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Equity Valuation: Galp Energia SGPS, S.A.

Gonçalo Rodrigues Afonso

Master in Finance

Supervisor:
PhD Luís Miguel da Silva Laureano, Assistant Professor,
Iscte Business School

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BUSINESS
SCHOOL

Department of Finance

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Abstract

This report was developed to find the fair value for Galp Energia SGPS, S.A. shares by the end of 2022 (31/12/2022) and compare the obtained value with the close price observed in the market on the same date, in order to enable a conclusion about the stock target price.

Galp Energia SGPS, S.A., with a total revenue of 28 622 million euros in the 2022 fiscal year is the biggest integrated oil company in Portugal, operating on several sides of the energy market with operations around the world. The past year represents a favourable year for the company, whereas 2023 will certainly be a year marked by great uncertainty in world economies and in the energy markets, which gives this analysis a relevant purpose.

To accomplish the objective of this report, it will be used several valuation methods, such as discounted cash flows and multiple methods. In addition, it will be used a sensitivity analysis to estimate possible impacts on Galp Energia SGPS, S.A., taking into consideration several scenarios and hypotheses.

After applying the referred valuation methods, with a special focus on the discounted cash flow method, the determined fair value of the company is 16.56 euros per share, which compared to 12.61 will lead to the conclusion that it is undervalued in the analyzed period.

Keywords: Galp Energia SGSP, S.A., Company Valuation, Discounted Cash Flow, Multiples Valuation, Energy industry.

JEL Classification: G30; G32.

Resumo

Este relatório foi desenvolvido para encontrar o justo valor das ações da Galp Energia, SGPS, S.A. no final de 2022 (31/12/2022) e comparar o valor obtido com o preço de fecho observado no mercado na mesma data. Para permitir uma conclusão sobre o preço-alvo da ação.

A Galp Energia SGPS, S.A., com uma receita total de 28 622 milhões de euros no ano fiscal de 2022, é a maior empresa petrolífera integrada em Portugal, operando em vários lados do mercado energético com operações em todo o mundo. O último ano de 2022 representa um ano favorável para a empresa, enquanto 2023 será certamente um ano marcado por grande incerteza nas economias mundiais e no mercado energético, o que confere a esta análise um propósito relevante.

Para atingir o objetivo deste relatório, serão utilizados diversos métodos de avaliação, tais como fluxos de caixa descontados e métodos múltiplos. Além disso, será utilizada uma análise de sensibilidade para estimar possíveis impactos na Galp Energia SGPS, S.A., tendo em consideração diversos cenários e hipóteses.

Após a aplicação dos referidos métodos de avaliação, com principal foco no método dos fluxos de caixa descontados, o justo valor da empresa é de 16.56 euros por ação, o que comparado com 12.61 levará a concluir que a mesma se encontra subvalorizada no período analisado.

Palavras-Chave: Galp Energia SGSP, S.A., Avaliação de Empresas, Fluxos de Caixa Descontados, Avaliação por Múltiplos, Setor Energético.

Classificação JEL: G30; G32.

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Glossary

Boe – Barrel of oil equivalent

CAPEX – Capital Expenditure

CAPM – Capital Asset Pricing Model

D&A – Depreciations and Amortizations

DCF – Discounted Cash Flow

EBIT – Earnings Before Interest and Taxes

EBITDA – Earnings Before Interest, Taxes, Depreciation, and Amortizations

EQV – Equity Value

EV – Enterprise Value

FCFF – Free Cash Flow to the Firm

GDP – Growth Domestic Product

GW – Gigawatts

GW/h – Gigawatts-hour

I&M – Industrial and Energy Management

IMF – International Monetary Fund

INE – Instituto Nacional de Estatística

Kboepd - Thousand barrels of oil equivalent per day

Mboe – Thousands of barrels of oil equivalent

Mboe/d - Thousands of barrels of oil equivalent per day

Mton – Millions of tons

NOA – Nom Operating Assets

O&E – Oil and Energy

P/E – Price-to-earnings Ratio

PEG – Price-earnings to grow

RC – Replacement Cost

ROA – Return on Assets

ROE – Return on Equity

ROI - Return on Equity

ROIC – Return on Invested Capital

TGR - Terminal Growth Rate

WACC – Weighted Average Cost of Capital

YTM – Yield to Maturity

Introduction

In our personal lives, as well as in the corporate world, the preparation for our next step is crucial for success. With this in mind, transporting this idea to the field of corporate finance, equity valuation, and the used methods are crucial for investors and companies planning their next step through a good investment decision.

So, the main goal of this report is to determine the fair value for Galp Energia, SGPS, S.A. shares by the end of 2022, and compare it with the close price observed in the market on the same date.

Galp Energia SGPS, S.A. is one of the biggest Portuguese companies listed in the PSI20 index and the leading integrated oil company in Portugal. It develops several lines of businesses in the energy market (operating with various resources from crude oil and natural gas products to biodiesel and solar energy), being the main consumers located in Portugal, Spain, Latin America, and some African countries. Of all the company's business segments that stands out, is the industrial & energy management segment with the commercial segment, which together, combine 87% of the total revenue, representing a value of 24 410 million euros according to the 2022 fiscal year report.

As stated by the last report published by the company, Galp Energia's total revenue has a value of 28 622 million euros, which represents a 71% growth compared with last year. The past year of 2022 represented another prosperous year in terms of revenues due to the price spike in the oil market (which will benefit the commercial segment), all this combined with a growth in fossil fuels consumption of around 5.3% (reference for July 2022, according to energy services regulator in Portugal[1]).

However, the macroeconomic outlook for 2023 and the crisis in energy markets together with the political instability can represent a risk for world economies, in particular for the South European countries, where Galp Energia SGPA, S.A. is inserted, which gives a special purpose to the aim of this report.

To accomplish the main objective of this report, several valuation methods will be used namely discounted cash flows and multiple methods, considering historical data from 2018 until 2022 and an explicit forecast from 2023 to 2027, and a perpetuity thereafter.

[1] Available at: https://www.erse.pt/biblioteca/atos-e-documentos-da-erse/?tipologia=--+Boletins&setor=&ano=&descricao=.

Thus, after an accurate analysis of all the information obtained, it will be possible to understand if Galp Energia SGPS, S.A. is overvalued or undervalued at the end of 2022.

Following the aforementioned, and, as a summary of the structure that will be followed, I will start by introducing the theoretical aspects that support the valuation methods used. After that, four chapters will follow, chapters in which it will be possible to understand both the organization of the company, details about the industry, and the economic environment.

With this basis and notion of both the surroundings and the company, the valuation will be presented, as well as the assumptions followed to reach the target price presented.

1. Literature Review: Introduction to Valuation Models

The process of valuing a company is particularly based on subjectivity and several assumptions follow until the final result. Within these assumptions is the valuation model used. Thus, Damodaran (2012) states that not the more complex and sophisticated models lead to better results, since more complex models need more inputs bringing up the probability of mistakes and input errors. Bearing this as a starting point, Damodaran (2012) suggests an important point to consider about the valuation, and I would like to highlight the referred point, which I will consider during this project: in a world where the problem is not too little information but too much, the selection of the right information and data is almost as important as the model used.

Damodaran (2002) defines three approaches to valuation:

1. Discounted Cash Flow Valuation.
2. Relative Valuation (Multiples Valuation).
3. Contingent Claim Valuation.

Thus, the subsequent contents of the literature review will be focused on the methods and respective components I will use to accomplish the valuation objective already mentioned.

1.1 Discounted Cash-Flow Valuation

The foundation to understand the discounted cash-flow model (DCF) is the idea behind the time value of money. This concept states that money today is worth more than an identical amount of money in the future, being the DCF the formalization of this idea, as mentioned by Mauboussin and Callahan (2021).

Connected to this theory, Koller et al. (2020) introduce the DCF as a model that reflects the future performance of a company into a single number. Under this assumption, a value of a company or security is dynamic, i.e., determined by the expectation of generating future cash flows. The referred future cash flows will be discounted at a rate that best reflects the risks (adjustment of the cash flows to the time value of money), being this a sensitive and crucial part of the model.

The DCF basis principles presented above can lead to a diverse list of adapted models focused on determining the fair value of an asset that generates cash flows, which according to Damodaran (2006) four variants can be exploited.

It is important to note that the choice of the model, as well as the discount rates to perform the valuation, may lead to different results.

However, in this project, the valuation through the DCF model will be done by discounting the expected future cash flows to a Weighted Average Cost of Capital (WACC), which means, the application of the Free Cash Flow to the Firm (FCFF).

1.2 Free Cash Flow to the Firm

As a variant of the DCF model, the FCFF in essence reflects the profitability of a company after the deduction of investments and expenses. In other words, Damodaran (2002, chapter 15) refers that this model reflects "the sum of the cashflows to all claim holders in the firm".

Transposing this concept to mathematical terms, we have:

$$FCFF = EBIT * (1 - t) + Depreciation\ and\ Amortization\ - \Delta\ Net\ Working\ Capital - CAPEX \quad (1)$$

Given this, the value of a company using this model is obtained by discounting the free cash flows at the weighted average cost of capital (WACC). So as referred by Damodaran (2002), the value for a stable growth firm is given by:

$$Value\ of\ Firm = \sum_{t=1}^{t=n} \frac{FCFF_t}{(1+WACC)^t} \quad (2)$$

where:

- n = last year of the cash flows to discount.
- $FCFF_t$ = Free cash flow to the firm for year t.
- WACC = Weighted Average Cost of Capital.

According to the Millennium Alliance Organization [2], oil and gas will end by 2060, i.e., in 37 years, which means that Galp Energia SGPS, S.A. business would end by this period. However, due to the renewables segment, the company business would continue in a period beyond 2060. The way to reflect the referred effect of growth beyond the explicit period of cash flows estimated is through the terminal value. So, we need to consider a terminal growth rate to determine the terminal value.

[2] Article available at: https://mahb.stanford.edu/library-item/fossil-fuels-run/.

Considering this, we must include the terminal value in the FCFF formula. So, Damodaran (2002) suggests an adjustment including this component:

$$Value\ of\ Firm = \sum_{t=1}^{t=n} \frac{FCFF_t}{(1+WACC)^t} + \frac{[FCFF_{n+1}/(WACC-g)]}{(1+WACC)^n} \quad (3)$$

where:

- n = number of cash flows to discount
- $FCFF_t$ = Free cash flow to the firm for year t
- WACC = Weighted Average Cost of Capital
- $\left[\frac{FCFF_{n+1}}{WACC-g_n}\right]$ = Terminal Value
- g = Terminal Growth Rate

Bearing the concept of the terminal value and terminal growth rate, some questions can be exploited. The first question I consider important is if the period selected in the terminal value calculations can affect the valuation. Goedhart et al. (2005), respond to this question referring that although important, the forecasting period only affects the distribution of the company value between the explicit forecast and the following years. Despite this introduction, the growth component will be explored in the section 2.2.2., since the FCFF is the crucial formula, I will consider for this project.

1.2.1 Weighted Average Cost of Capital

As mentioned in the previous chapter, and in simple terms, the WACC is used as a discount rate for the FCFF. Berk and Demarzo (2019) precisely referred that the WACC is the effective after-tax cost of capital of a company and can be obtained using the following formula:

$$WACC = \frac{E}{E+D}\, rE + \frac{D}{E+D} rD\ (1-\tau c) \quad (4)$$

where:

- E represents the Equity.
- D represents the Debt value.
- rE represents the cost of equity.
- rD represents the cost of debt.
- τc is the effective tax rate.

It is relevant to consider the importance of the WACC, and the specifications to consider in companies in the energy sector, such as Galp Energia SGPS, S.A. Dobrowolski et al. (2022) reinforces the aforementioned by referring that the energy sector, due to the high complexity of the investment projects, economic and political and regulations constraints, need special attention as to the origin of its financing sources.

It is pertinent and enriching to this project to mention the results of the study conducted by Dobrowolski et al. (2022). The main purpose of this study, according to the authors, is to cover an existing gap between the theory and the empirical studies on WACC. Thus, the results showed that energy sector companies should adjust their WACC calculations to better fit emerging market conditions and crises. This study comes within the framework of post-pandemic and recent conflicts in Europe, a situation that illustrates the political and economic instability that will mark 2023 and the following years, mainly with impacts on energy markets.

Given this, I will present the detailed components needed to calculate the WACC given the equation (4).

1.2.1.1 Cost of Equity

The cost of equity component corresponds to the return that is paid to equity holders. This may be obtained following the Capital Asset Pricing Model (CAPM), where the market risk is measured through a calculation of a Beta. The referred Beta, when multiplied by the equity risk premium, the result obtained is the total risk premium for a risky asset, as referred by Damodaran (2020).

Modigliani and Miller (1958), which represents a reference paper in this field, introduced the theory that in a perfect market (a market where there are no transaction costs, and no asymmetric or lack of information) the capital structure of the firm is independent of the cost of capital. It is logical that in practice, and in the markets, this theory is only a proxy and a starting point to understand the trade-offs and choices of companies' debt and equity structures.

However, despite the markets not presenting these characteristics of functioning, I will follow the assumptions behind CAPM that require, behind others, the following:

- The market is efficient.
- There are no transaction costs.
- Information is symmetric.

Given this, the respective cost of equity is given by:

$$rE = rf + \beta L \times (Erm - rf) \quad (5)$$

where:

- rf represents a risk-free rate.
- Erm represents the expected return of the market.
- βL represents the sensitivity of the stock to the market return.

Next, I introduce and develop each one of the components presented above.

Risk-free rate

The risk-free rate, represented by the rf, is commonly represented by an asset considered risk-free, usually government bonds. Damodaran (2008:3) in a paper that gives a framework and a guide to help in the choice of those assets, raises the basic question: "What is a risk-free asset?" or "What makes an asset risk-free?". The author alludes to the basis principle of risk in finance, which is the variance of the factual return around the expected return of the asset. A risk-free asset has its actual return equal to its expected return, and, for that reason, a government bond is considered a risk-free asset since its expected return matches the actual return over a certain period.

Regarding the choice of the risk-free asset in valuations, Damodaran (2008) suggests the use of a 10-year bond rate as a risk-free rate if we were dealing with mature markets.

Market risk premium

The market risk premium is given by the difference between the expected return of the market and the risk-free rate. In other words, and keeping in mind the applicability in practice, Fama and French (2002:62) mentioned precisely the aforementioned: "Investors care about the expected excess return they receive for taking on the risk of investing in equities. This excess return, otherwise known as the risk premium, is the difference between the expected return on common stocks and the risk-free rate of return."

Sensitivity to the market return (Beta)

Generically, beta is a sensitive measure of market volatility. As a part of the CAPM, it indicates in the model a relationship between the systematic risk component and an

expected return. With respect to the beta value interpretation, the higher the beta, the higher the riskiness of an asset, being that a beta equals zero for a risk-free asset.

For this valuation, I will use the levered beta, as we can see in equation (5) represented by βL as a consequence of the company's financing structure. According to Fernández (2003), the beta-levered formula is given by:

$$\beta L = \beta U + (\beta U - \beta d) \times (1 - T) \times \frac{D}{E} \quad (6)$$

where:

- βU is the unlevered beta.
- βd corresponds to the beta of the debt.
- T is the tax rate.
- $\frac{D}{E}$ reflects the debt-to-equity ratio.

1.2.1.2 Cost of Debt

The cost of debt, which is represented by the rD, illustrates the effective cost for the company of financing projects through third parties (financial institutions such as banks, for example). For the calculation of this component, we should incorporate the interest tax shield, i.e., the tax benefit obtained by the deduction of the interest expenses, i.e., the after-tax cost of debt.

There are two common approaches followed to arrive at the final objective: finding the cost of the debt component. We can calculate the yield to maturity (YTM) of the bonds in the market or use a proxy. The first approach will be more practical when the debt structure is not complex and when the company has traded debt. Koller et al. (2020:324) precisely refers that "for companies whose debt trades infrequently or for nontraded debt, use the company's debt rating to estimate the yield to maturity.", representing this as a proxy for the cost of debt.

So, Koller et al. (2020) introduces the after-tax cost of debt as:

$$After\ tax\ Cost\ of\ Debt = \ Cost\ of\ Debt \times (1 - Tm) \quad (7)$$

where:

- Tm represents the tax rate.

1.2.2. Growth Component

As mentioned in section 1.2., there is a growth component in the value of firm calculation. This is crucial for the analysis since this component impacts the central foundation of a DCF model, which is the capacity to generate future cash flows.

As referred by Damodaran (2002), there are three ways of estimating the growth rate, being:

- The historical growth rates.
- Use analysts' forecasts (analysts who follow the firm).
- Estimating a rate based on the firms' actions that can create value in the future.

Regarding the first method, the same will only be reliable when it is expected that the future years will not diverge from the historical period in analysis, otherwise, this cannot be an accurate way to estimate the capacity to generate future cash flows. The second method is a common method used for publicly traded companies, as referred to by Damodaran (2008).

Lastly, estimating the rate by evaluating the quality of their actions in terms of new investments that may create sustained growth and capacity to generate future cash-flows, in other words, as referred by Damodaran (2002), investment in new assets, distribution channels, and the expansion of new marketing capabilities.

In conclusion, the growth component has a crucial role in a valuation model, and from the three listed above, despite the differences we must always consider that growth and reinvestment are strongly connected, being the fundamental component to generate future cash-flows, however, only if it is sustained.

1.3. Relative Valuation (Multiples valuation)

As mentioned at the beginning of the literature review chapter, we can perform a valuation through different methods. After the detailed explanation of one of the valuation methods I will use to perform this project, this chapter will be dedicated to the development of the valuation through multiples.

In a simplified perspective, multiples are a simplified way to uniformize and compare companies with similar characteristics. This valuation method is based on a principle that

as Damodaran (2012) mentioned, unlike the DCF models that the value of an asset is based on the future cash flows, risks, and growth, the relative valuation is based on other assets with similar characteristics.

According to Fernandez (2001), we can highlight three main groups of multiples:

- Multiples based on equity value.
- Multiples are based on equity and debt value.
- Growth-referenced multiples.

As an example of the three main groups of multiples referred to by Fernandez (2001), we can consider:

Table 1.1 *- Example of the 3 main group of multiples*

Multiple groups	*Multiple*
Multiples Based on Equity Value	Price to Earnings Ratio (PER)
	Price to Asset Value
Multiples Based on Equity and Debt Value	Enterprise Value to EBITDA
	Enterprise Value to Book Value
Growth-Referenced Multiples	Price earnings to Growth (PEG)
	Enterprise Value to EBITDA Growth

Despite being a practical method, the relative valuation should be used as a complement and a comparison together with other methods like the DCF. Precisely focused on this, Goedhart and Koller (2005)[3] allude to the following: "We believe that a careful analysis comparing a company's multiples with those of other companies can be useful in making such forecasts, and the DCF valuations they inform, more accurate. Properly executed, such an analysis can help a company to stress-test its cash flow forecasts, understand mismatches between its performance and that of its competitors, and hold useful discussions about whether it is strategically positioned to create more value than other industry players are.".

However, special attention will have to be paid regarding the interpretation of the results obtained from using this method. Again, Goedhart and Koller (2005) [3] indicate that even in the same industries, sometimes analysts calculate the average price-to-earnings ratio and multiply this result by the earnings to obtain the fair value of the company. The problem that may arise from this situation is that even in the same industry,

[3] Article available at: The right role for multiples in valuation | McKinsey.

two companies can have different growth rates, capital and debt structure, and sources of revenue, things that can impact the conclusions obtained.

As a suggestion, and considering all the aspects already referred to, Goedhart et al. (2005), defined four basic principles to help companies identify the best multiples. Given this, the principles are:

- Use peers with similar ROIC and growth projections.
- Use forward-looking multiples.
- Use enterprise-value multiples.
- Adjust the enterprise-value-to-EBITDA multiple for nonoperating items.

Peer Group

The peer group plays an important part in conducting a valuation using the multiples referred to in the previous chapter. In a summarized way, the peer group is the process of finding a group of companies, with identical characteristics, i.e., provide us a benchmark to the relative valuation, in the case of this project, companies with similar characteristics as Galp.

There are several methods to select the group of companies to use as a peer group in relative valuation, but from the suggestions given by several authors, we should start with a group of companies between 8 and 15, according to Koller et. al (2020). Beyond others, we should consider as a criterion of selection:

- Companies from the same industry.
- Similar market capitalization.
- Companies whose operations are in areas with similar characteristics.
- Similar business model.

2. Macroeconomic Outlook

In this chapter, an analysis will be made of the prospects for the evolution of the surrounding economy, both internationally and in Portugal.

2.1 World

After the world economies recovered from the stagnation caused by the COVID-19 pandemic, the beginning of 2022 started with a war in Ukraine. The start of this war brought a sharp energy crisis in the markets after the Russian decision to suspend gas and oil supply to European countries.

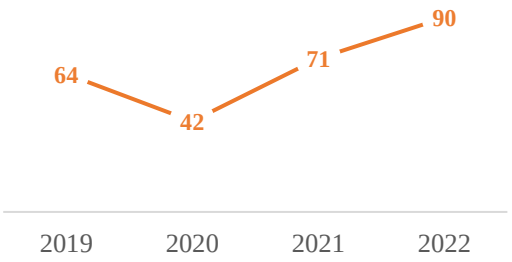


***Figure 2.1** - Evolution of the Brent price per barrel (in $), source: Galp Annual Reports (2020 and 2022).*

As a result of this energy crisis and considering that energy products are vital in all the lines of the production processes, we watched an increase in the general prices of goods and services, putting huge pressure on families and companies all over the world, with special impact in more fragile economies.

According to the International Monetary Fund (IMF), the world inflation in 2022 reached 8.8%, a maximum rate in years. However, because of the monetary policy carried out by the central banks all over the world, together with the stabilization of the energy markets, is expected a drop in inflation rates during 2023, and, again, according to the IMF the annual world inflation rate is expected to stay at 6.6%. Despite this expected decrease, this policy decision by central banks turns out to be an important point to follow during 2023, due to the pressure on debts owned by companies and families which are indexed to floating rates.

Thus, as a summary of all these factors combined, the year 2022 is translated into a combined annual growth of 3.2%, according to the IMF. Regarding 2023, it is expected that the GDP will grow by around 2.3%.

2.2 The Portuguese Reality

As part integrated into the eurozone economy, and integrated into a globalized world, the Portuguese economy did not pass by all the events described in the previous page, the effects of the war in Ukraine and the energy markets crisis, conducted Portugal to record inflation rates and growth forecasts far below to those forecasted in previous years. Despite this situation, Portugal is still above the average in the eurozone in terms of economic growth predictions.

Considering data from the Portuguese Instituto Nacional de Estatística (INE), the average annual inflation rate was 7.8% in 2022, having to go back to 1992 to find a similar value. From 2023 until 2025, there is an expectation that there will be a break in inflation levels, similar to what is referred worldwide. Considering the forecasts made by Banco de Portugal it is expected that the rate for 2023(F) to be 5.5%, 2024(F) to be 3.2%, and finally, in 2025(F) to decrease to values around 2.1%. Figure 2.2 below illustrates the evolution of the harmonized index of consumer prices from 2018 until 2025.

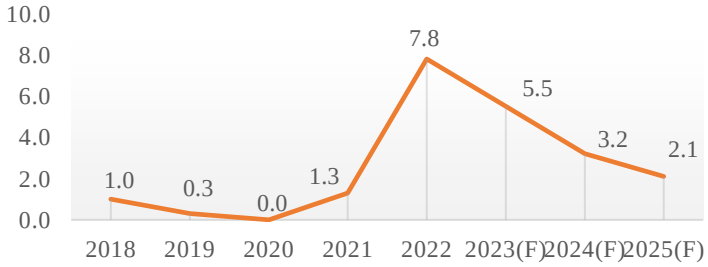


Figure 2.2 - *Harmonized index of consumer prices evolution, source: Adapted from Pordata.*

Despite the referred slowdown of inflation rates until 2025, is expected that the European Central Bank will continue to increase the reference rates, with a direct impact on EURIBOR rates, at least until the end of 2023, keeping maximum levels still in 2024. Given this scenario, the companies must evaluate their debt and credit conditions, to minimize the growing path of these rates.

By analyzing Figure 2.3, is possible to understand the growing trend, going from levels below zero to numbers around 3%.

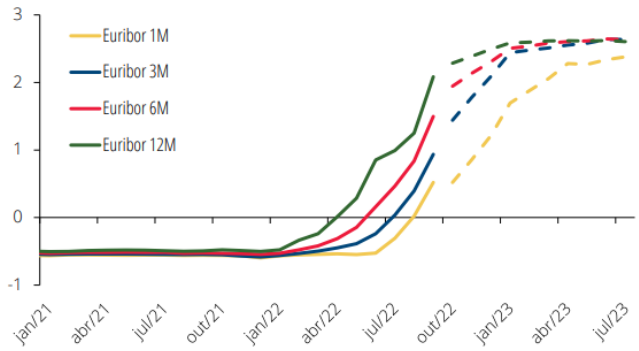


Figure 2.3 - *Euribor rates evolution, source: Banco de Portugal.*

In which economic growth concerns, it is expected that the Portuguese economy to grow in line with the other European countries, however, far below the previous year. Only around 2025, the Portuguese economy will recover from pre-pandemic levels.

3. Industry Overview

Increasingly, oil and energy companies are making their journey through a greener industry. The pressure for these changes in a sector with operations that are quite harmful to the environment, in the majority with oil and fossil fuels, comes from several sources, either by governmental laws or by a greater awareness of society regarding environmental issues. Despite this pressure for a quick change, let us analyze the functioning of this industry based on fossil fuels.

Fossil fuels are yet the main source of energy consumed. In 2022, fossil fuels weighted 75% of the energy mix of the G7 countries, what represents a huge challenge considering the objectives of decarbonization defined by governments and environmental associations.

Typically, this industry operates in a chain that can be separated into three main phases. The first phase in the chain is the upstream, which represents the extraction of natural resources from the source. Skipping now to the end, it all ends downstream which includes the refining and transformation of the "raw" energy, into energy ready to be introduced in the market. The midstream part is the part responsible for building a connection between the upstream and downstream parts. The Galp Energia SGPS, S.A. business is focused on the upstream and downstream positions in the chain.

Putting now the focus on the analysis of the numbers and dimensions of this industry, according to Reuters[4], the global O&E (oil and energy) industry earned a total of 4 trillion dollars in 2022, which puts an average of 1.5 trillion dollars in the last few years. From these numbers, it is relevant to understand the margins and the price composition of the final product, so as an example let us consider Figure 3.1[5], which collects data from 2021 and illustrates the composition of a liter of oil in several regions. By the data shown, it is possible to conclude that the taxes over fossil fuels represent almost 50% of the price paid by the consumers in the OECD zone, which reflects the importance of the governments in the construction of the final price.

[4] Article Available at: https://www.reuters.com/business/energy/oil-gas-industry-earned-4-trillion-last-year-says-iea-chief-2023-02-14/#:~:text=OSLO%2C%20Feb%2014%20(Reuters),Fatih%20Birol%2C%20said%20on%20Tuesday.

[5] Graph available at: https://www.opec.org/opec_web/en/data_graphs/333.htm.

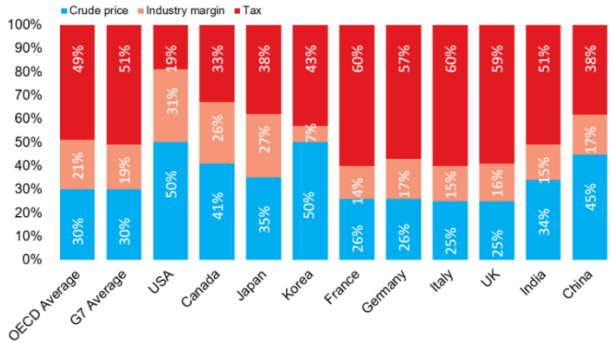


Figure 3.1 *- Weight of taxes in oil final price, source: OPEC*

As investment trends in the industry, we can expect for 2023 a global investment of around 2.8 trillion dollars, according to the International Energy Agency [6] of which 1.7 trillion dollars will be spent to clean energy. These values mean that for every 1 dollar invested in fossil energy, 1.7 dollars will now be invested in clean energy. A situation that clearly shows a shift in the industry as we used to know.

3.1 Main Players and Iberian Energy Market

Galp Energia SGPS, S.A. is one of the major players in the energy market in the Iberian Peninsula. However, their competitors are companies with a bigger dimension and influence in other markets. Thus, the purpose of this chapter is to highlight what firms operate in the same market as Galp Energia SGPS, S.A., as well as explore the concentration of the energy market in this region.

Regarding companies' operations in the integrated oil business, with a special focus on refining and upstream components, I must highlight three companies: BP, Repsol, and CEPSA.

In terms of commercialization of energy products, Galp Energia SGPS, S.A. leads the market in this region, but in the upstream business concern, Repsol and BP due to their strong presence worldwide and bigger dimension had much more influence than the Portuguese energetic.

[6] Article Available at: https://www.iea.org/reports/world-energy-investment-2023/overview-and-key-findings.

3.2 The Inevitable Change

As mentioned, there is a clear change in how energy companies look to the future, and with that comes a deep change in the production, distribution, and organization of the business, which is clear by the trend shown in Figure 3.2. Consumer patterns are crucial indicators for energy companies shaping their supply to an increasingly demanding market that demands a change in energy production sources.

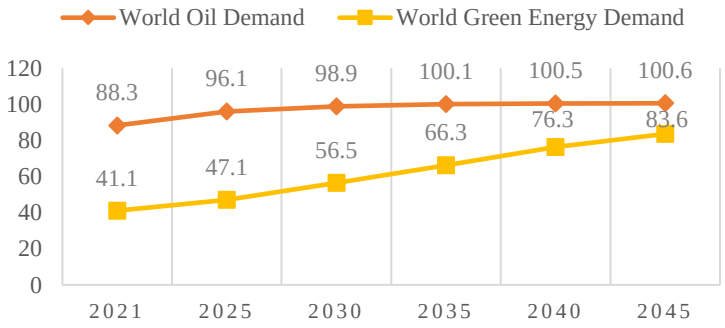


***Figure 3.2** - World demand for oil and green energy (in mboe/d), source: International energy agency.*

According to research led by McKinsey & Company [7], companies must study and carefully choose the investment timing to not lose the opportunity to be in the pole position of this transition, since most of them already have the resources and the technology to adapt to this change. From the several pillars referred to in this research, I would like to highlight the importance that McKinsey puts on the hydrogen and offshore projects since these are two main bets of Galp Energia SGPS, S.A. for the future, which puts Portuguese energy quite well aligned strategically for what will be the future of the industry.

[7] Article available at: https://www.mckinsey.com/industries/electric-power-and-natural-gas/our-insights/how-oil-and-gas-companies-can-be-successful-in-renewable-power#/.

4. Company Overview

Galp Energia SGPS, S.A. is one of the biggest Portuguese companies listed in the PSI20 index and the leading integrated oil company in Portugal, that develops several lines of businesses in the energy market. To understand the foundations of this history of success in the Portuguese corporate sector, we need to go back to 1976. In 1976, the merger between the four largest oil companies operating in Portugal took place, giving rise to Petrogal (then already the leader in refining and midstream segments). At this time, the capital of the oil company was held by the Portuguese government.

In 1999, along with the integration of the commerce of natural gas, Galp Energia SGPS, S.A. which would be privatized a year later, forming the company as we know it in the present days. During the past two decades, the company has expanded its business into all of the Iberian Peninsula, as well as in South America and some African countries, and has shown a notable growth trajectory, in line with the challenges and demands of a competitive business world.

Nowadays, the company operations are separated into 4 main business segments: upstream, industrial and energy management (I&M), commercial, and renewables, segments that I will explain in more detail in the next point of this chapter. Combined, all segments represent a total of 28 622 million euros in total revenue in the 2022FY, which represents an increase of almost 71% compared with the previous fiscal year.

4.1 Structure and Shareholder Structure

The organic structure of the company is based on the four branches of business. Given this, the four subsidiaries that support the company's activity are:

1. Galp Energia E&P BV (Upstream).
2. Petrogal, S.A. (I&M).
3. Galp New Energies, S.A. (Renewables).
4. Galp Energia, S.A. (Commercial).

It is important to note that the group's structure is composed of several other subsidiaries which are held by the aforementioned entities.

Concerning the shareholder structure, as of the end of the 2022FY, the shareholder structure is composed by:

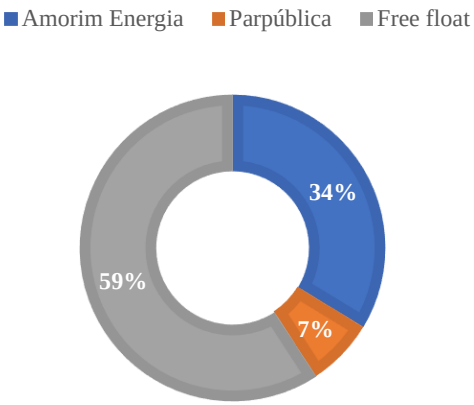


Figure 4.1 *- Shareholder structure, source: Galp Annual Reports (2020 and 2022).*

The company has a total capital of 5 117 million euros, representing a total of 815 111 548 nominal shares. As we can see, 59% of the shares are traded in the Portuguese EURONEXT market. As regards the other shareholders, the major private shareholder is Amorim Energia, and, with a minority participation we have Parpública, a company with capital held by the Portuguese government.

4.2 Business Description

As mentioned above, the company operates in 4 business segments, which I will next describe in more detail:

Upstream

This business segment is concerned with the extraction of oil and gas directly from the natural source. Currently, the company has a portfolio of upstream projects in Brazil, Angola, Mozambique, Namibia, and São Tomé e Príncipe. From this portfolio, the company highlights the projects Tupi and Iracema (two oil extraction stations both located in Brazil), and the project Rovuma Basin (a gas extraction point located in Mozambique).

Translating the total portfolio in numbers, during 2022 the same was responsible for an average annual production of 127 kboepb (thousand barrels of oil equivalent per day), the same production registered in 2021. This production generated a gross amount of 4

401 million euros in revenues, a growth of almost 49% in comparison with the 2021FY, a year with 3 058 million euros.

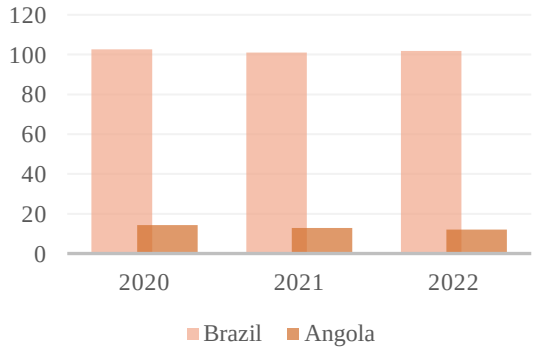


***Figure 4.2** - Oil extraction (in kboepd), source: Galp Annual Reports (2020 and 2022).*

As we can see from Figure 4.2, the main driver of this segment is Brazil. For 2023, the company has announced the sale of the operations located in Angola, which makes the operations located in South America even more important for the upstream business, being all the operations of oil extraction concentrated in Brazil.

Regarding the evolution of the company reserves, it is important to mention that despite the production showing itself constant when compared with 2021FY, the proven reserves (1P) decreased by around 10%. To understand the concept behind the reserves 1P, the Society of Petroleum Engineers refers to [8] "quantities of petroleum anticipated to be commercially recoverable by application of development projects to known accumulations from a given date forward under defined conditions. Reserves must satisfy four criteria: discovered, recoverable, commercial, and remaining (as of the evaluation's effective date) based on the development project(s) applied."

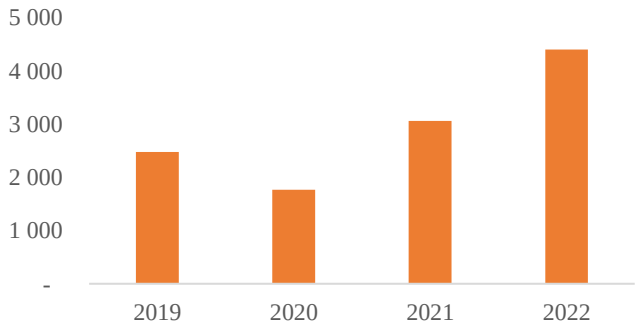


***Figure 4.3** - Evolution of upstream sales since 2019 (in €), source: Galp Annual Reports (2020 and 2022).*

[8] Available at: https://www.spe.org/media/filer_public/0c/83/0c835db9-501f-4ce7-97f1-a1d6bb4e3331/prmgmtsystem_v103.pdf, p.3.

Industrial and Energy Management

The I&M component is the branch responsible for transforming and refining fossil fuels (crude oil, gas, and biofuels), to sell fuels ready for use in industries and commercial activities.

All the industrial activities of the company are in the Iberian Peninsula, in Portugal, precisely in Sine's refinery where Galp Energia SGPS, S.A. processes its transformation activity of raw materials. According to the 2022FY numbers, a total of 88 thousand barrels of crude oil equivalent (mboe) were processed, which represents an increase YoY of almost 15%.

In terms of gross revenues, the I&M segment contributed 11 000 million euros, compared with the 6 298 million registered in the past FY. Despite the commitment of the company to decarbonize Sine's refinery, most of this increase can be attributed to the improvement of refining margin, whose evolution is illustrated in Figure 4.4, and in 2022 fixed itself into 11.6$ per barrel of oil (boe), a significant increase of 252% when compared to 2021FY.

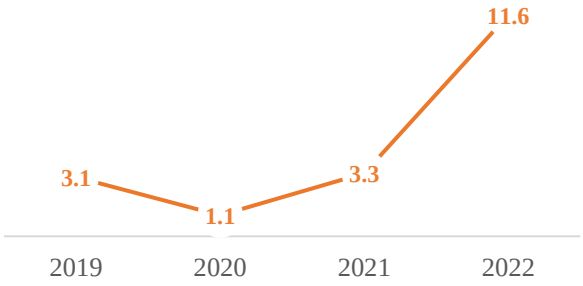


***Figure 4.4** - Evolution of the refining margin ($/boe), source: Galp Annual Reports (2020 and 2022).*

Renewables and new businesses

Despite the reduced weight in the revenue structure, contributing a total of 190 million euros in gross revenues in the 2022FY. Renewables and new businesses are the future of the company business, and, due to this, the center of its strategy of reducing the carbon footprint generated by the other business units. The renewables portfolio was spread across three different countries, Portugal, Spain, and Brazil.

This segment has a foundation in two key areas: solar energy and wind energy. Combined, at the end of 2022, the company had a production capacity (including some projects in construction) of 9 gigawatts (GW). In the next few years, we can expect an

increase in the revenues from this segment, since most of the production capacity is in development, as we can see by the graph below (please see Figure 4.5).

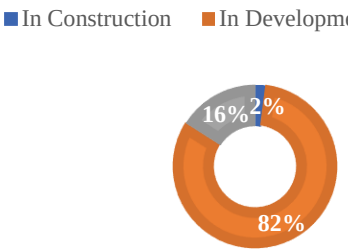


***Figure 4.5** - Distribution of the renewables production capacity, source: Galp Annual Reports (2020 and 2022).*

Beyond solar and wind energy, the company is betting on projects that can increase the value chain, and with that, generate new businesses. As an example of projects related to this, we have:

- *Lithium battery technologies:* due to the strong potential of Portugal in lithium reserves, the company has developed ways to increase the capacity of storage of energy, of this component crucial in electric mobility.
- *Corporate Venture Capital:* direct investment in companies with innovative and "green" technologies.

Commercial

Lastly, we have the commercial segment. The main objective of this business unit is to fulfill all the energy needs of the clients (for example families, and companies in all sectors of activity) with the offer of the energy products described in the other segments.

Due to the general increase in prices, caused by the crisis in all the energy markets, the income from the direct sales to customers presented, along with all the segments already described an increase in comparison to the 2021FY, a total of 13 410 million euros (compared to 7 917 million euros in the past year).

The company continues to improve and reinforce its distribution network, the electric charge stations, as well as the service areas across the Iberian Peninsula, standing out even more as the main reference in the Portuguese energy sector.

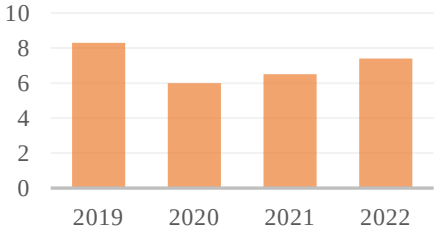


***Figure 4.6** - Sales of oil products to clients (mton), source: Galp Annual Reports (2020 and 2022).*

5. Financial Analysis

As already mentioned, 2022 represents a pleasant year in terms of revenue for Galp Energia SGPS, S.A. With this chapter, I intend to analyze these results and evaluate their quality, and the possibility of translating them into growth, making it possible to have an overview of some key indicators.

5.1 Revenues and operational efficiency

Thus, to better illustrate and understand the evolution of the total revenues (only from those related to direct business) and the revenues per segment at replacement cost (RC), from 2019 to 2022, let us consider the table presented below (please see Table 5.1):

Table 5.1 *- Revenues per segment (in €'M), source: Galp Annual Reports (2020 and 2022).*

	2019	2020	2021	2022
Upstream	2 475	1 768	3 058	4 401
I&M	6 185	4 453	6 298	11 000
Commercial	8 892	5 922	7 917	13 410
Renewables	25	33	50	190
Others	147	2 005	84	236
Consolidation Adjustments	-1 155	-1 000	-1 289	-2 320
Total Revenues	**16 569**	**13 181**	**16 118**	**26 917**

Firstly, looking at the consolidated position, it is possible to conclude that, excluding 2020, the trend is growing. When compared the year of 2019 to 2022, the consolidated revenues showed an increase of almost 62%.

The revenues directly related to direct business in 2022FY are 26 917 million euros, compared with the 16 118 million euros registered in the 2021FY, which represents a growth of 67%. This growing trend, particularly in 2022 is related to the increase in refining margin and the favourable market conditions.

Despite this evolution of revenues, if our main objective is to examine in more detail the operational profitability, we must investigate the evolution of the EBITDA margin. By looking into the evolution of the EBITDA margin, we conclude that despite the increase in revenues, from 2021 to 2022, the operational costs grew at a higher rhythm than the revenues, which means that there is no improvement in operational efficiency, being the growth in EBITDA caused by the increase of revenues due to favourable market circumstances.

To better understand the disaggregation of this indicator of operational efficiency by business unit from 2019 until 2022, please consider Table 5.2. It is important to consider

that the EBITDA and the EBITDA margin considered were the same used for the valuation (please see Annex F).

Table 5.2- EBITDA and EBITDA margin (in €'M and %), source: Galp Annual Reports (2020 and 2022) and own calculations.

	2019	2020	2021	2022
EBITDA	3 063	1 891	2 917	5 222
EBITDA Margin %	17.2%	15.2%	17.4%	18.2%

5.2 Profitability Ratios

Starting with a general view of the last four-year results, please let us consider the Table 5.3:

Table 5.3 - Historical net income (in €'M), source: Galp Annual Reports (2020 and 2022).

	2019	2020	2021	2022
Net Income	480	-534	150	1 725

The results of the 2022FY were quite higher than the previous years due to the already referred instability in energy prices, which caused the margins for energy products sold to soar. Considering these results, the profitability ratios for the period are:

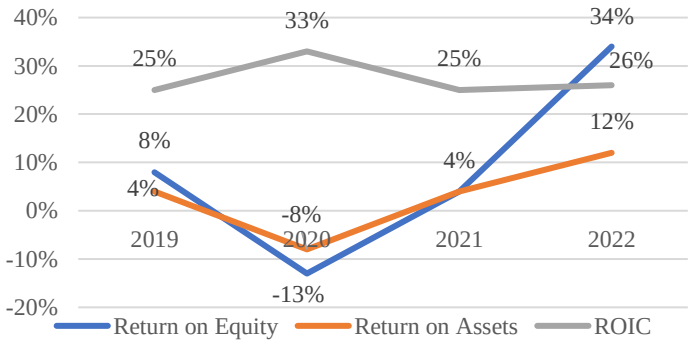


Figure 5.1 - Galp profitability ratios, source: Galp Annual Reports (2020 and 2022) and own calculations.

The Return on Equity (ROA) was 8% in 2019 and went up to 34% in 2022, being this variation explained by the great results obtained in 2022. Regarding the return on assets, the behaviour was the same, but on a smaller scale since the total assets showed an increase, although not as expressive.

The Return on Invested Capital (ROIC) reflects how a company uses its invested capital to generate profits. Over the four years, the ratio remained between 25% and 33%. This range of values is not too expressive, since years with the worst results were compensated with a lower investment as well, keeping the ratio balanced.

5.3 Liquidity

Regarding the capacity to liquidate responsibilities in a short-term period, in other words, the evaluation of the capacity of the firm to liquidate its short-term liabilities, only with its short-term assets, this can be measured, beyond others, with the following ratios displayed in Figure 5.2.

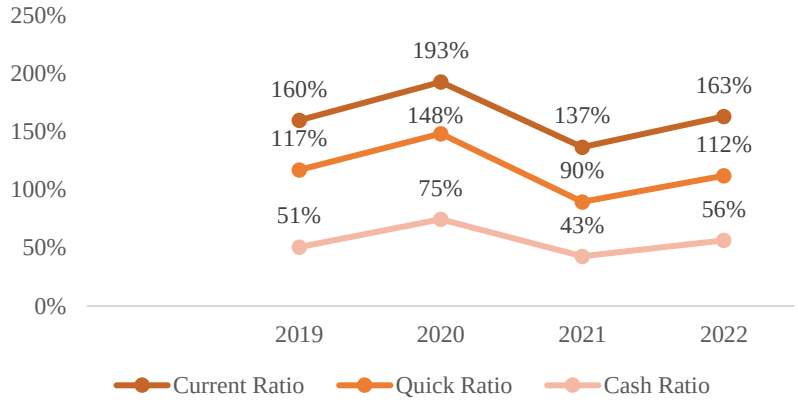


***Figure 5.2** - Liquidity ratios, source: Galp Annual Reports (2020 and 2022) and own calculations.*

From the ratios presented in Figure 5.2**,** Galp Energia SGPS, S.A. shows a comfortable position relative to its short-term responsibilities, having enough short-term assets to cover all the liabilities. The improvement compared with the 2021FY results can be explained by the continuation of the upward trend in current assets, offset by the slight decrease in current liabilities.

The current ratio illustrates the capacity of the company to pay their short-term debt, and being above 100% in all years in analysis, demonstrated the capacity to liquidate all the referred responsibilities.

The quick ratio, is quite like the current ratio, although only considers assets with a bigger liquidity, i.e., assets more easily converted into cash, such as client's receivables and others. Only in 2021, the ratio was below 100%, which means that in 2021 the company was not able to pay its current liabilities by sorting this type of funds. However, the ratio showed an improvement in 2022 with the ability to meet the obligations being restored.

Lastly, the cash ratio measures the same abilities already referred to, however, only uses cash and cash equivalents. Since Galp Energia SGPS, S.A. does not have large amounts of cash immediately available, it is normal that the same was situated around 56%, which does not represent a matter of concern.

After the analysis of the liquidity ratios, measuring the ability to solve short-term responsibilities, it is relevant to mention the evolution of the working capital. By consulting Table 6.7, where it is possible to observe the evolution of the working capital, we conclude that there is a growing trend of the current assets and current liabilities. However, the current assets grew at a higher rhythm the working capital was bigger every year from 2019 until 2022 (814 million euros in 2021 vs. 1 632 million euros in 2022, which represents an increase of 100%).

5.4 Capital Structure

Over the last five years, the total equity showed a growing trend, except in the 2021FY. In 2022, it amounted to 5 117 million euros (compared with 3 970 million euros in 2021FY, an increase of 29%).

Concerning the level of debt, it grew at a quite different rhythm than the equity, totalizing an amount of 10 979 million euros in 2022FY, a slight increase compared with the 10 942 million euros in 2021FY (a residual increase of 0.34%).

Through Figure 5.3 is possible to analyze the evolution of both components over the last four years.

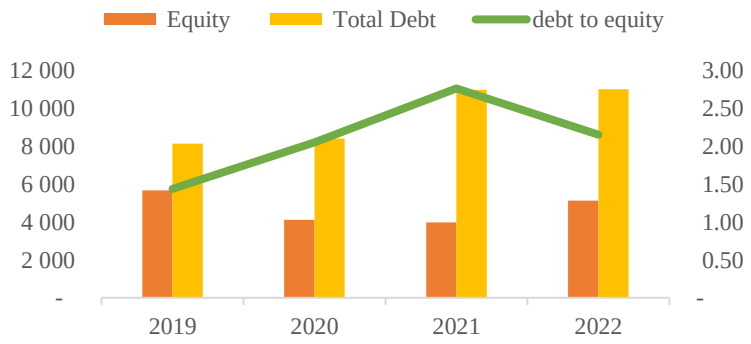


Figure 5.3 *- Capital Structure, source: Galp Annual Reports (2020 and 2022).*

Still relative to the evolution of the equity, it is important to note that the increase registered from the 2021FY to the 2022FY comes from the incorporation of the satisfactory results obtained in the last fiscal year. The debt vs. equity structure has reflected the commitment of the company to stabilize its debt, however, the demands of a market in constant changes require an increase in the investment, which will inevitably cause these components to increase.

5.5 Stock Performance

Figure 5.4 shows the evolution of the close price of Galp Energia SGPS, S.A., with monthly frequency from 01/01/2018 until 31/12/2022, with comparison to the PSI20 Index, for the same period.

Analyzing the evolution of the stock price, from 2018 to 2022 the share price has fallen about 19.4%, which represents a decrease of 3 euros. It is important to note the effect of the COVID-19 pandemic in all the markets around the world which had a direct impact on the prices in 2020.

The stock closed 2022 trading at 12.61 euros per share, being during the present year that he reached the highest price since 2020.



***Figure 5.4** - Evolution of the stock price (in €), source: Yahoo Finance.*

6. Valuation

The valuation of Galp Energia SGPS, S.A. is performed by using the FCFF model in order to achieve the main goal of this project, which is to obtain the fair value of the share price as of the end of 2022. With the FCFF valuation performed, it going to be presented a sensitivity analysis to understand how changes in WACC, and the TGR impact the share price. Finally, to complement and check the obtained results, a Relative Valuation using multiples will also be presented.

6.1 Assumptions and forecast period

Over the next sections, several assumptions will be followed. The historical period used to perform the valuation is 2019-2022, being the foundation of the assumptions related to the forecasted period dated between 2023-2027. The referred assumptions rely on each business unit of the company with information and market expectations for the forecasted period. Given this, the business units considered are: Upstream, I&M, Commercial, and Renewables.

It is also important to refer that the period beyond 2027, was determined as terminal value since the model is built assuming perpetual cashflows.

6.1.1 Revenues

Upstream

The upstream business segment was responsible for almost 4 401 million euros in revenues in the 2022FY, being stated as the third biggest segment of the company in terms of sales. For the forecasted revenues of this business unit (which can be seen in Table 6.1), it was considered essentially two key aspects: the amount of oil and gas extracted, as well as the reference market price of the Brent barrel.

Regarding the oil and gas extracted, it was considered that the extraction rhythm for the forecasted years will vary according to the annual demand for oil and gas in the OECD area (please see annex G). According to this indicator, and considering the efforts made to transform the economies using green energy, the demand for fossil fuels will begin to diminish around 2025 (please see Annex C and G). This will make companies and individuals look for alternative sources of energy that are less polluting for their activity, a change in consumption patterns that will impact sales of this segment directly.

Concerning the market price for the Brent barrel, The Economist Intelligence Unit [9] provides forecasts for the price per barrel (in USD) from 2023 until 2024. However, the company sold the final product after applying a discount relative to the market price (discount which is a company policy, as stated by Alpalhão (2020)). This discount was considered for the calculation of the revenues of the segment. It is important to note that since the reference prices for the Brent barrel are in USD, they were converted at the exchange rate shown in the table in Annex H whenever it is used.

Table 6.1 *- Upstream revenues forecast (in €´M), source: Own calculations.*

Upstream	2019	2020	2021	2022	2023F	2024F	2025F	2026F	2027F
Segment Revenues	2 475	1 768	3 058	4 401	3 779	4 258	4 147	3 967	3 786
Growth %		*-28.57%*	*72.96%*	*43.92%*	***-14.13%***	***12.68%***	***-2.62%***	***-4.33%***	***-4.57%***
Weight on total revenues	13.91%	9.94%	17.19%	24.74%	**21.24%**	**23.94%**	**23.31%**	**22.30%**	**21.28%**

.

I&M

This business unit is responsible for refining and transforming the raw material into fossil fuels ready to use. In the 2022FY, stands out as the second biggest segment in terms of revenues. Shortly, the main drivers to determine the sale price are given by adding to the market reference price a refining margin.

First, before starting to attribute a unitary value to the quantities processed, let us introduce the evolution of the quantity produced from 2023-2027. At the end of the 2022FY Galp was operating practically at his maximum capacity of refining, and since it is not expected this capacity to grow significantly, the evolution of the materials processed is obtained by calculating the past four years moving average (see Annex C).

With an estimation of quantities for each year of the forecasts, it will be necessary to estimate the refining margin compared to a barrel of Brent to arrive at what will be the theoretical sales price for the products in question. The refining margin for the historical years was obtained by calculating the gross revenue per kboe processed compared to the Brent market price for each year. For the forecast period, was applied the past four-year moving average for each year, respectively.

As we can observe by analyzing the table in Annex C**,** it is expected that the refining margin drops to 19% in 2023F, compared to the 39% registered in 2022, due to the already referred crisis in energy markets. From 2024F until 2027F, it is expected the stabilization

[9] Available at: https://www.eiu.com/n/.

of this margin because of the stabilization of Brent barrel reference prices in international markets, and it is assumed to fluctuate between 24% and 27% in the mentioned period.

These factors combined, make the segment sales vary by an average of -3% from 2024F until 2027F, as is possible to observe by the data presented in Table 6.2.

***Table 6.2** - I&M revenues forecast (in €'M), source: Own calculations.*

I&M	2019	2020	2021	2022	2023F	2024F	2025F	2026F	2027F
Segment Revenues	6 185	4 453	6 298	11 000	7 774	8 566	8 248	8 226	7 620
Growth %		*-28.00%*	*41.43%*	*74.66%*	***-29.33%***	***10.19%***	***-3.71%***	***-0.26%***	***-7.37%***
Weight on total revenues	34.77%	25.03%	35.40%	61.84%	**43.70%**	**48.15%**	**46.37%**	**46.24%**	**42.84%**

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Commercial

The commercial business unit sells energy products directly to families and companies, being the biggest revenue source of the company. Following the same reasoning of the previous segments, we will then have to determine quantities sold for each forecasted year and subsequently value them to estimate the revenues.

For the determination of the quantities sold, and considering the data published by the company regarding quantities sold between 2019-2022, it was applied the same reasoning as for the upstream, by linking the number of quantities sold to the demand for oil and gas products at the OECD area for each year until 2027F.

With regards to the average selling price of these products, there is an important detail as presented in Table 6.3. The company publishes the quantities sold in different physical measures since we are dealing with material with different physical characteristics, which is oil and gas. To calculate the average sell price of gas, and oil, it was necessary to find a measure of equivalence between both materials.

Thus, the historical average sale price was obtained taking into account the thermal parity concept[10], which derives a ratio where one barrel of oil is equivalent to 5.85 MMBtu, i.e., a 6:1 theoretical ratio. With this division, it will be possible to determine the respective historical average sales price for gas and oil being that the forecasted values are calculated using the four-year moving average for each year respectively.

These assumptions lead to an average growth of 5% in revenues for the commercial segment for the period between 2024F-2027F, as it is possible to observe in Table 6.3.

[10] Article Available at: Are Crude Oil & Natural Gas Prices Linked? - CME Group.

Table 6.3 *- Commercial revenues forecast (in €´M),* source: Own calculations**.**

Commercial	2019	2020	2021	2022	2023F	2024F	2025F	2026F	2027F
Segment Revenues	8 892	5 922	7 917	13 410	9 216	9 681	10 232	10 448	9 641
Growth %		*-33.40%*	*33.69%*	*69.38%*	***-31.27%***	***5.04%***	***5.69%***	***2.11%***	***-7.73%***
Weight on total revenues	49.99%	33.29%	44.51%	75.38%	**51.81%**	**54.42%**	**57.52%**	**58.74%**	**54.19%**

Renewables

This is the segment with the most growth potential over the next few years. The main driver is solar energy, which is then the central point of these forecasts. Generally, revenues forecast rely on what will be the solar energy production capacity, multiplied by the reference price in the markets for the electricity in EUR/Mwh.

Galp Energia SGPS, S.A. announced their intent to expand their production capacity to 4GW until 2025, beyond the 1.6 GW increase announced for 2023. The growth in operational capacity considered was 1.6 GW for 2023, and an average growth of 1.2 GW per year from 2024F to 2027F. Therefore, consider that production will increase by the same percentage as the operational capacity varies over the forecasted period.

Lastly, the reference price for electricity was obtained by consulting the forecasts available in the Thomson Reuters database. With this, we can expect a huge growth potential of this segment, growing an average of 43% from 2024F to 2027F, as is possible to observe by analyzing Table 6.4.

Table 6.4 *- Renewables revenues forecast* (in €´M)*, source: Own calculations.*

Renewables	2019	2020	2021	2022	2023F	2024F	2025F	2026F	2027F
Segment Revenues	25	33	50	190	176	380	505	570	637
Growth %		*32.00%*	*51.52%*	*280.00%*	***-7.13%***	***115.47%***	***32.70%***	***13.02%***	***11.78%***
Weight on total revenues	0.14%	0.19%	0.28%	1.07%	**0.99%**	**2.14%**	**2.84%**	**3.21%**	**3.58%**

Total Revenues

Combining the revenues of each segment with other types of revenues, adjusted by consolidation adjustment we obtain the consolidated revenue of Galp Energia SGPS, S.A. This type of revenue and adjustments, given its immateriality and deviation from the main sources of revenue, was estimated by calculating the four-year moving average for each year, in case of other revenues, and for the consolidated adjustments in average of the past weight on the revenue structure.

Thus, it is possible to observe that it is expected that in 2023F the consolidated revenues show a sharp drop compared to 2022 due to the stabilization of energy prices in the markets. However, they will show a slight recovery in the following years, except for 2027F (please see Annex F).

6.1.2 Operational expenses and EBIT

The energy business is complex and demands either highly qualified labor or external services, needed to ensure the regular functioning of all the integrated activities of the company.

Excluding the cost of goods, Galp Energia SGPS, S.A. operational cost structure relies precisely on several external highly specialized services and in wages and salaries costs. The costs presented in Table 6.5 were calculated as a percentage of the historical revenues, whose weights relative to the forecast period were obtained through the moving average of the last four-year period respectively. The details about each cost component can be consulted in Annex D and Annex E.

Table 6.5 *- Operational cost disaggregation* (in €´M), *source: Own calculations.*

Operarional Costs	**2019**	**2020**	**2021**	**2022**	**2023F**	**2024F**	**2025F**	**2026F**	**2027F**
Cost of sales	12 592	8 461	11 752	20 921	15 591	16 930	17 404	17 513	16 217
External Services and Supplies	1 650	1 473	1 563	1 888	1 928	2 108	1 946	1 909	1 886
Wages and salaries	346	356	310	370	390	401	409	417	424
Other operational costs	132	156	111	88	149	163	136	134	140
Provisions and impairment at receivables	6	114	74	133	90	117	105	110	103
EBITDA	**3 063**	**1 891**	**2 917**	**5 222**	**2 565**	**2 779**	**2 734**	**2 878**	**2 660**
EBITDA Margin %	**17.22%**	**15.19%**	**17.44%**	**18.24%**	**12.15%**	**12.05%**	**11.73%**	**12.30%**	**12.17%**
Growth %	**-**	**-38.26%**	**54.26%**	**79.02%**	**-50.87%**	**8.32%**	**-1.62%**	**5.28%**	**-7.57%**
Depreciation, Amortization and impairment losses	979	1 289	961	1 380	1 245	1 395	1 315	1 310	1 270
EBIT	**2 084**	**602**	**1 956**	**3 842**	**1 320**	**1 384**	**1 419**	**1 568**	**1 391**

6.1.3 CAPEX and D&A

The last year was marked by an extraordinary investment in maintenance that took place in some extraction platforms used in the upstream business. This maintenance process is highly specialized and therefore it was necessary to make large investments. With the uncertainty around the world economies, as well as in the energy markets, the investments for 2023F and the following years are expected to slow down compared to 2022.

Given this, the CAPEX evolution is presented in Table 6.6. It is important to note that D&A was calculated based on the percentage variation of the CAPEX (please see Annex E).

Table 6.6 *- CAPEX forecast* (in €´M), *source: Own calculations.*

CAPEX	**2019**	**2020**	**2021**	**2022**	**2023F**	**2024F**	**2025F**	**2026F**	**2027F**
CAPEX	856	898	936	1 265	1 141	1 279	1 205	1 201	1 164
Growth %		4.91%	4.23%	35.15%	**-9.78%**	**12.05%**	**-5.74%**	**-0.40%**	**-3.05%**
% of Revenues	4.81%	7.21%	5.60%	4.42%	**5.51%**	**5.68%**	**5.30%**	**5.23%**	**5.43%**

6.1.4 Working Capital

Galp Energia SGPS, S.A. publishes the data related to working capital, and it is possible to establish that in all periods the current assets are superior to the current liabilities, being the difference between them bigger over the years under analysis, which means that the current assets grow at a higher rhythm that the current liabilities.

The forecasts for this segment were obtained through the historical average weight on the company revenues, as it is possible to seen in Table 6.7.

***Table 6.7** - Working capital forecast* (in €´M), *source: Own calculations.*

Working Capital	2018	2019	2020	2021	2022	2023F	2024F	2025F	2026F	2027F
Consolidated Accounts	814	952	597	1 879	1 632	1 173	1 355	1 562	1 502	1 345
% Revenues	3.93%	4.23%	2.63%	8.18%	7.62%	**5.66%**	**6.02%**	**6.87%**	**6.54%**	**6.28%**
Var WC	-	138	-355	1 282	-247	-459	182	207	-60	-158

6.1.5 Effective Tax Rate

Galp Energia SGPS, S.A., as well as many other oil firms around Europe, are under very complex and high tax legislation. Disregarding other tax law specifications (some of them variable according to the results), the historical rate applied to the company was 31.5%, a rate that was considered in all forecasted years.

6.1.6 Weighted Average Cost of Capital (WACC)

Capital Structure

For the determination of the capital structure of Galp Energia SGPS, S.A., was determined the market value of debt and equity. The market value of debt was considered to be the book value, whereas the market value of equity was obtained by multiplying the number of shares outstanding by the share price on 31/12/2022 (please see Table 6.8).

***Table 6.8** - Capital structure detail* (in €´M), *source: Galp Annual Reports (2022 and 2020), and own calculations.*

Capital Structure	2019	2020	2021	2022
Shares Outstanding	771 203 091	771 203 091	771 203 091	757 032 034
Share Price	14.90	8.75	8.52	12.61
Market Value of Equity	11 491	6 748	6 571	9 546
Market Value of Debt	2 894	3 743	4 300	3 987
D/E	**25.19%**	**55.47%**	**65.44%**	**41.77%**

Risk-Free Rate and Country Risk Premium

As risk risk-free rate, it was used as a proxy for the average daily yield during 2022 of the 10-year German government bonds. As country risk premium it was considered to be the difference between German Government bonds and 10-year Portuguese government bonds (considering the same data frequency as the German bonds, please see Table 6.9).

Table 6.9 *- Country risk premium, source: Own calculations*

CRP	
10y German Bond	1.21%
10y Portuguese Bond	2.16%
CRP	**0.96%**

Cost of Debt

With the lack of information about debt yields, the cost of debt (r_d) considered in the WACC computations was adding to the risk-free rate a specific default spread reflecting the risk of the country in which the company operates. The default spread was obtained, again by consulting the Damodaran website[11] regarding default spreads and country risk premiums. Thus, the cost of debt was obtained by adding the default spread for Portugal, which is 2.04%, to the already presented risk-free rate, totaling 3.25%.

Market Risk Premium (MRP)

For this component, the same method is for the Unlevered Beta. The Market Risk Premium was obtained by consulting the Aswath Damodaran website[12] and corresponds to a value of 7.89%.

Betas

The Unlevered Beta (β_u) was obtained by consulting Damodaran´s data available on his website[13]. According to the information available, was selected the integrated oil industry and an effective tax rate of 31.5% and, given this, the unlevered beta obtained was 0.72.

To compute the Levered Beta β_L, it is now necessary to compute the Beta of Debt (β_d). Given this, the Beta Debt is computed using equation (8), as follows:

[11] Article Available at: pages.stern.nyu.edu/~adamodar/New_Home_Page/datafile/ctryprem.html.
[12] Article Available at: pages.stern.nyu.edu/~adamodar/New_Home_Page/datafile/ctryprem.html.
[13] Article Available at: Betas (nyu.edu).

$$\beta_D = \frac{r_d - (r_f + CRP)}{MRP} = \frac{3.25\% - (1.21\% + 0.96\%)}{7.89\%} = 0.14 \quad (8)$$

Now, with the two needed betas computed, it is possible to estimate the Levered Beta, following equation (6). So, the computations are:

$$= 0.72 + (0.72 - 0.14) \times 42\% \times (1 - 31.5\%) = 0.89$$

Cost of Equity

After obtaining all the components needed, it is now possible to compute the cost of equity. Considering the CAPM, the cost of equity is given by equation (9):

$$R_e = (r_f + CRP) + \beta_L \times MRP \quad (9)$$

$$= (1.21\% + 0.96\%) + 0.89 \times 7.89\% = 9\%$$

WACC Computation

After all the necessary parameters are estimated, is now possible to compute the WACC used in this valuation.

A brief note relative to the values of E/(E+D) and D/(E+D) components': It is expected that the company will reduce its debt in the coming years, similar to what occurred in 2021 and 2022, so it is considered prudent, given the period that the calculations cover, to stabilize these values in a relationship of 80% to 20%, since the actual values are relatively close.

Table 6.10 below, shows briefly the inputs considered to achieve a WACC of 7.8%.

Table 6.10 *- WACC components, source: Own calculations*

WACC	
Re	9.16%
E/(E+D)	80.00%
D/(E+D)	20.00%
Rd	3.25%
t	31.50%
WACC	**7.77%**

6.2 Discounted Cash Flow Valuation

The forecasts referred to in the previous chapter, Revenues, Operational costs, Depreciation and Amortization Capex, Working Capital, and WACC will be used to compute the FCFF, discounted using the estimated WACC.

6.2.1 Free Cash Flow to the Firm

The FCFF shows the value that the company can generate after deducting all operational expenses, where were included the elements above mentioned. Over the forecasted years, it is expected a significant decrease in the FCFF in 2023F, however, stabilizing in the following years (please see Table 6.11). If we analyze the evolution of the EBITDA, as well as the Operating Cash-Flow we conclude both are considerably stable over the forecasted years, which means that no major changes in the company's operational component are expected, being the value generated impacted by the variations of the CAPEX and Working Capital.

Table 6.11 - *FCFF computation* (in €´M), *source: Own calculations.*

DCF	2019	2020	2021	2022	2023F	2024F	2025F	2026F	2027F
EBITDA	**3 063**	**1 891**	**2 917**	**5 222**	**2 565**	**2 779**	**2 734**	**2 878**	**2 660**
Depreciation & Amortization	-979	-1 289	-961	-1 380	-1 245	-1 395	-1 315	-1 310	-1 270
EBIT	**2 084**	**602**	**1 956**	**3 842**	**1 320**	**1 384**	**1 419**	**1 568**	**1 391**
Taxes	-656	-190	-616	-1 210	-416	-436	-447	-494	-438
NOPLAT	**1 428**	**412**	**1 340**	**2 632**	**904**	**948**	**972**	**1 074**	**952**
Depreciation & Amortization	979	1 289	961	1 380	1 245	1 395	1 315	1 310	1 270
Operating Cash-Flow	**2 407**	**1 701**	**2 301**	**4 012**	**2 149**	**2 343**	**2 287**	**2 384**	**2 222**
CAPEX	-856	-898	-936	-1 265	-1 141	-1 279	-1 205	-1 201	-1 164
ΔWC	138	-355	1 282	-247	-459	182	207	-60	-158
FCFF	**1 689**	**448**	**2 647**	**2 500**	**549**	**1 246**	**1 289**	**1 124**	**901**

6.2.2 Terminal Growth Rate

The terminal growth rate (g) represents the rhythm in which the cash flows of the company are expected to grow perpetually, in the case of this valuation, after 2027F. As terminal growth rate was assumed the GDP growth expected for 2027 in the Eurozone, since it is in this geography that Galp places its products and services on the market. Considering all of these, the g component represents a 1.8% growth rate. Applying the terminal growth rate, was obtained a Terminal Value of 14 953 euros.

6.2.3 Enterprise Value

Taking as a starting point the FCFF presented in Table 6.12 and applying the discount of each cash flow at the WACC, as well as the incorporation of the terminal value, it is now possible to achieve the enterprise value of Galp Energia SGPS, S.A. The enterprise value (EV) consists of the sum of the cash flows discounted at the WACC, plus the terminal value.

Table 6.12 - EV computation (in €´M), *source: Own calculations.*

Enterprise Value	2023F	2024F	2025F	2026F	2027F
FCFF	549	1 246	1 289	1 124	901
TV					14 953
PV FCFF and TV	**510**	**1 072**	**1 030**	**833**	**11 083**
EV	**14 528**				

6.2.4 Equity Value

Finally, after obtaining an enterprise value of 14 528 million euros, it is necessary to calculate the equity value to determine the target price per share. The equity value is given by adding the non-operating assets and subtracting the debt. After this adjustment, the division between the equity value and the number of shares outstanding results in a target price of 16.56 euros per share (please see Table 6.13).

Table 6.13 - Galp target price (in € M and share price in €), *source: Own calculations.*

Equity Value	
Enterprise Value	14 528
NOA	4 080
Net Debt	6 071
EQV	12 537
Shares Outstanding	757
Target Price	**16.56**

6.2.5 Sensitivity Analysis

As it is possible to ascertain, the several steps of building this valuation model require several assumptions that a small change directly impacts the final target price per share. This section reflects exactly what changes in critical inputs used in the valuation model impact the target price. The inputs chosen are WACC and the Terminal Growth Rate with a range scenario of ± 1% for each component. The results are the following:

Table 6.14 - Sensitivity analysis results, source: Own calculations

Enterprise Value		WACC				
		6.77%	7.27%	**7.77%**	8.27%	8.77%
g	0.75%	17.23	15.75	14.48	13.37	12.40
	1.25%	18.61	16.89	15.44	14.19	13.11
	1.75%	20.25	18.24	**16.56**	15.14	13.91
	2.25%	22.27	19.86	17.89	16.24	14.84
	2.75%	24.78	21.84	19.47	17.54	15.92

Table 6.15 - Sensitivity analysis results (in %), source: Own calculations

Enterprise Value		WACC				
		6.77%	7.27%	**7.77%**	8.27%	8.77%
g	0.75%	4.04%	-4.90%	-12.59%	-19.26%	-25.10%
	1.25%	12.35%	2.00%	-6.78%	-14.31%	-20.85%
	1.75%	22.31%	10.15%	**0.00%**	-8.61%	-16.00%
	2.25%	34.47%	19.93%	8.00%	-1.95%	-10.40%
	2.75%	49.65%	31.86%	17.60%	5.90%	-3.87%

As we can observe, the range of target prices goes from 12.4 euros per share to 24.8 euros per share, which shows that the price is very sensitive to changes in both components.

6.3 Relative Valuation

After performing a valuation through the DCF approach, the multiples valuation will work as a "back test" of the obtained results, however, it will be necessary to interpret the results obtained with caution. In this chapter, the multiples used are the EV/EBITDA and the Price-to-Earnings ratio.

Firstly, it is necessary to select an adequate peer group, i.e., a group of companies with similar characteristics and operational performance. The peer group was chosen, following the method presented in Table 6.16:

Table 6.16 - Peers group, source: Reuters and own calculations.

Peer Group			
Company	**Country**	**P/E**	**EV/EBITDA**
BP PLC	United Kingdom		2.71
Eni SpA	Italy	3.34	2.15
Equinor ASA	Norway	3.98	1.25
Neste Oyj	Finland	17.50	12.23
OMV AG	Austria	4.33	1.76
Repsol SA	Spain	5.01	1.75
TotalEnergies SE	France	7.99	2.34
Average		**7.03**	**3.46**
Standard Deviation		5.38	3.90
Average + Standard deviation		12.41	7.35
Average - Standard deviation		1.64	-0.44

Average excluding outliers	**4.93**	**1.99**

Considering the method above, were selected a group of 6 companies of which 4 are integrated oil companies, and 2 from oil/gas reefing and commercial activity which is not entirely the business of Galp Energia SGPS, S.A., although represents almost the totality of the revenues, and for that reason were included in the per group.

Table 6.17 - Relative valuation results (in €'M and share prices in €), source: Own calculations.

Relative Valuation	P/E Valuation	EV/EBITDA
Peer group	4.93	1.99
Net Income	1 983	-
EBITDA	-	5 222
Enterprise Value	-	10 405
Equity	9 776	8 414
Shares Outstanding	757	757
Share Price	**12.91**	**11.11**

Upside/Downsize potential	**-22.02%**	**-32.89%**

The calculations followed to obtain the theoretical share price were:

- P/E Valuation: considering the P/E ratio of each firm presented as a possible peer, was made an average of these ratios, and after that a standard deviation to sum and subtract to this average. This process is followed to identify and exclude outliers that can affect the results obtained, which is the case of Neste Oyj (see Table 6.16). With the outliers excluded, it was obtained an average P/E ratio of 4.93. The share price was obtained by multiplying the average peer ratio by Galp's net income of 2022FY, divided by the number of shares outstanding, which led to a share price of 12.91 euros.
- EV/EBITDA: the process of selecting the peer group to calculate the average ratio was the same as followed in the P/E Valuation. The share price was obtained by multiplying the average ratio by Galp Energia SGPS, S.A EBITDA of 2022. After this multiplication, was computed the EQV and divided by the number of shares outstanding, obtaining a share price of 11.11 euros.

6.4 Analyst Expectations

Galp Energia SGPS, S.A. provides on their website a list of recommendations and target prices published by analysts and investment banks. Collecting the expectations published on the company website[14], and other research notes relating to the last quarter of 2022 and the beginning of 2023, we have:

[14] Information Available at: https://www.galp.com/corp/pt/investidores/informacao-ao-acionista/cobertura-de-analistas.

Table 6.18 - Analysts expectations (in €), *source: Company website*

Analyst	Date	Target Price
Equita SIM	25/10/2022	14.4
Goldman Sachs	07/11/2022	16
Jefferies International	20/12/2022	17
Mediobanca	14/02/2023	13

Now having an aggregated view of the set of analyst's opinions available on company's website[15], we conclude that the volatility registered in the energy markets make the range of possible target price quite vast (please see Table 6.19 below).

Table 6.19 - Range of analysts' expectations (in €), *source: Company website*

	Average	Min.	Max.
Target Price (Eur)	13.54	10.60	19.00

6.5 Valuation Results

The results obtained are summarized in Table 6.20, reflecting the fair value of Galp Energia SGPS, S.A. performed through a DCF valuation and a Relative valuation at the end of 2022.

Table 6.20 - Valuation results (in €), *source: Own calculations.*

Model	Share Price
Closing price 2022	12.61
FCFF	16.56
EV/EBITDA	11.11
P/E	12.91

As is possible to observe in Table 6.20, the results obtained from the FCFF are the furthest from the closing price, being that for this model a price of 16.56 euros per share was obtained, which represents an upside potential of almost 32%.

This disparity between the closing price and the FCFF price is consensual for the analysts, showing that at the end of 2022, with the assumptions and market information available Galp Energia SGPS, S.A. stock had a recommendation of buy.

On the other hand, the results of the relative valuation were considerably different from the ones obtained by the FCFF, leading to a downside potential of 22% for the P/E and 33% for the EV/EBITDA when compared to the FCFF price. These results can be explained by the fact that if we look for the P/E and EV/EBITDA ratio of Galp Energia

[15]Information Available at: https://www.galp.com/corp/pt/investidores/informacao-ao-acionista/cobertura-de-analistas.

SGPS, S.A we conclude that they are quite above the average ratios of the peer group. The peer group is composed of companies with different dimensions and markets, but mainly with different operational efficiency, a situation that could make the results obtained with this group of peers undervalued.

Conclusion

The main objective of this report is to determine the fair value of Galp Energia SGPS, S.A. at the end of 2022 using the FCFF and relative valuation methods.

Taking as a starting point the literature review chapter, it was possible to obtain a theoretical basis that supported all the concepts used for evaluations using the aforementioned methods. After that, a framework was created that allowed us to understand the company's operations, as well as the entire external environment that can affect the valuation made.

With the theoretical framework carried out, the main objective of this report was developed. The results obtained allowed us to conclude that, under the FCFF model, the stock was undervalued by 32%, which corresponds to a target price of 16.56 euros per share.

The relative valuation using P/E and EV/EBITDA, regarding the peer group, did not allow obtaining results consistent with the FCFF valuation. The results obtained using these methods resulted in a price per share of 12.91 and 11.11 euros, respectively.

Thus, we are assisting a period marked by great volatility in energy markets, especially with which the Brent reference price is concerned, which requires that all the assumptions and forecasts must be reviewed quite regularly, and the recommendation, as well as the target price, may change considerably in a short period.

References

Alpalhão, M. A. (2020). EQUITY RESEARCH GALP ENERGIA SGPS SA: VALUATION OF THE POWER BUSINESS UNIT (Reference http://hdl.handle.net/10400.5/20710) [Master Thesis, Instituto Superior de Economia e Gestão], UTL Repository.

Berk, J. B., DeMarzo, P. M., & Stangeland, D. (2019). Corporate finance: The Core. Pearson Canada.

Damodaran, A. (2002). Investment Valuation: Tools and Techniques for Determining the Value of Any Asset. (3rd ed). New York: John Wiley & Sons.

Damodaran, A. (2004). Applied corporate finance: Second edition, Nyu.edu. from https://pages.stern.nyu.edu/~adamodar/New_Home_Page/ACF3E/manuscript.htm.

Damodaran, A. (2012). VALUATION: APPROACHES & Discounted Cash Flow Models - Basic Framework. Approaches to valuation. Retrieved December 10, 2022, from https://pages.stern.nyu.edu/~adamodar/New_Home_Page/lectures/approach.html.

Damodaran, A. (2020). Equity Risk Premiums: Determinants, Estimation, and Implications - The 2020 Edition. SSRN Electronic Journal. https://doi.org/10.2139/ssrn.3550293.

Damodaran, A. 2008c. What is the risk-free rate? A Search for the Basic Building Block. Stern School of Business, New York University.

Dobrowolski, Z., Drozdowski, G., Panait, M., & Apostu, S. A. (2022). The weighted average cost of capital and its universality in crisis times: Evidence from the energy sector. Energies, 15(18), 6655. https://doi.org/10.3390/en15186655.

Fama, E. F., & French, K. R. (2002). The equity premium. The Journal of Finance, 57(2), 637–659. From https://doi.org/10.1111/1540-6261.00437.

Fernández, P. (2001). Valuation using multiples. How do analysts reach their conclusions? IESE Business School.

Kienzler, C., Lichy, A., Tai, H., & van der Marel, F. (2023, February 27). How oil and gas companies can be successful in renewable power. Mckinsey.com; McKinsey & Company. From https://www.mckinsey.com/industries/electric-power-and-natural-gas/our-insights/how-oil-and-gas-companies-can-be-successful-in-renewable-power#/.

Koller, T., Goedhart, M., & Wessels, D. (2005). The right role for multiples in valuation, McKinsey on Finance 15.

Koller, T., Goedhart, M., & Wessels, D. (2020). Valuation – Measuring and Managing the value of companies. (7th ed.). McKinsey & Company.

Kuo, G. (2019, May 23). When Fossil Fuels Run Out, What Then? From https://apastyle.apa.org/style-grammar-guidelines/references/examples/blog-post-references#1.

Mauboussin, M. J., & Callahan, D. (2021). Everything is a DCF model A mantra for valuing cash-generating assets. Morganstanley.com. https://www.morganstanley.com/im/publication/insights/articles/article_everythingisadcfmodel_us.pdf.

McHich, A. (2018, May 9). Are Crude Oil and Natural Gas Prices Linked? https://www.cmegroup.com/education/articles-and-reports/are-crude-oil-natural-gas-prices-linked.html .

Modigliani, F. and Miller, M.H. (1958). The Cost of Capital, Corporation Finance and the Theory of Investment. The American Economic Review, 48, 261-297.

Santos. A, & Augusto. F (2023). O impacto da subida das taxas de juro na situação financeira das empresas. From https://www.bportugal.pt/sites/default/files/antonio_santos_e_francisco_augusto.pdf .

Society of Petroleum Engineers (2018). Petroleum Resources Management System (Revised June 2018). From https://www.spe.org/media/filer_public/0c/83/0c835db9-501f-4ce7-97f1-a1d6bb4e3331/prmgmtsystem_v103.pdf.

Reports

Galp Energia SGPS, S.A. 2018. *Annual Report 2018*
Galp Energia SGPS, S.A. 2019. *Annual Report 2019*
Galp Energia SGPS, S.A. 2020. *Annual Report 2020*
Galp Energia SGPS, S.A. 2021. *Annual Report 2021*
Galp Energia SGPS, S.A. 2022. *Annual Report 2022*

Internet Resources

Damodaran: https://pages.stern.nyu.edu/~adamodar/
Galp Energia SGPS, S.A website: https://www.galp.com/corp/en/
Instituto Nacional de Estatística: https://www.ine.pt/xportal/xmain?xpgid=ine_main&xpid=INE
International Monetary Fund: https://www.imf.org/en/home
Reuters Eikon Refinitiv: https://eikon.refinitiv.com/
The Economist EIU: https://www.eiu.com/n/

Annexes

Annex A – Historical Balance Sheet

Balance Sheet				
(000 Eur)	2019	2020	2021	2022
Non-current assets				
Tangible assets	5671	4878	5 169	5 700
Non tangible assets	577	532	645	672
Goodwill	85	85	85	70
Assets Right of use	1167	1002	1 079	1 116
Participation in Join Ventures and others	870	483	389	417
Deffered taxes	367	509	485	559
Other receivables	259	266	293	263
Other financial assets	169	402	560	256
Total Non-current assets	**9 165**	**8 157**	**8 705**	**9 053**
Current Assets				
Inventories	1 055	708	1 007	1 361
Other financial assets	174	190	992	339
Clients	980	781	1 243	1 464
Other receivables	935	877	885	942
Tax receivable	-	101	139	3
Cash and equivalents	1 460	1 678	1 942	2 432
Non-current assets held for sale	-	-	-	500
Total Current Assets	**4604**	**4335**	**6 208**	**7 041**
Total Assets	**13769**	**12492**	**14 913**	**16 094**
Equity				
Share Capital	911	911	911	897
Own Shares	-	-	-	-
Reserves	1 356	967	1 327	1 562
Net Income	2 153	1 281	813	1 701
Non-controlling interests	1 237	940	918	956
Total Equity	**5 657**	**4 099**	**3 969**	**5 116**
Non-current Liabilities				
Financial Debt	2 616	3 204	2 995	3 187
Leasings	1 042	923	1 015	1 095
Other payables	121	111	95	99
Responsabilities from retirement benefits	332	381	300	252
Deffered Taxes	299	479	653	555
Other financial instruments	5	37	136	48
Provisions	819	1 008	1 209	1 430
Total Non-current Liabilities	**5 234**	**6 143**	**6 403**	**6 666**
Current Liabilities				
Financial Debt	278	539	1 305	800
Leasings	182	166	164	182
Accounts Payable	852	650	811	1 005
Other payables	1 343	763	1 190	1 505
Other financial instruments	84	130	1 069	373
Tax payables	141	-	-	361
Liabilities associated to non-current assets held for sale	-	-	-	87
Total Current Liabilities	**2 880**	**2 248**	**4 539**	**4 313**
Total Liabilities	**8 114**	**8 391**	**10 942**	**10 979**

Annex B – Historical Consolidated Profit and Loss Statement

Profit and Loss Account	2019	2020	2021	2022
Revenues				
Sales	15 962	10 771	15 618	26 485
Services	608	610	499	355
Other operating revenues	368	187	324	321
Earnings from financial instruments	123	53	27	877
Results related to join ventures and others	121	220	83	152
Total Revenues	**17 182**	**11 841**	**16 551**	**28 190**
Costs and Losses				
Cost of sales	-12 592	-8 461	-11 752	-20 921
Operating costs	-1 650	-1 473	-1 563	-1 888
Wages and salaries	-346	-356	-310	-370
Depreciation, Amortization and impairment losse	-979	-1 289	-961	-1 380
Provisions and impairment at receivables	-6	-114	-74	-133
Other operational costs	-132	-156	-111	-88
Financial costs	-197	-239	-937	-164
Total Costs and Losses	**-15 902**	**-12 088**	**-15 708**	**-24 944**
Income before Tax	**1 280**	**-247**	**843**	**3 246**
Income taxes	-742	-242	-652	-1 434
Other taxes	-58	-45	-41	-87
Net Consolidated Income	**480**	**-534**	**150**	**1 725**
Other Comprehensive income	3	-461	464	258
Total Consolidated Income	**483**	**-995**	**614**	**1 983**

Annex C – Revenues Forecast

Upstream	2019	2020	2021	2022	2023F	2024F	2025F	2026F	2027F
Segment Revenues	2 475	1 768	3 058	4 401	3 779	4 258	4 147	3 967	3 786
Growth %		*-28.57%*	*72.96%*	*43.92%*	***-14.13%***	***12.68%***	***-2.62%***	***-4.33%***	***-4.57%***
Oil Extracted (kboepy)	39 420.00	42 668.50	41 573.50	41 537.00	41 805.56	42 075.85	41 510.13	40 952.01	40 401.39
Gas Extracted (kboepy)	5 037.00	4 781.50	4 635.50	4 818.00	4 789.32	4 760.81	4 737.59	4 714.48	4 691.48
Oil Discount					80.00%	80.00%	80.00%	80.00%	80.00%
Gas Discount					30.00%	30.00%	30.00%	30.00%	30.00%
Brent Market Price (USD per Berrel)	64.30	41.96	70.86	90.00	75.00	81.60	78.80	75.60	72.20
OECD Demand for Oil					0.65%	0.65%	-1.34%	-1.34%	-1.34%
OECD Demand for Gas					-0.60%	-0.60%	-0.49%	-0.49%	-0.49%

I&M	2019	2020	2021	2022	2023F	2024F	2025F	2026F	2027F
Segment Revenues	6 185	4 453	6 298	11 000	7 774	8 566	8 248	8 226	7 620
Growth %		*-28.00%*	*41.43%*	*74.66%*	***-29.33%***	***10.19%***	***-3.71%***	***-0.26%***	***-7.37%***
Raw Materials Processed (kboe)	96 000.00	87 100.00	76 600.00	88 000.00	86 925.00	84 656.25	84 045.31	85 906.64	85 383.30
Brent Market Price (USD per Berrel)	64.30	41.96	70.86	90.00	75.00	81.60	78.80	75.60	72.20
Galp Theorical Sale Price	64.43	51.13	82.22	125.00	89.43	101.18	98.14	95.76	89.25
Margin to Brent Price	0.20%	21.84%	16.03%	38.89%	19.24%	24.00%	24.54%	26.67%	23.61%

Commercial	2019	2020	2021	2022	2023F	2024F	2025F	2026F	2027F
Segment Revenues	8 892	5 922	7 917	13 410	9 216	9 681	10 232	10 448	9 641
Growth %		*-33.40%*	*33.69%*	*69.38%*	***-31.27%***	***5.04%***	***5.69%***	***2.11%***	***-7.73%***
Average sale price oil products	893	823	1 015	1 510	1 060	1 102	1 172	1 211	1 136
Average sale price gas products	46.90	43.10	72.10	117.63	69.93	75.69	83.84	86.77	79.06
Sales Oil products \mton	8.30	6.00	6.50	7.40	7.45	7.50	7.40	7.30	7.20
Sales Gas products \TWh	31.60	22.90	18.30	19.00	18.89	18.77	18.68	18.59	18.50
OECD Demand for Oil					0.65%	0.65%	-1.34%	-1.34%	-1.34%
OECD Demand for Gas					-0.60%	-0.60%	-0.49%	-0.49%	-0.49%

Renewables	2019	2020	2021	2022	2023F	2024F	2025F	2026F	2027F
Segment Revenues	25	33	50	190	176	380	505	570	637
Growth %		*32.00%*	*51.52%*	*280.00%*	***-7.13%***	***115.47%***	***32.70%***	***13.02%***	***11.78%***
Production in MWh	31 000.00	327 000.00	1 288 000.00	1 930 000.00	2 205 714	3 860 000	5 514 286	7 168 571	8 822 857
Operational Capacity in GW				1.40	1.60	2.80	4.00	5.20	6.40
Growth in operational capacity					14.29%	75.00%	42.86%	30.00%	23.08%

Auxiliar Renewables	2022	2023F	2024F	2025F	2026F	2027F
Eur\MWh	144.00	80.00	98.5	91.5	79.55	72.25
Growth %		***-44.44%***	***23.13%***	***-7.11%***	***-13.06%***	***-9.18%***

Other Revenues	2019	2020	2021	2022	2023F	2024F	2025F	2026F	2027F
Segment Revenues	147	205	84	236	168	173	165	186	173
Growth %		***39.46%***	***-59.02%***	***180.95%***	***-28.81%***	***3.13%***	***-4.58%***	***12.30%***	***-6.78%***

Annex D – Cost of Sales Forecast

Cost of Sales	2019	2020	2021	2022	2023F	2024F	2025F	2026F	2027F
Upstream	- 354	55	- 354	- 367	- 431	- 445	- 433	- 403	- 402
Industrial & Midstream	- 5 369	- 3 817	- 6 095	- 9 904	- 6 983	- 7 760	- 7 572	- 7 451	- 6 912
Comercial	- 7 693	- 4 905	- 6 936	- 12 472	- 8 063	- 8 494	- 9 102	- 9 330	- 8 519
Renewables	- 19	- 23	- 31	- 91	- 113	- 231	- 296	- 330	- 384
Total	**- 13 435**	**- 8 690**	**- 13 416**	**- 22 834**	**- 15 591**	**- 16 930**	**- 17 404**	**- 17 513**	**- 16 217**

Upstream	2019	2020	2021	2022	2023F	2024F	2025F	2026F	2027F
Cost of Sales	354	-55	354	367	431	445	433	403	402
Growth %		***-115.54%***	***743.64%***	***3.67%***	***17.46%***	***3.14%***	***-2.62%***	***-6.93%***	***-0.30%***
Upstream revenues %	14.30%	-3.11%	11.58%	8.34%	11.41%	10.44%	10.44%	10.16%	10.61%

I&M	2019	2020	2021	2022	2023F	2024F	2025F	2026F	2027F
Cost of Sales	5 369	3 817	6 095	9 904	6 983	7 760	7 572	7 451	6 912
Growth %		***28.91%***	***59.68%***	***62.49%***	***-29.49%***	***11.12%***	***-2.42%***	***-1.61%***	***-7.23%***
I&M revenues %	86.81%	85.72%	96.78%	90.04%	89.83%	90.59%	91.81%	90.57%	90.70%

Commercial	2019	2020	2021	2022	2023F	2024F	2025F	2026F	2027F
Cost of Sales	7 693	4 905	6 936	12 472	8 063	8 494	9 102	9 330	8 519
Growth %		***-36.24%***	***41.41%***	***79.82%***	***-35.35%***	***5.34%***	***7.17%***	***2.50%***	***-8.69%***
Commercial revenues %	86.52%	82.83%	87.61%	93.01%	87.49%	87.73%	88.96%	89.30%	88.37%

Renewables	2019	2020	2021	2022	2023F	2024F	2025F	2026F	2027F
Cost of Sales	19	23	31	91	113	231	296	330	384
Growth %		***21.05%***	***34.78%***	***193.55%***	***23.90%***	***105.27%***	***27.90%***	***11.42%***	***16.58%***
Renewables revenues %	76.00%	69.70%	62.00%	47.89%	63.90%	60.87%	58.67%	57.83%	60.32%

Annex E – Other Operational Costs

Salaries	2019	2020	2021	2022	2023F	2024F	2025F	2026F	2027F
Salaries and other costs	346	356	310	370	390	401	409	417	424
Growth %		***2.89%***	***-12.92%***	***19.35%***	***5.40%***	***2.70%***	***2.20%***	***1.80%***	***1.70%***

External Services	2019	2020	2021	2022	2023F	2024F	2025F	2026F	2027F
External Services	**1 650**	**1 473**	**1 563**	**1 888**	**1 928**	**2 108**	**1 946**	**1 909**	**1 886**
Growth %		***-10.73%***	***6.11%***	***20.79%***	***2.11%***	***9.32%***	***-7.65%***	***-1.90%***	***-1.24%***
Royalties	196	138	219	345	290	325	314	305	289
% of Upstream Revenues	***7.92%***	***7.81%***	***7.16%***	***7.84%***	**7.68%**	**7.62%**	**7.58%**	**7.68%**	**7.64%**
Subcontracts	365	318	332	176	363	383	340	317	338
% of Commercial Revenues	***2.12%***	***2.69%***	***2.05%***	***0.62%***	***1.87%***	***1.81%***	***1.59%***	***1.47%***	***1.68%***
Transportation Costs	318	347	266	249	354	386	330	327	337
% Total Revenues	***1.85%***	***2.93%***	***1.64%***	***0.88%***	***1.83%***	***1.82%***	***1.54%***	***1.52%***	***1.68%***
I&M Production Costs	227	158	139	192	217	220	192	194	192
% of I&M Revenues	***3.67%***	***3.55%***	***2.21%***	***1.75%***	***2.79%***	***2.57%***	***2.33%***	***2.36%***	***2.51%***
Other Costs	544	512	607	926	704	794	770	767	730
% of Total Revenues	***3.17%***	***4.32%***	***3.74%***	***3.28%***	***3.63%***	***3.74%***	***3.60%***	***3.56%***	***3.63%***

Other Costs	2019	2020	2021	2022	2023F	2024F	2025F	2026F	2027F
Other operating expenses	132	156	111	88	149	163	136	134	140
Growth %		***18.18%***	***-28.85%***	***-20.72%***	***69.78%***	***9.40%***	***-16.93%***	***-1.41%***	***4.95%***
Total Revenues %	0.77%	1.32%	0.68%	0.31%	0.77%	0.77%	0.63%	0.62%	0.70%

Annex E (continued)

Provisions and impairment at receivables	2019	2020	2021	2022	2023F	2024F	2025F	2026F	2027F
Provisions and impairment at receivables	6	114	74	133	90	117	105	110	103
Growth %		***1800.00%***	***-35.09%***	***79.73%***	***-32.11%***	***29.50%***	***-10.00%***	***4.44%***	***-6.41%***
Total Commercial %	0.067%	1.925%	0.935%	0.992%	0.980%	1.208%	1.029%	1.052%	1.067%

D&A	2019	2020	2021	2022	2023F	2024F	2025F	2026F	2027F
D&A	979	1 289	961	1 380	1 245	1 395	1 315	1 310	1 270
Growth %		***31.66%***	***-25.45%***	***43.60%***	***-9.78%***	***12.05%***	***-5.74%***	***-0.40%***	***-3.05%***
Total Revenues %	5.50%	10.35%	5.75%	4.82%	6.61%	6.88%	6.01%	6.08%	6.40%

Provisions	2019	2020	2021	2022	2023F	2024F	2025F	2026F	2027F
Upstream	-1	-3	10	1	2	2	4	2	3
I&M	4	-94	-73	-119	-71	-89	-88	-92	-85
Commercial	-11	1	-2	-7	-5	-3	-4	-5	-4
Renewables	-	-10	-2	-	-2	-3	-1	-1	-2

Annex F – EBIT Calculation

Profit and Loss Account	2019	2020	2021	2022	2023F	2024F	2025F	2026F	2027F
Revenues									
Revenues	17 724	12 381	17 407	29 237	21 114	23 059	23 297	23 398	21 858
Services and others	1 220	1 070	609	1 705	1 151	1 134	1 150	1 285	1 180
Other Income including consolidated adjustments	-1 155	-1 000	-1 289	-2 320	-1 551	-1 696	-1 712	-1 722	-1 607
Total Revenues	**17 789**	**12 451**	**16 727**	**28 622**	**20 713**	**22 497**	**22 734**	**22 961**	**21 431**
Growth %		**-31.08%**	**39.78%**	**70.32%**	**-27.63%**	**8.61%**	**1.06%**	**1.00%**	**-6.67%**
Operarional Costs	**2019**	**2020**	**2021**	**2022**	**2023F**	**2024F**	**2025F**	**2026F**	**2027F**
Cost of sales	-12 592	-8 461	-11 752	-20 921	-15 591	-16 930	-17 404	-17 513	-16 217
External Services and Supplies	-1 650	-1 473	-1 563	-1 888	-1 928	-2 108	-1 946	-1 909	-1 886
Wages and salaries	-346	-356	-310	-370	-390	-401	-409	-417	-424
Other operational costs	-132	-156	-111	-88	-149	-163	-136	-134	-140
Provisions and impairment at receivables	-6	-114	-74	-133	-90	-117	-105	-110	-103
EBITDA	**3 063**	**1 891**	**2 917**	**5 222**	**2 565**	**2 779**	**2 734**	**2 878**	**2 660**
EBITDA Margin %	**17.22%**	**15.19%**	**17.44%**	**18.24%**	**12.15%**	**12.05%**	**11.73%**	**12.30%**	**12.17%**
Growth %		**-38.26%**	**54.26%**	**79.02%**	**-50.87%**	**8.32%**	**-1.62%**	**5.28%**	**-7.57%**
Depreciation, Amortization and impairment losses	-979	-1 289	-961	-1 380	-1 245	-1 395	-1 315	-1 310	-1 270
EBIT	**2 084**	**602**	**1 956**	**3 842**	**1 320**	**1 384**	**1 419**	**1 568**	**1 391**

Annex G – OECD Energy Demand

Energy Demand	2021	2025	2030	var 21-25	var 25-30	Average per year 21-25	Average per year 25-30
Oil OECD Europe	11.6	11.9	11.1	2.586%	-6.723%	0.65%	-1.34%
Gas OECD Europe	8.4	8.2	8	-2.381%	-2.439%	-0.60%	-0.49%

Annex H – Exchange Rates Forecast

	2019	2020	2021	2022	2023	2024	2025	2026	2027
USD/EUR (avg.)	0.89318	0.87621	0.84493	0.94888	0.9126	0.8869	0.8677	0.8584	0.8475
USD/EUR (end.)	0.89016	0.81493	0.88292	0.93756	0.8969	0.8734	0.8621	0.8511	0.8475

Annex I – Working Capital

WC	2018	2019	2020	2021	2022	2023F	2024F	2025F	2026F	2027F
Consolidated Accounts	814	952	597	1 879	1 632	1 173	1 355	1 562	1 502	1 345
% Revenues	4%	4%	3%	8%	8%	6%	6%	7%	7%	6%
Var WC	-	138	- 355	1 282	- 247	- 459	182	207	-60	-158