending the study period to cover more years, which would help in understanding long-term trends and the impact of external economic factors, such as the COVID-19 pandemic and geopolitical events, on the financial performance of SOEs. Conducting a detailed analysis of SOE performance before, during, and after major crises could, theoretically, reveal different methods in financial management practices, and show how quickly the SOE financial performance suffers and recovers from a crisis, which also would differ for every SOE.

On top of this, additional research where there was data gathered for similar privately-owned companies would be better suited for determining whether SOEs are a worthwhile investment or finding out that it would be better to leave enterprise management to be done by the private sector. Additional research could also examine specific sub-sectors and industries within the energy industry, such as renewable energy, fossil fuels, and nuclear power, which could highlight unique differences in financial performance and financial management.

As mentioned before, there should also be additional regulatory assessments, conducted by people who are well-oriented within the regulatory sphere and understand the possible intricate detail differences across regions and countries that in the end greatly affect what the SOEs can and cannot perform. The impact of recent and upcoming regulatory changes should constantly be assessed, along with their impact on the financial performance and strategic direction of SOEs. Such close examination could provide a close-up look for policymakers and managers.

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