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EQUITY RESEARCH: GREENVOLT – RENEWABLE ENERGY, S.A.

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Master in Finance

Supervisor:
PhD Pedro Manuel de Sousa Leite Inácio, Assistant Professor,
ISCTE-IUL

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BUSINESS
SCHOOL

Department of Finance

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Abstract

Globally, climate change is no longer just a concern and a threat, but a reality with strong negative impacts on the economy, society and the population's quality of life. Therefore, the topic proved important for this project. The company under analysis is Greenvolt - Energias Renováveis. Greenvolt it was created in March 2021 from a subsidiary of the Altri Group and operates in three business areas: biomass, wind and photovoltaic energy and, finally, decentralized production. Greenvolt is increasingly recognized as a reference not only in the Portuguese market, but also in the global market as one of the main players in the promotion and development of wind and solar energy projects. This recognition has materialized in the successful IPO on the Portuguese stock exchange and Greenvolt's rapid promotion to its reference index, the PSI-20. The aim of this project is to develop a valuation model that will enable the fair value of Greenvolt - Energias Renováveis shares to be achieved, as well as to advise on the decision to buy or sell its shares. Regarding the models used in the valuation and analysis of Greenovolt, the choice, considering the literature review carried out in the project, was to use the Discounted Cash Flow (DCF) and the Comparative Method (Multiple), since both provide different and complementary perspectives. Although the conceptually "correct" model is the Discount Cash-Flow model, the best model to use will depend on the nature and stage of the company's growth. For this reason, the best thing to do is to combine the results of the different valuation models, since they all complement each other.

In conclusion, Greenvolt's shares were found to be undervalued both at the time of the Initial Public Offering (IPO) and in June 2024. A higher level of volatility was also observed in the company's shares compared to its industry peers, a phenomenon that can be plausibly explained by Greenvolt's relatively short track record in the market and the innovative nature of its business model.

Keywords: Greenvolt – Renewable Energy, S.A.; Renewable Energy; Company Valuation; Underpricing; Information Asymmetry

Resumo

Globalmente, as alterações climáticas deixaram de ser apenas uma preocupação e uma ameaça para se tornarem em uma realidade com fortes impactos negativos a níveis económicos, sociais e na qualidade de vida da população. Neste sentido, o tema, revelou-se importante para a realização do presente projeto. A empresa sob análise é a Greenvolt - Energias Renováveis, que foi criada em março de 2021, a partir de uma subsidiária do Grupo Altri e atua em três áreas de negócio, a biomassa, a energia eólica e fotovoltaica e, por último, a produção descentralizada. A Greenvolt é cada vez mais reconhecida e uma referência, não só no mercado português, mas também no mercado global como um dos principais intervenientes na promoção e no desenvolvimento de projetos de energia eólica e solar. Este reconhecimento materializou-se no sucesso da entrada em bolsa, através do IPO bem-sucedido na bolsa portuguesa, e da rápida promoção da Greenvolt ao seu índice de referência, o PSI-20. Este projeto tem como objetivo desenvolver um modelo de avaliação que permita alcançar o justo valor da ação da Greenvolt – Energias Renováveis, bem como, o de aconselhar sobre a decisão de compra ou venda das suas ações. Relativamente aos modelos utilizados na avaliação e análise da Greenovolt, a escolha, tendo em conta a revisão de literatura realizada na dissertação da tese, optou-se por utilizar o método do Discounted Cash Flow (DCF e o Método dos Comparativos (Múltiplos), uma vez que ambos fornecem perspetivas diferentes e complementares entre si. Embora o modelo concetualmente "correto" seja o modelo do Discount Cash-Flow, o melhor modelo a utilizar dependerá da natureza e da fase de crescimento da empresa. Por essa razão, o melhor a fazer é combinar os resultados dos diferentes modelos de avaliação, uma vez que todos eles se complementam.

Em conclusão, as ações da Greenvolt encontravam-se subvalorizadas, tanto no momento da Oferta Pública Inicial (OPI) como em junho de 2024. Verificou-se igualmente uma volatilidade superior nas ações da empresa face aos seus pares do setor, fenómeno que poderá ser plausivelmente justificado pela ainda curta trajetória da Greenvolt no mercado e pela natureza inovadora do seu modelo de negócio.

Palavras-chave: Greenvolt – Energias Renováveis, S.A.; Energias Renováveis; Avaliação de empresas; Underpricing; Assimetria de Informação

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Glossary

β - Beta

β_F - Beta of the Firm

β_L - Levered Beta of the Firm

BESS - Battery Energy Storage System

B2B - Business-to-business

CAPEX - Capital Expenditures

CAPM - Capital Asset Pricing Model

COD - Commercial Operation Date

CPI - Consumer Price Index

CMVM - Portuguese Securities Market Commission

DCF - Discounted Cash Flow

ECB - European Central Bank

EDPR – EDP Renováveis (Portuguese Energy Company)

EPA - Environmental Protection Agency

EPS - Earnings per Share

EBIT - Earnings before Interest and Tax

EBITDA - Earnings before Interest, Tax, Depreciation, and Amortization

EQV - Equity Value

ERIX - European Renewable Energy Index

EU - European Union

EV - Enterprise Value

FCFE - Free Cash Flow to Equity

FCFF - Free Cash Flow to Firm

FY – Financial Year

FV - Firm Value

KKR - Kohlberg Kravis Roberts & Co. L.P.

KREL - Kent Renewable Energy Limited

LCOE - Levelized Cost of Electricity

GDP - Gross Domestic Product

GPEI - Global Energy Price Index

GW – Gigawatt

HJT - Heterojunction

IA Information Asymmetry

IEA - International Energy Agency

IRA - Inflation Reduction Act

IRENA - International Renewable Energy Agency

IPO Initial Public Offering

MW - Megawatt

MWh - Megawatt per hour

NPV - Net Present Value

p.p – Percentage Points

PER – Price-to-Earnings Ratio

PPA - Power Purchase Agreements

PSI-20 - Portuguese Stock Index

PV - Photovoltaic

OECD - Organization for Economic Cooperation and Development

OPEX - Operational Expenditure

R_d - Cost of Debt

R_e - Cost of Equity

Rf - Risk-free rate

RM - Return of the market

ROE - Return on Equity

ROIC - Return on Invested Capital

RtB - Ready-to-Build

SEO - Seasoned Equity Offering

t - Tax rate

UK - United Kingdom

WACC - Weighted Average Cost of Capital

WC - Working Capital

Y/E - Year-end

YoY - Year-on-Year

YTM - Yield-to-Maturity

1. Introduction

Given the demands of the global market, the need for companies to differentiate themselves to overcome the fierce competition in their market is ever greater. A company's ability to guarantee its profit margins, motivate and increase the bond with its employees and even overcome the conditions of an increasingly rigorous market is interlinked with its financial performance. However, the valuation of any listed company is influenced not only by the characteristics mentioned above, but also by the future predictions that investors and financial analysts have about its future performance. The company under analysis, Greenvolt - Energias Renováveis, was created in March 2021 from a subsidiary of the Altri Group. The company operates and promotes the development, in Portugal and abroad, of power plants and other facilities for the production, storage and sale of energy from renewable sources, namely bioelectric, solar, wind, hydro, urban or industrial waste, biomass or other sources from which it can obtain renewable energy. Therefore, operates in three business areas: biomass, wind and photovoltaic energy and, finally, decentralized production. Over the last year, the energy market has been, and continues to be, marked by very high prices, a trend that has been observed since 2020, which has been exacerbated by Russia's invasion of Ukraine and its impact on oil and gas prices. This new reality has made the need to guarantee energy independence in Europe even more evident, accelerating the current development of the market, and it is expected that in the coming years, both by virtue of regulation and by virtue of market agents seeking to avoid exposure to high energy prices, it will continue to be a constantly evolving and growing issue. As a result of these events, Greenvolt is increasingly recognized and a reference not only in the Portuguese market, but also in the global market as one of the main players in the promotion and development of wind and solar energy projects. This recognition has materialized in the listing on the stock exchange, through a successful IPO on the Portuguese stock market, and the rapid promotion of Greenvolt to its benchmark index, the PSI-20. In recent years, Greenvolt has been able to build a prominent position and consolidate its leadership in the Renewable Energy production sector. In 2024, Greenvolt recorded an EBITDA of (14.7) million euros and a Net Profit of (133.9) million euros. In recent years, Greenvolt has managed to build a prominent position and consolidate its leadership in the renewable energy production sector. The year 2024 was marked by the largest decline in Greenvolt’s results. However, despite the results having decreased compared to previous years, they reflect the investment and expansion the company has been pursuing over the past three years.

The present project aims to identify and analyze the factors that have influenced the evolution of Greenvolt's share price, as well as to propose hypotheses regarding its long-term sustainability. The methodological approach adopted begins with an examination of the share price at the time of issuance, followed by a comparison with a retrospective assessment based on the data available at the date of the initial public offering. Subsequently, an analysis of the main events that occurred between the initial public offering and the period under review is conducted, to contextualize the observed evolution and substantiate the current share price.

Accordingly, this project seeks to explain the superior performance achieved by Greenvolt in comparison with several benchmark stock market indices since its listing. The central objective is to answer the question: "Have Greenvolt's shares been undervalued, overvalued, or correctly valued?", while simultaneously providing an in-depth analysis of the factors influencing the formation of its market price.

The relevance of this dissertation lies in its contribution both to academic literature—by deepening the study of company valuation and capital market behavior—and to professional practice, by offering a comprehensive understanding of Greenvolt's share value and the dynamics that have shaped its evolution from the initial public offering to the present. The distinctive feature of this work is its integrated and multidimensional approach, combining the analysis of share price evolution with a critical reflection on the explanatory theories of the undervaluation phenomenon.

2. Literature Review

2.1. Preliminary Concepts

2.1.1. Initial Public Offering (IPO)

An Initial Public Offering (IPO) is the first time that the shares of a private company are offered to the public, "consisting of the process of transitioning from a privately held company to a publicly traded one with shares listed on the Stock Exchange" (Basha, Haralayya, & Vibhute, 2021, pp. 12-26). IPOs are often issued by small and medium-sized enterprises seeking capital to expand, but they can also be undertaken by large private companies aiming to become publicly traded.

2.1.2. Underpricing

The underpricing is characterized by the issuance of new shares at prices below their market value. Engelen & Essen (2010, p. 8) describe the phenomenon as: "Underpricing is usually estimated as the percentage difference between the price at which the shares were sold to investors during the offering period and the price at which the shares trade afterwards in the secondary market." This strategy undervalues a company's shares to attract investors, thereby ensuring liquidity for the newly issued securities.

2.1.3. Bookbuilding

The bookbuilding process is characterized by the involvement of multiple parties in conducting the necessary research to determine the price investors are willing to pay and the quantity they are prepared to acquire. The main objective is to reach an optimal price for the transaction of an IPO. The Cambridge Dictionary defines bookbuilding as "a process in which financial advisers ask important investors how many shares they might buy and at what price in order to decide the price at which to sell the shares" (Bookbuilding, 2023).

2.1.4. Underwriter

The term underwriter refers to the financial intermediary that is selected and hired to underwrite the IPO and trade the shares in the financial market. As Baron (1982, pp. 1217) notes, "issuers, therefore, delegate the offer price decision to an investment bank that underwrites the IPO."

2.2. Underpricing Theories

2.2.1. Asymmetric Information Models

Winner's Curse

This theory, proposed by Kevin Rock (1986), suggests that investors do not have the same level of information and knowledge when subscribing to an IPO. Some of the participants, namely the issuer, the underwriter (an investment bank), and certain investors, are considered to be better informed compared to other investors. Thus, well-informed investors will only subscribe to underpriced IPOs, which have greater return potential, while uninformed investors will invest indiscriminately.

As a result of this inequality in the availability of information, we arrive at the so-called "Winner's Curse" theory. The theory assumes that less informed investors end up being harmed during the subscription of an IPO. This happens because when the offer price is attractive, the underwriter tends to allocate more shares to its priority clients, who are informed investors. On the other hand, if the offer price is higher, the less informed investors end up receiving a larger quantity of shares. In both cases, less informed investors are at a disadvantage.

The "Winner's Curse" occurs because, although the less informed investor may succeed in fulfilling their orders, this "victory" has little value, since the probability of receiving underpriced shares is low. The Winner's Curse hypothesis is comparable to the notion of a Pyrrhic victory, that is, a victory achieved at a high cost.

Principal-agent Models

Principal–agent models highlight the conflicts of interest between the underwriter (investment bank) and the issuer – the practice of underpricing an issuance in exchange for kickbacks, such as high commissions, additional payments, or promises of future benefits, favors the underwriting bank rather than protecting the issuer's interest in maximizing IPO profits. In this way, underpricing may partly result from corrupt practices by underwriters. Loughran and Ritter (2002) drew attention to these situations.

Signalling through Underpricing

Contrary to Rock's (1986) model, the framework proposed by Ibbotson (1975) is based on the idea that the issuer possesses more information about itself and about the issuance than any other investor, which allows it to underprice an IPO. This information asymmetry is rooted in the fact that the issuing entity has greater knowledge of the present value, or the risk of its

future cash flows compared to other investors, who do not have access to this type of information.

With this assumption, the issuer aims to "leave a good impression on investors", encouraging interest in future offerings that may eventually be overpriced, leveraging the trust previously established with investors. Allen and Faulhaber (1989), Grinblatt and Hwang (1989), and Welch (1989) contributed with theories that incorporate this same model.

2.2.2. Institutional Explanations

The theory of institutional explanations focuses on three characteristics of the market: (i) litigation prevention, which acts as a form of insurance to avoid future claims from investors dissatisfied with the performance of shares after the IPO. To mitigate this risk, the issuing entity sets the IPO price carefully, balancing the costs of underpricing with the potential legal costs of future lawsuits. (ii) price stabilization: Ruud (1993) argues that underpricing does not stem from deliberate actions by the issuer or underwriter, but rather from price stabilization. In this view, while the shares are properly priced, in the open market the price is maintained above the initial offer value due to the intervention of the underwriter to stabilize it. (iii) finally, tax incentives: several authors contend that taxation contributes to IPO underpricing, depending on the issuer's fiscal situation. This argument is reasonable insofar as wages are often taxed at higher rates than capital gains, leading firms to reduce salaries and instead offer compensation in the form of stock options, which are more tax efficient.

2.2.3. Ownership and Control

Underpricing as a Tool for Ownership Dispersion and Liquidity Promotion

Underpricing is also viewed as a tool for maintaining executive control, employed by managers and entrepreneurs, and not necessarily as a mechanism to promote long-term market liquidity, according to Brennan and Franks (1997). The authors further argue that underpricing serves as a strategy to attract a larger pool of investors, thereby dispersing company ownership and limiting the influence of large shareholders (blockholders) - defined by the authors as individuals or institutions holding at least 3% of the issued capital after the IPO.

Booth and Chua (1996) proposed a model that determines the level of underpricing based on the desired ownership structure and the liquidity of the secondary market. Zheng and Li (2007) provide evidence supporting Booth and Chua's (1996) framework - their findings suggest a positive correlation between the number of investors in a firm, the extent of underpricing, and market liquidity. However, they do not find a significant relationship between the number of

shareholders post-IPO and different liquidity measures, implying that underpricing may not be as effective in fostering liquidity as initially expected.

Underpricing nonetheless has a direct positive impact on market liquidity, measured by trading volume, since it draws more investors. Still, the model shows certain limitations, as it does not account for share blocks held by pre-IPO shareholders who choose not to sell during the offering. Additionally, it overlooks the role of anonymity afforded by a widely dispersed ownership base. Several scholars argue that this anonymity enables large investors to accumulate significant shareholdings and devise strategies more effectively, as anonymous transactions do not directly influence market behavior (Bolton & von Thadden, 1998; Holmström & Tirole, 1993; Maug, 1998).

Underpricing as a Tool for Maximizing IPO Value and Proceeds

In contrast to Brennan and Franks (1997), Stoughton and Zechner (1998) argue that underpricing may serve as a strategy to maximize the value of an IPO by allocating shares to a limited number of institutional investors. The authors suggest that by granting a larger portion of shares to a single investor, managers incentivize these investors to generate more information and to conduct more effective monitoring - underpricing, in this case, represents the cost of monitoring rather than an opportunity cost. According to the authors, there is a balance between risk dispersion and profitability: distributing shares among smaller investors helps reduce risk, while allocating them to larger investors enhances returns and fosters stronger monitoring efforts. In this context, the presence of well-informed large investors increases the perceived value of the company and improves the financial outcomes of the IPO. The limitation and discretionary allocation of shares restrict access for small investors during the IPO - this unmet demand tends to grow until the shares reach the secondary markets, resulting in price appreciation and ultimately benefiting institutional investors for their monitoring efforts.

2.2.4. Behavioral Explanations

Behavioral theories offer explanations, based on psychology and investor behavior, for the underpricing of shares in IPOs. Although this theoretical approach is still in the initial stages of analysis and research, it has provided important insights into how psychological factors may influence the value of an IPO.

The behavioral explanation for the “information cascades” effect, proposed by Welch (1992), suggests that investors make decisions based on the actions of other investors rather than

relying solely on their own information. When an IPO proves successful and profitable, additional investors are encouraged to participate in future offerings, even if they lack direct knowledge of the company. Conversely, if the IPO is unsuccessful, it can create a negative signal that discourages further investment. This behavior generates pressure for underpricing, as investors may demand an initial undervaluation as the "price" for committing and triggering the cascade of subsequent investments.

Another behavioral angle, supported by authors such as Ljungqvist et al. (2006), involves investors' optimistic expectations. The idea here is that underpricing should not occur when investors hold extremely optimistic views about the company's future. In such cases, the issuer could take advantage of these expectations to maximize capital gains, issuing fewer shares to the public and limiting the supply. Eventually, the price would revert to its fundamental value, and long-term returns would turn negative.

The final behavioral explanation for underpricing, "overconfidence," refers to the excessively confident behavior of individual and institutional investors who believe they can predict the future performance of a stock more accurately than what is possible. This attitude can generate higher initial demand for undervalued shares, increasing short-term liquidity, but eventually leading to price corrections.

Overall, behavioral theories suggest that underpricing is not only a matter of asymmetric information or risk but is also strongly shaped by psychological dynamics, such as herd behavior among investors and their expectations regarding future performance.

2.3. Information Asymmetry – Measurement and Impact

Information asymmetry (IA) plays a crucial role in shaping pricing strategies in IPOs, contributing to the phenomenon of underpricing to manage market uncertainties. IA arises when different parties involved in a transaction have unequal access to relevant information.

Several studies attempt to measure information asymmetry through variables that reflect the degree of informational uncertainty among investors. Five variables are commonly used to measure IA: (i) the standard deviation of abnormal returns – which assesses the volatility of returns before and after quarterly earnings announcements (the higher the standard deviation, the greater the information asymmetry); (ii) the market-adjusted standard deviation of the company's daily abnormal stock returns – which measures the dispersion of daily returns relative to the market, providing insight into the company's informational uncertainty; (iii) the number of public announcements disclosed; (iv) the ratio between the number of shares traded

in the year prior to issuance and the total shares outstanding at the end of the fiscal year preceding the equity issuance announcement; (v) analyst coverage - the number of analysts covering the company before the IPO may serve as a proxy for the firm's transparency level.

IA can be general across the market or specific to a given company, and over time, it tends to be transmitted to the market. Disclosure moments include announcements related to earnings, dividends, or share offerings (though not the IPO itself).

The study applies cross-sectional, time-series, and timing tests. Cross-sectional tests aim to identify firm or market characteristics associated with higher or lower underpricing at a given point in time. Beatty and Ritter (1986) suggest that information asymmetry is a key factor in explaining underpricing. They argue that the greater the uncertainty surrounding the company's value, the higher the initial undervaluation must be to attract investors.

Time-series tests analyze IPO behavior over time, observing how underpricing varies across different periods. These tests help identify temporal trends and market cycles, such as increases or decreases in underpricing during technology bubbles or financial crises. Through such studies, we gain a better understanding of how macroeconomic factors and market dynamics influence underpricing.

Timing tests emphasize the importance of strategy in selecting the right moment to go public and reduce underpricing. This type of test evaluates the impact of event timing on IPOs, such as financial results announcements or regulatory changes, and how these factors affect underpricing. Ibbotson and Jaffe (1975) were pioneers in studying IPO timing, finding that IPO waves (periods with a high number of public offerings) are correlated with lower levels of underpricing. These waves typically occur in bullish markets, where demand for new shares is strong, allowing underpricing to be minimized.

He et al. (2010) investigated the relationship between the uncertainty of a firm's debt value and the uncertainty of its equity value and found that: (i) changes in credit ratings are inversely correlated with IA; (ii) rating changes are perceived as signals of firm quality and influence market behavior; and (iii) IA increases when announcements are negative and decreases when, they are positive.

2.3.1. Effect on the Cost of Capital

The impact of IA on underpricing and, consequently, on the cost of capital for an entity, has short and long-term effects, especially in terms of investor confidence and perceptions of company risk. Some of the main effects and associated theoretical rationales are: (i) Increased

Cost of Capital, which according to Rock (1986) suggests that underpricing is necessary to compensate less informed investors, since they run the risk of buying shares at a price below fair market value, resulting in less capital raising than would be possible if the shares were priced correctly. However, this represents a direct cost to the company, which needs to issue more shares to raise the same amount of capital. (ii) The effects on the capital structure can also be affected by underpricing. By issuing more shares than necessary, the company may end up with a capital structure that is more dependent on equity than debt, which, in some circumstances, may be less efficient from a tax perspective. (iii) The effect on the long-term cost of capital - whenever a company issues an IPO at a price below the market price, it may convey and increase the perception of risk to investors and, consequently, result in a higher return requirement on their part. Merton (1987) states that the investor base is crucial to the cost of capital of the company. Underpricing can attract many individual investors, which can disperse ownership of the shares, but it can also raise the cost of capital if these investors have a negative perception of the company in the long term, increasing the return requirement to compensate for the perceived risk. Armstrong et al. (2011) demonstrate that companies with greater information asymmetry tend to have a higher cost of capital, as investors demand higher returns to compensate for the risk associated with the lack of information. (iv) Underpricing also influences the company's long-term performance. Although underpricing may seem like an effective strategy to attract initial investors, it can harm the company's long-term performance in the market. In addition, the negative impact on the company's long-term performance can lead to greater stock price volatility, increasing uncertainty and the cost of capital required by investors, as evidenced by Ritter (1991).

The impact of AI on underpricing can significantly increase the company's cost of capital, influencing its capital structure and increasing uncertainty among investors, with negative long-term effects.

2.3.2. Announcements' Impact on Equity Prices

Some authors, such as Asquith and Mullins (1986), identified a relationship between stock prices and IA, observing a 2.7% drop in stock prices on the day of the announcement in 80% of the cases analyzed. In addition, the total capital of companies decreased by 78% of the profits obtained from a second issue. Similarly, Mikkelson and Partch (1985) had already noted that stock prices fell with announcements of common stock and convertible debt issues, while credit agreements had a positive impact.

2.4. Drivers of Profitability for Renewable Energy Firms

Profitability plays a crucial role in global sustainability. To address energy challenges and combat climate change, viable alternatives to fossil fuels are essential. For this to happen, renewable energy companies need to be financially sustainable (Morina et al., 2021). The profitability factors of renewable energy companies include both internal variables, such as technological efficiency and cost management, and external factors, such as public policies and the growing global demand for "clean" energy. With the aim of identifying the factors that influence the profitability of these companies, Morina et al. (2021) conducted a study analyzing the impact of various elements on companies located in European Union (EU) countries, based on data collected between 2004 and 2018. Profitability was assessed using indicators such as return on assets (ROA) and Tobin's q (the ratio between market capitalization and the replacement cost of the company's assets). The study considered business factors such as size, risk, age, capital intensity, and growth rate, as well as national variables such as fluctuations in electricity prices, market concentration, and government subsidies. Macroeconomic factors such as financial crises, annual GDP growth, and inflation were also analyzed. Detailed research results are available in Appendix A.

2.5. Determinants of Post-IPO Performance

2.5.1. Intended Use of Proceeds

Amor and Kooli (2017) used a quantitative methodology to investigate how the intended use of funds raised influences companies' long-term performance after their IPO. The results indicate that companies that allocate funds to debt repayment or general purposes, without a specific allocation, tend to underperform in the long term. In contrast, companies that allocate IPO proceeds to investments demonstrate more positive performance over time.

2.5.2. The "Green Effect"

Anderloni and Tanda (2017) conducted a comparative analysis between the performance of "green" and "non-green" companies in the energy sector. According to Walker et al. (2015), IPOs tend to be more undervalued when the business valuation is more complex. The results indicate that, in the long term, there are no significant differences in performance between these two categories of companies. However, "green" companies are more undervalued, possibly due to investors' limited knowledge of the emerging technologies used in the renewable energy sector. Older, non-green companies that are already established in the market tend to have lower AI, possibly because they are easier to evaluate. Anderloni and Tanda (2017)

also raise the hypothesis that, in the long term, returns may differ, considering recent sustainability trends and changes in regulatory frameworks.

2.5.3. Impact of Fossil Fuels' Price on Renewable Energy

The relationship between renewable energy and fossil fuels tends to be inversely proportional, given that they are direct substitutes. Xia et al. (2019) investigated this correlation, with results varying according to the level of risk. They divided fossil energy into five segments (oil, gas, coal, electricity, and carbon) and measured the performance of renewable energy using the European Renewable Energy Index (ERIX), which considers sources such as wind, solar, biomass, and hydro. The research showed that renewable energies had higher average returns and lower volatility, reflecting an optimistic market outlook. On the other hand, fossil fuel companies had lower returns and greater instability. Kumar et al. (2012) suggested that variation in fossil fuel prices affects renewable energy companies through substitution mechanisms. Xia et al. (2019) confirmed this interdependence between renewable energy returns and fossil fuel-related products. Additionally, they found that: (i) the impact of positive news is stronger in the relationship between renewable and fossil energies, (ii) declines in ERIX returns are highly influenced by internal factors, and (iii) there is clear competition between fossil resources and renewable energies.

2.5.4. Historical Long-Run Performance of IPO's

Ibbotson and Ritter (1995) identified that companies that issue IPOs generally underperform in the long term compared to those that do not issue. Ritter (1991) also found that the long-term performance of these companies is considerably lower than that of non-issuers. Miller (1977) suggests that this difference is due to a divergence of opinions - while well-informed investors only buy shares when the price allows them to profit, some less informed investors make offers based on incorrect or no information, disregarding the efficient market hypothesis. As a result, the share price tends to rise initially, which can result in unsatisfactory long-term performance. Loughran and Ritter (1995) suggest that investment banks deliberately underprice issues to generate visibility and interest, which explains the negative returns in the first year.

2.6. Firm Valuations Methods

2.6.1. Discounted Cash Flow (DCF)

The DCF (Discounted Cash Flow) method is based on the entity's ability to generate profit for investors, considering future cash flows. It is assumed that the future value of an investment

or asset today depends on the analysis conducted to determine whether the entity can generate wealth (Mota et al., 2020), considering inherent risks and inflation.

This method calculates the present value of the investment by projecting future cash flows and applying a discount rate, which corresponds to the expected return for investors. Thus, the valuation of a company should be based on the estimate of its future cash flows, adjusted by a discount rate that reflects investors' return expectations (Lie & Lie, 2003). According to Mota et al. (2020), this model offers a dynamic view of a company's value by incorporating its ability to generate value in the future.

This method can be approached through two distinct methodologies: Free Cash Flow to the Firm (FCFF) and Free Cash Flow to Equity (FCFE). The choice of either method reflects the expectations of investors and other stakeholders regarding the company's profitability and growth opportunities, after discounting expenses (interest, taxes, depreciation, and amortization) that may distort the company's ability to generate cash flows (Bilych, 2013).

Free Cash Flow to Firm (FCFF)

FCFF is an approach that accounts for cash inflows and outflows generated by the company's operating activities, allowing for the projection of different scenarios based on historical data and projected information on certain variables.

To calculate inflows, we used EBIT after tax deduction and, as it is calculated on an accrual basis, we added depreciation and amortization expenses. Outflows include capital expenditures (Capex) and working capital (WC) requirements.

The formula for calculating FCFF is as follows, where t represents the tax rate on the company's profits.

$$FCFF_f = EBIT_f * (1 - t) + Amortizations - CAPEX\ Investment - WC\ investment \quad (1)$$

(Free Cash Flow to the Firm (FCFF) Formula)

Discount Rate

The discount rate, as mentioned earlier, plays an important role in the DCF method, as it allows us to adjust future cash flows to their present value, reflecting the risk and uncertainty associated with those flows.

To estimate future cash flows, we chose to use the Weighted Average Cost of Capital (WACC) model.

Weighted Average Cost of Capital (WACC)

The WACC model allows us to analyze the entity's financial structure through the discount rate, considering the company's financial autonomy (percentage of total assets over equity) and its degree of debt, both weighted by their respective costs. The WACC model is a weighted average of a cost and a required return (Fernández, WACC: Definition, Misconceptions, and Errors, 2010).

Thus, WACC is represented by the following formula:

$$WACC = \frac{Equity}{Equity + Debt} * R_e + \frac{Debt}{Equity + Debt} * R_d \quad (2)$$

(Weighted Average Cost of Capital (WACC) Formula)

The cost of equity (Re) corresponds to the return required by shareholders, while the cost of debt (Rd) corresponds to the interest rate applied to the company's loans. The model also incorporates the "tax benefit" derived from interest payments, since these expenses are deductible from the tax rate (t).

Cost of Debt (R_d)

According to several authors (such as Modigliani & Miller's (1958)), debt is an important component for an entity, as it allows it to grow. However, this component generates risk, and the higher the debt value, the greater the return expected by investors to compensate for the level of risk associated with the level of debt.

The cost of debt (Rd) corresponds to the interest rate that the company pays on loans and other types of financing obtained. This value can be determined by the yield on corporate bonds issued by the entity (as is the case with Greenvolt) or, alternatively, by calculating the ratio between total interest expenses and similar charges and the total amount of the company's liabilities.

Cost of Equity (R_e)

The cost of equity (Re) represents the return required by shareholders to invest in the company, considering the "risk inherent in the company's activity and the cash flows it generates" (Havnaer, 2013, pp. 262-266). The cost of equity can be determined using the Capital Asset Pricing Model (CAPM), as shown below.

Capital Asset Pricing Model (CAPM)

The CAPM model, developed by Sharpe, Mossin and Lintner, has become a cornerstone of finance (Ross, 1977). The model is based on several assumptions, namely that markets are efficient, that the relationship between risk and return is stable over time, and that investors are risk-averse, demanding higher rates of return for riskier investments (Lobão et al., 2021). In other words, the model establishes a linear relationship between the expected rate of return on investment, considering the associated systematic risk, influenced by macroeconomic, environmental, or political factors.

Another type of inherent risk is specific to the company and is related to specific characteristics, such as the sector/industry, its market position, financial health, and other internal aspects. It is possible to reduce these errors through diversification.

The model calculation requires three inputs: the risk-free rate (RF), the expected market return (RM), which is often represented by market indices such as the S&P500 or NASDAQ, and the company's beta (systematic risk) (βF). The formula used is as follows:

$$R_e = R_f + \beta_F * (R_M - R_F) \quad (3)$$

(Return on Equity (R_e) Formula)

The difference ($RM - RF$) represents the market risk premium.

Risk-free Rate (R_f)

The risk-free rate is theoretically considered to be "the rate of return on a risk-free investment" (Hayes, 2024). However, although all investments involve some level of risk, in practice, the risk-free rate is usually considered to be equivalent to the interest rate on a Treasury bond with a top credit rating, which is generally known as the safest investment available to investors - although there is a possibility that a highly rated government will default on its bonds, this probability is considered to be extremely low.

Beta of the Firm (β_F)

The Beta (β), or systematic risk, reflects a measure of risk associated with the company, which relates the company's return to the market return (Kivedal & Borgersena, 2018), considering the volatility of the established relationship. It is calculated using the ratio between the covariance of the company's returns and market returns, with the variance of market returns.

$$\beta_F = \frac{COVAR(R_F, R_M)}{VAR(R_M)} \quad (4)$$

(Beta of the Firm or Systematic risk (β_F) Formula)

We can obtain three results for Beta after it is calculated: positive variation, negative variation, and no variation - equal to one. A positive Beta reveals that the company's shares follow market movements, which also indicates a higher risk for investors. Conversely, a negative Beta tells us that the shares move in the opposite direction to the market and that the risk is lower. When we obtain a Beta equal to one, we can assume that the risk of the asset is equivalent to that of the market in general. Therefore, the more efficient firms have lower Beta (Binder, 1992).

According to Damodaran (2002), a company's beta is influenced by the type of business, the level of economic leverage, and the level of financial leverage (both of which have an inverse relationship with risk). Considering the influences associated with the company mentioned in this paragraph, we obtain the levered beta (which reflects the risk of a company with a structure composed of equity and debt) and the unlevered beta (which assumes that the company is financed entirely by equity). To leverage or "deleverage" a beta, Hamada's equation, shown below, can be used.

$$\beta_L = \beta_u * \left[1 + \frac{Debt}{Equity} * (1 - t)\right] \quad (5)$$

(Levered Beta (β_L) Formula)

The beta obtained from market returns and company stock returns is leveraged. If this is not the case (if the beta is obtained from a secondary source), Hamada's equation will be necessary.

The beta calculated from market returns and company stock returns is a leveraged beta. However, if this is not the case, and the beta is derived from a secondary source, Hamada's equation will be necessary.

Enterprise Value

Enterprise Value corresponds to the commercial value of the company and can be obtained by discounting the projected cash flows for the company (FCFF) by the WACC. The formula is presented below:

$$EV_f = \sum_{t=1}^{n} \frac{FCFF_t}{(1 + WACC_f)^t} \quad (6)$$

(Enterprise Value (EV) Formula)

Firm Value

Enterprise Value (EV) and Firm Value (FV) are two distinct concepts. FV is obtained by adding non-operating assets to EV.

$$FV = EV + market\ value\ of\ non - operating\ assets \quad (7)$$

(Firm Value (FV) Formula)

Equity Value

The final stage in the assessment, using the FCFF method, consists of calculating the value of equity (EQV), which tells us how much the company is worth to shareholders. The calculation considers debt-related expenses - external financing.

$$Equity\ Value = FV - market\ value\ of\ debt \quad (8)$$

(Equity Value (EV) Formula)

Terminal Value

The calculation of Terminal Value is considered an important indicator in company valuation, especially in industries that depend on large investments to create or improve long-term cash flows (Mota et al., 2020). In these cases, terminal value predominantly constitutes a significant part of the total value of the company, which makes the accuracy of its calculation an important factor for the overall reliability of a valuation model (Behr, Mielcarz, & Osiichuk, 2018).

Bilych (2013) suggests using two- or three-stage DCF models, in which the company's growth rate varies. This method is especially appropriate when a company is growing faster than the market and a slowdown is expected in the future (in the case of a two-stage DCF model), or when the company is in an early stage, with the expectation that the growth rate will undergo two changes over time (in the case of a three-stage DCF model). Mota et al. (2020) argue that the growth rate can be determined in two ways: (i) by adding the real growth rate of the economy to the inflation rate, or (ii) based on the return on invested capital, as indicated in the following formula.

$$g = ROIC * (1 - payout\ ratio) \quad (9)$$

(Company's Growth Rate Formula)

Gama & Torres (2021) suggest using a sustainable growth rate (g*) as a benchmark for business growth. This rate assumes that the company expands solely on the basis of its retained earnings, keeping its operating and financial conditions unchanged. The formula for calculating the sustainable growth rate is presented as follows.

$$g^* = ROE * (1 - payout) \quad (10)$$

(Company's Sustainable Growth Rate Formula)

where ROE is the return on equity of the company. The only difference between the two rates presented is the measure of the company's profitability.

Free Cash Flow to Equity

The free cash flow to equity (FCFE) method represents the cash flow available to shareholders after deducting the value of all capital expenditures and investments, tax payments, and Capex outflows. In other words, it represents the cash flow available to pay as dividends. It can be expressed based on FCFF, as shown in the following expression:

$$FCFE = FCFF - Debt\ service + Debt\ obtained \quad (11)$$

(Free Cash Flow to Equity (FCFE) Formula)

This method requires that the discount rate reflect only the cost of capital. However, the method can also be applied with dividends received from investors instead of FCFE (the results will be different if part of the FCFE is retained by the company or if investments are made with a Net Present Value (NPV) other than zero).

FCFF vs FCFE

Both methods, FCFF and FCFE, have different purposes and applications. The choice of method depends on the financial analysis we intend to perform. The FCFF method is considered more advantageous from the investor's perspective. This method reflects the cash flows generated by a company before payments to shareholders occur (Bilych, 2013). On the other hand, the FCFE method represents the availability of cash flows generated for shareholders (Bilych, 2013). As argued by Mota et al. (2020), the FCFF methodology is more advantageous because it distinguishes between operational and financial performance in the company's financial analysis (detailing the impact of all capital expenditures and investments, tax payments, and Capex outflows separately) and because it assumes a constant debt rate.

2.6.2. Multiples Method

The multiples method is another form of financial analysis and evaluation aimed at determining the value of a company by assessing the value of other similar companies. The method compares the value of the company being analyzed with a group of similar companies—from the same sector, of the same size, etc. - and then adjusts the average of the selected group of multiples to reflect the differences between the company under analysis and the others.

The multiples method offers a simple and intuitive approach to valuation, although it involves a degree of subjectivity in the choice of comparable companies and the ratios to be applied (Mota et al., 2020). Despite its widespread use among professionals and academics, there is no consensus on the most appropriate multiple for valuing companies using this technique (Lie & Lie, 2002). As mentioned by Damodaran (2006), comparable companies should have similarities in terms of growth potential, cash flows, and risk profile.

2.6.3. DCF vs Multiples

The DCF methodology is often abandoned due to the difficulties it faces in the accuracy and reliability of cash flow projections, which can be uncertain and subjective, and in choosing an appropriate discount rate, which can be challenging and controversial. While DCF methods seek to calculate the intrinsic value of an asset, the multiples method focuses on establishing its price based on market behavior (Damodaran, 2006). As Damodaran (2002) states, 90% of stock research uses a multiples approach to valuation. Given that all valuation methods have their limitations, both methods should be used and compared to obtain a range of values and cross-check assumptions and results.

3. Company, Sector and Macroeconomic Overview

3.1. Company History, Structure and General Information

Greenvolt is a Portuguese company dedicated to renewable energy production, focusing on the development, construction, and operation of large-scale sustainable projects. Since its creation in 2021, the company has been on a growth trajectory, marked by strategic acquisitions and international expansion.

Greenvolt, a subsidiary of the Altri group, was created in March 2021 from the former Bioelétrica da Foz, S.A. - a company specializing in the production of electricity from renewable energy sources. Initially, the Altri group entered a partnership with EDP (Empresa de Energia Portuguesa) and EDP Produção – Bioelétrica, SA. was created, which ended in 2018. After the end of this partnership, the Altri Group acquired 50% of EDP (the acquisition was made through one of its subsidiaries - Caima - Indústria de Celulose, S.A.) and became the sole owner of the company, which was named Bioelétrica da Foz, S.A., and later known as Greenvolt.

The company aims to create sustainable value from the production of energy through renewable sources, contributing positively to the world with a view to energy sustainability, innovation, justice, and independence.

Greenvolt's activities are structured around three fundamental pillars: sustainable biomass, wind and solar energy - the development of large-scale renewable energy projects and distributed generation, all based on a commitment to sustainability.

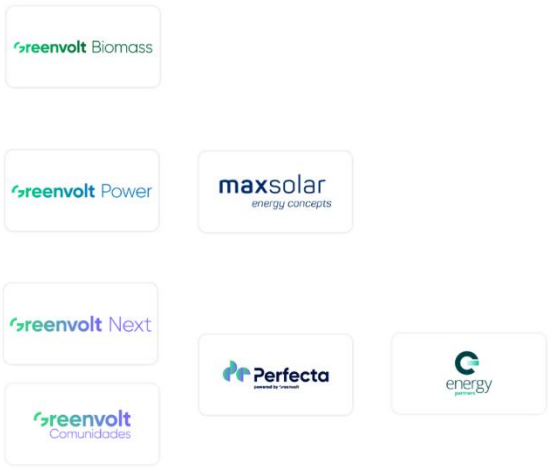
The biomass business unit is dedicated to converting organic waste into electricity, aligning itself with the principles of the circular economy and contributing to waste reduction and the promotion of environmental sustainability. The Wind and Solar segment focus on the development and implementation of large-scale renewable energy projects, with an emphasis on solar photovoltaic, wind, and energy storage solutions. These components are essential to ensuring the energy transition and strengthening the energy independence of the regions where the company operates. The strategy used in this business segment focuses on selling 70% to 80% of projects in the “Ready-to-Build” (RtB) or “Commercial Operation Date” (COD) phases, thereby optimizing return on investment and reinvesting resources in new projects. However, the company plans to expand its operations to include the phases after those indicated above, seeking greater control and profitability in the renewable energy sector. The Distributed

Generation segment focuses on the development and implementation of small-scale photovoltaic systems, predominantly for commercial or residential self-consumption of energy, focusing on the business-to-business (B2B) segment, where it believes it has a competitive advantage.

Greenvolt has adopted a largely inorganic growth strategy, focused on acquiring strategic companies. This approach has enabled the company to consolidate a diversified portfolio comprising eight operating entities, aligned with its three main business segments (Figure 3-1). In November 2022, Greenvolt consolidated its operations under four main brands: Greenvolt Biomass (operating in the residual biomass sector in Portugal and the United Kingdom); Greenvolt Power (responsible for the development of large-scale solar and wind projects); Greenvolt Next (active in Portugal, Spain, and Greece, focused on the implementation of decentralized renewable energy solutions), and Greenvolt Communities (operating exclusively in Portugal, dedicated to the creation of energy communities for collective self-consumption).

Greenvolt Communities is a sub-segment of distributed generation aimed at building energy communities, as the name suggests, for decentralized energy production and distribution. A community is made up of producers and consumers (the latter are not required to make any investment) and is only active in Portugal. Greenvolt Next also operates in the Distributed Generation segment. These two sub-segments significantly strengthen the company's position as a leader in decentralized renewable solutions, promoting positive economic, environmental, and social impact.

Greenvolt is present in around 19 countries, covering Europe, North America, and Asia. The company operates in Portugal, the United Kingdom, the United States, and 14 other European countries (Spain, France, Romania, Italy, Bulgaria, Croatia, Poland, Greece, Germany, Hungary, Serbia, Denmark, Iceland, and Ireland). The company went public in July 2021 when it held its IPO on Euronext Lisbon and was quickly included in the PSI 20 index of the Portuguese stock exchange.



Source: Greenvolt Website (2025)

Figure 3-1 *– Greenvolt Business Segments*

3.2. Ownership and Performance

Greenvolt made its debut on the Euronext Lisbon stock exchange in July 2021 with an IPO of €150 million, at a price of €4.25 per share. The stock immediately rose 13% on its first day of trading, and within a few months, the company was included in the PSI 20 index. The operation, coordinated by BNP Paribas and CaixaBank, was recognized as one of the best in the region and earned Greenvolt the "Issuer of the Year" award.

After Greenvolt issued its IPO, in June 2022 it carried out a Seasoned Equity Offering (SEO), which meant that it was no longer wholly owned by the Altri Group. In December 2023, Gamma Lux Holdco S.à.r.l., a company managed by Kohlberg Kravis Roberts & Co. L.P. (KKR), announced a public tender offer for 100% of Greenvolt's capital at a price of €8.30 per share, with the prior agreement of the main shareholders, who at the time held 60.86% of the capital. Throughout 2024, the shareholder structure underwent profound changes: in June, KKR converted Greenvolt 2030 bonds into shares and acquired additional securities on the market, bringing its stake to 83.62%. In October, the CMVM (Portuguese Securities Market Commission) approved the registration of the offer and minority shareholders were given the opportunity to sell their position until October 24, by the end of that month, KKR already controlled 97.64% of the capital, initiating the exclusion of minority shareholders. In December 2024, Greenvolt was delisted from Euronext Lisbon, making KKR its sole shareholder. The company's dividend policy is very conservative, with no dividend distribution until 2025.

At the same time, the company consolidated its financial policy and strategy based on a solid, robust balance sheet, diversification, and sustainability. The company strengthened itself through various strategic financing lines. One of these was the expansion of a syndicated credit line, which increased from €350 million to €400 million in October 2024, with the support of KKR and a group of international banks. These resources are earmarked for the development of the renewable energy project portfolio, which already totals 9.3 GW, complemented by project finance instruments to finance specific initiatives.

Greenvolt's expansion strategy is based on strategic acquisitions and extending the maturity profile of its debt. Since its IPO, it has adopted a solid financial strategy, using green bond issues to finance its expansion and sustainable projects. Between 2019 and 2024, the company issued three series of green bonds totaling €350 million, representing 25% of the Group's total debt at the end of 2024, maintaining its commitment to strengthening sustainable financing instruments to support investment in green projects included in the business plan, thus contributing to accelerating the energy transition. These issues were well received by the market, with demand exceeding supply on all occasions.

Greenvolt has shown remarkable growth in the renewable energy sector, having been very successful in recent years, consolidating itself as one of the leading companies in Portugal and expanding its international presence. The key to this growth is its asset rotation strategy. This strategy consists of developing renewable energy projects to maturity (RtB or COD) and selling between 70% and 80% of these assets to generate immediate capital. Thus, only about 20% to 30% of the projects remain on its balance sheet. This approach allows the company to maximize its liquidity, mitigate operational risks, and sustain a trajectory of accelerated growth in the renewable sector.

The Biomass segment specializes in producing energy from residual biomass, operating mainly in the United Kingdom and Portugal. In 2024, Greenvolt acquired a second plant in the United Kingdom, with similar characteristics to the Tilbury plant. This infrastructure is dedicated to the production of electricity and heat from sustainable biomass, contributing to the diversification and stability of the renewable energy matrix in the country, creating a complementary relationship with the existing infrastructure in Portugal. In 2024, Greenvolt's operations in this segment injected 941 GWh of electricity into the grid, helping to prevent the emission of approximately 148,756 tons of CO_2 into the atmosphere - a significant contribution to the decarbonization of the energy sector. In 2024, this segment generated revenues of €152.5 million, 9% less than in the same period of the previous year. EBITDA totaled €28.3 million,

representing a 50% decrease compared to the same period last year. Despite this decline, due to lower energy prices in the United Kingdom and the already planned closure of the Mortágua Power Plant at the end of July, the unit remained solid, contributing significantly to Greenvolt's financial stability.

The Utility-Scale segment has exceeded previous years' expectations. Despite a challenging environment for the sector, Greenvolt increased its pipeline from 8.4 GW at the end of 2023 to 13.2 GW at the end of 2024, having developed 3.9 GW to at least the RtB phase. The company also signed a contract with BYD to develop Battery Energy Storage Systems (BESS) projects of up to 1.6 GWh in Poland - the largest of its kind ever developed/produced in Europe to date. In 2024, total operating income from this segment amounted to €94.8 million, 1.6x lower than in the same period last year, with EBITDA totaling -€25.8 million, representing a 1.5x decrease compared to 2023. The financial performance of this segment is currently closely linked to the recording of capital gains on asset sales. During 2024, despite the purchase and sale agreements, the transfer of assets was not completed, which will have a positive impact during 2025.

Distributed generation is the fastest-growing segment for Greenvolt, which strengthened its presence in new geographical areas in 2024. The company continued its expansion with new projects in markets such as Poland, with the launch of Greenvolt Next Polska, with a target of installing 200 MWp in distributed generation between 2025 and 2027, and the Azores, with around 3.4 MWp already completed and 9.1 MWp in closed projects, reinforcing its leadership in business self-consumption solutions in Europe.

Greenvolt currently operates six biomass plants - five in Portugal (Constância, Ródão, Figueira da Foz I and II) and two in the United Kingdom (UK) (Tilbury Green Power and Kent Renewable Energy Limited (KREL)), with a total annual production of 941 GWh of electricity. In October 2024, it significantly strengthened this capacity by acquiring the Kent plant in south-east England, bringing its installed capacity to approximately 28 MWe (electric) and 25 MWth (thermal).

In 2024, the sector's performance was impacted by low electricity prices in the UK and unfavorable weather conditions in Portugal. Greenvolt plans to invest between €40 million and €50 million between 2024 and 2025 to replace the Mortágua plant. The biomass sector continues to benefit from long-term supply contracts and regulatory support mechanisms.

Greenvolt currently has a project pipeline with a total capacity of 13.2 GW spread across 18 countries. The forecast is to bring at least 5.3 GW to the RtB phase by the end of the year. The segment's strategy is to expand internationally, mainly in Europe.

3.3. Financial Analysis

Between 2018 and 2022, Greenvolt showed strong revenue growth, with very high annual rates, reflecting a phase of accelerated expansion, mainly inorganic. This growth initially translated into robust operating margins, particularly in 2020, when EBIT reached 30.3%, although from 2021 there was downward pressure on margins, reflecting higher integration and operating costs. In 2023, although revenues increased to €385.5 million (+48%), the EBIT margin fell to 11.5% and the company recorded a small net loss of €3.5 million, marking a reversal from previous profitability. In 2024, the Group's financial performance continued to be negatively affected: revenues declined by 11%, EBIT fell to -€91.9 million, and the net loss worsened to -€133.9 million. Additional details can be found in Appendix B.

These results reflect a combination of extraordinary and operational factors that impacted key indicators compared to 2023. This reduction is mainly associated with the Utility-Scale and Biomass segments. In the former, there were delays in planned asset sales, largely due to political changes in Poland - a strategic market for the group's pipeline - and constraints on projects in Spain. In the biomass segment, the planned closure of the Mortágua plant and investments made in the remaining plants resulted in longer than expected shutdowns. These effects, combined with falling electricity prices in the UK, significantly reduced operating income. The situation was aggravated by the unscheduled shutdown of the Kent plant, acquired in October 2024, which did not inject energy during the period of Greenvolt's detention. The unit returned to operation in January 2025, and it is expected that, throughout that year, the company will be compensated for the costs incurred and lost profits.

In addition, Greenvolt is in a phase of heavy investment, with around 800 MW under construction and new distributed generation operations starting up in several countries. Although this effort will strengthen installed capacity in the future, it is not yet reflected in immediate revenues.

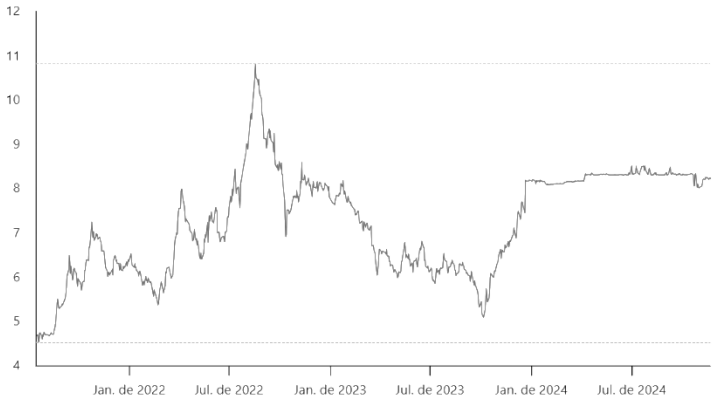
Greenvolt's cash flows between 2018 and 2024 reflect a trajectory of accelerated growth supported by heavy reliance on external financing. Until 2022, operations showed positive and stable flows, revealing an operational activity capable of generating liquidity. However, in 2023 and especially in 2024, operating flows became negative (-1.7 million and -14.1 million,

respectively). At the same time, investment flows grew exponentially, rising from moderate levels between 2018 and 2020 to very high levels from 2021 onwards, particularly in 2024 (-558 million euros), reflecting the acquisition of strategic assets and the expansion of the renewable generation pipeline. To sustain this effort, the company made extensive use of financing: in 2021, it obtained €451 million, benefiting from the IPO and new debt; in 2022, it further strengthened its position by €326 million; and in 2024, it obtained an additional €434 million, supported by KKR and the expansion of syndicated credit lines. The net cash balance follows this trend: significant increases in 2021 and 2022, followed by reductions in 2023 and 2024. Appendix C presents the data.

Over the last two years (2022-2024), the company has strengthened its balance sheet, increasing the coverage of long-term financing sources for fixed assets. Between 2018 and 2021, Greenvolt had small operations and positive working capital, exceeding working capital requirements. The same scenario did not occur between 2022 and 2024, when working capital became negative, falling short of working capital requirements. Cash on hand totals €327 million, in line with the company's liquidity maintenance policy. Available sources of liquidity also include available credit lines - commercial paper, factoring, and overdrafts are available. The IPO in 2021 strengthened the balance sheet and brought strong liquidity, with cash peaking in 2022. However, from 2023 onwards, high investments and delays in the pipeline increased working capital requirements, leading to renewed pressure on liquidity and weaker results in 2024. Despite the expansion and KKR's entry, the ratios show high leverage and lower interest coverage capacity. Appendix D provides further details.

Stock Price

Between November 2021 and June 2024, Greenvolt’s shares experienced three main phases. The company debuted on July 15, 2021, at €4.25 per share and closed 2021 at €6.35, reflecting an initial appreciation. In 2022, the shares rose sharply, reaching a high of €10.80 and a low of €5.25, highlighting significant volatility due to the company’s short market history and innovative business model. After the peak in August 2022, the price corrected and stabilized, remaining above the issue price. By the first half of 2024, the shares were trading around €8.32, showing moderate recovery. Key factors driving this evolution include macroeconomic conditions, the performance of the renewable energy sector, company growth, and changes in capital structure, such as the capital increase in June 2024 through the issuance of 24,065,362 new shares. A detailed analysis is provided in the following sections. Figure 3-2 illustrates thehistorical share price evolution.



Source: Jornal de Negócios (2024)

***Figure 3-2** – Greenvolt Stock Price Evolution*

3.4. Industry Statistical Analysis

Per Capita Energy Use

The evolution of per capita energy consumption in Portugal can be analyzed in three distinct phases. Between 1960 and 2000, there was very significant growth, particularly between 1965 and the early 2000s, during which primary energy consumption per capita increased more than fourfold. This growth was associated with economic development, urbanization, the widespread use of cars, and the widespread use of electrical equipment in the domestic and service sectors. Between 2000 and 2010, the trend changed, becoming more volatile. Energy consumption stabilized and, in certain years, declined, strongly influenced by external shocks such as the 2008 international financial crisis, which affected economic activity and reduced energy demand. Between 2011 and 2024, there was a gradual reduction in per capita energy consumption, with a cumulative decrease of around 20% since 2000, placing primary energy consumption per capita in 2023 at its lowest level in the last two decades. This evolution is the result of a combination of factors, including energy efficiency gains, the modernization of electrical equipment, the growing penetration of renewable energies in the national energy system, changes in consumption patterns, and the effects of less favorable economic cycles. A detailed graph can be found in Appendix E.

In Portugal, current trends show per capita energy consumption below the EU average. This can be explained by the lower energy intensity of its production structure, which is heavily service-oriented, and by the gradual adoption of public policies and efficiency measures that have contributed to a more rational use of energy. Figure F and Appendix G also show per capita energy use in 2024, broken down by geography.

Renewables in Total Energy Consumption

Over the past 30 years, renewable energy sources have come to account for a larger share of total energy consumption. This increase has been more pronounced since 2005, but 2022 marked a turning point: for the first time, renewables surpassed coal and gas generation. Decentralized production also made significant progress, particularly rooftop solar photovoltaic energy, which in 2024 already accounted for a significant share of total capacity, with projections pointing to more than 50% of Europe's cumulative solar capacity coming from this segment in the coming years. A graphical representation of this data can be found in Chart H and Chart I.

In 2024, renewable energy sources supplied 71% of Portugal's electricity consumption, reaching a historic record. This figure reflects the country's prominent position in the European context, representing around 23% of the EU gross final energy consumption. In 2004, this figure was only 9.6%, showing consistent and structured growth in the sector. In 2024, the EU recorded that 46.9% of net electricity generated came from renewable sources. Among the Member States, Denmark and Iceland stood out as the countries with the highest percentage of renewables in their net electricity production (88.4% and 98.9% respectively). Iceland remains an exception globally, as almost all of its energy consumption comes from renewable sources, mainly geothermal and hydroelectric. It was followed by Portugal (85%, mainly wind and hydroelectric) and Croatia (73%, mainly hydroelectric). In contrast, the lowest percentages were recorded in France (26%), Poland (30%), and Belgium (36%). A graphical representation of this data can be found in Chart J.

Currently, depending on the country/region, renewable sources account for between 10% and 40% of total energy consumption. Recent volatility in energy markets and growing pressure for energy transition have reinforced demand for Power Purchase Agreements (PPAs). At the same time, rising interest rates have led investors to favor operational assets, such as solar and wind farms already in operation. In this context, companies such as Greenvolt have benefited from an environment favorable to the expansion of renewables and new business opportunities, despite the uncertain global scenario.

Renewables in Primary Energy Supply

In the countries where Greenvolt operates, there has been a marked increase in the share of renewable energy in the primary energy supply. Among these, Iceland stands out as the leader, with around 89.9% of its supply coming from renewable energy. Iceland, Portugal, and Denmark are also at the forefront of this transition, reflecting high percentages of energy

consumption supported by clean sources. If biofuels are excluded from the analysis, given that this form of production is not part of Greenvolt's portfolio, the picture remains similar: Iceland does not use biofuels, while Portugal and Denmark are significantly dependent on them, which account for approximately 50% of their renewable supply.

Energy production is measured by a unit of power, in this case, Gigawatts. According to the International Renewable Energy Agency (IRENA). In 2024, global renewable energy capacity reached a record high, with the addition of 582 GW of new renewable capacity, an increase of about 19.8% compared to 2023. Of these additions, solar photovoltaic (PV) energy accounted for approximately 452.1 GW, about 78%, followed by wind energy with 114.3 GW. The cumulative total of installed renewable capacity worldwide reached 4,443 GW at the end of 2024.

Levelized Cost of Electricity

The Levelized Cost of Electricity (LCOE) is one of the most widely used indicators for assessing and comparing the competitiveness of different power generation technologies. This indicator relates the total costs incurred over the lifetime of a given technology to the total electricity generated by it over the same period (IRENA, 2022). In practical terms, it represents the average cost of electricity production over the entire lifetime of a project, usually expressed in euros per megawatt-hour (€/MWh), and is calculated by dividing the present value of total costs by the present value of electricity produced over the project's time horizon. However, it has significant limitations: it assumes a static nature, not reflecting the dynamics of electricity markets; it does not consider the temporal relevance of energy production in contexts of supply and demand volatility; and it disregards potential associated alternative revenues or costs. Thus, the LCOE should be interpreted as a benchmark and not as an absolute criterion for assessing the competitiveness of electricity generation projects. For a more robust and comprehensive analysis, it is essential to incorporate complementary variables, such as the capacity factor, total initial investment costs, and operating and maintenance expenses.

Cost Drivers

Renewable energy projects, like any other type of investment, are subject to costs that determine their viability and competitiveness. In 2024, these costs were influenced by a set of structural and cyclical factors that shaped the evolution of the sector and consolidated renewables as a more competitive alternative to fossil fuels (IRENA, 2024). The reduction in initial investment (Capex) stood out as one of the main drivers of the fall in costs, benefiting from economies of scale, greater technological efficiency, and more consolidated supply

chains. At the same time, the significant decline in the cost of storage systems - around 93% since 2010 (IEA, 2024) - has increased the viability of integrating renewables into electricity grids. However, financing remained a critical driver: in the EU, discount rates stood at around 3.8%, while in emerging markets they exceeded 12%, reflecting political and regulatory risks (IRENA, 2024). Operating and maintenance costs (Opex) fell for solar and wind technologies but remained high for biomass and hydroelectric power due to logistical and environmental expenses. In addition, the high penetration of intermittent sources (solar and wind) required additional investments in transmission networks, flexibility, and storage, adding indirect costs. Technological innovation has played a central role in reducing costs. Advances in photovoltaic modules, wind turbines, hybrid systems, and digitization have improved production efficiency, reduced losses, and increased reliability. The regulatory environment has also been important. Lengthy licensing processes, incentive policies, and disruptions in supply chains - exacerbated by the pandemic and the Russia-Ukraine conflict - have had a direct impact on costs.

Commodities are another determining factor, accounting for a large part of installed costs. Solar and wind projects depend on inputs such as copper, aluminum, nickel, and cobalt, whose prices have been highly volatile in recent years. After a decline in 2020 due to the pandemic, prices skyrocketed until 2024 due to increased demand and additional disruptions caused by the war. This instability raised input costs, prolonged delivery times, and directly affected project execution.

In 2024, the cost structure of renewable energy resulted from a balance between technological innovation, economies of scale, and greater efficiency with commodity volatility, financing costs, and regulatory requirements. Despite these challenges, renewables remained the most competitive alternative to fossil fuels, consolidating their central role in the global energy transition (IRENA, 2024; IEA, 2024). A graphical representation of this data can be found in Chart K.

Cost and Capacity Factor

Two of the most critical factors for the success of renewable energy projects are the associated costs and the capacity factor. In 2024, these costs continued to play a decisive role in determining the competitiveness of renewable energies in relation to fossil fuels. According to IRENA's Renewable Power Generation Costs in 2024 report, more than 90% of new renewable utility projects had a lower LCOE than fossil alternatives, highlighting gains in scale, technological maturity, and more efficient supply chains. Reductions in initial investment benefited from optimized engineering and procurement processes, as well as the use of more

efficient technologies, with new-generation solar panels and wind turbines. The cost of storage systems has fallen by about 93% since 2010, which facilitates the integration of renewables and reduces the costs associated with intermittency. Financing remained an important driver. In the European Union, discount rates of approximately 3.8% were common for renewable projects, while in emerging markets rates above 10-12% persist, reflecting higher regulatory and market risks. Despite some declines in initial investments, inflation, high logistics costs, supply chain disruptions, and higher interest rates also contributed to upward cost pressures. Operating and maintenance costs (Opex) have improved in solar and wind technologies, but remain high in biomass and hydro due to transportation, adverse environmental conditions, and specialized maintenance. The high penetration of intermittent sources (solar and wind) also requires additional investments in grids, flexibility, and storage, cost components that are often underestimated.

The capacity factor has also improved for many solar and wind projects, driven by more careful geographic selection, improvements in equipment efficiency, and operational optimization. This allows for more consistent production and higher utilization rates, contributing to a reduction in the average cost per unit generated. Data on total installed costs and the evolution of capacity factors can be found in Appendices L and M, respectively.

Solar PV

The LCOE for solar photovoltaic projects has been steadily declining over the last decade, consolidating this technology as one of the most competitive options in the energy sector. The combination of technological improvements, economies of scale, and a reduction in module prices, whose global average value fell to USD 691/kW in 2024, representing an 11% decrease compared to 2023, and the optimization of supply chains have contributed decisively to the increase in energy revenues and the consequent decrease in LCOE. According to the IRENA report Renewable Power Generation Costs in 2024, the global average LCOE for utility-scale solar photovoltaic energy stood at USD 0.043/kWh, confirming a cumulative reduction of around 90% compared to 2010, when the figure stood at approximately USD 0.417/kWh. In addition to the reduction in equipment costs, there has also been a significant improvement in the capacity factor, supported by the installation of projects in regions with high solar radiation, the adoption of bifacial modules, and the increased efficiency of commercial modules, which in 2024 already exceeded 22% on average, with records exceeding 25% in more advanced technologies, such as heterojunction (HJT) cells. Another relevant factor was the growing integration of battery storage systems, which, despite representing an additional cost, have

become more affordable and play an increasingly important role in mitigating the intermittency of solar production. This development contributes to increasing the value of the electricity generated, strengthening the competitiveness of photovoltaic energy in markets where flexibility and stability of supply are critical.

In 2024, the LCOE of solar photovoltaic energy consolidated its position as one of the lowest among all electricity generation technologies, positioning it as the most competitive source in the global energy transition. However, despite these advances, the LCOE can vary significantly between regions. China and India stood out as lower-cost markets, benefiting from economies of scale, cheaper labor, and integrated supply chains, with LCOEs often below the global average. In Latin America, countries such as Chile and Brazil had competitive costs due to high solar radiation availability and well-structured energy auctions. In Europe and the United States, although costs have fallen substantially, they remain slightly above the global average due to higher labor costs, greater regulatory pressure, and more significant financing costs.

Onshore wind

In 2024, onshore wind energy established itself as one of the most competitive sources of renewable electricity worldwide. According to the IRENA report Renewable Power Generation Costs in 2024, the global average LCOE for new onshore wind projects stood at USD 0.034/kWh, positioning this technology as the cheapest renewable option in many markets and, in global average terms, even more competitive than solar photovoltaic energy. The evolution since 2010 shows a significant reduction in capital costs (Capex) and generation-related costs, resulting from continuous technological advances and economies of scale. The specific costs of installing onshore wind farms have fallen by almost half over the period, driven by the development of more powerful turbines, increased operational efficiency, and significant improvements across the supply chain.

Despite this cost reduction trajectory, there was a slight increase in LCOE in 2024, around +3% compared to 2023, mainly explained by higher financing costs, rising raw material prices, and persistent disruptions in global supply chains. In addition, regulatory factors, complex licensing processes, and increased logistics costs continue to pose significant challenges in several markets, contributing to limiting cost reductions.

Bioenergy

The LCOE for bioenergy projects has distinct characteristics compared to other renewable technologies. According to IRENA's Renewable Power Generation Costs in 2024 report, the

total installed costs of this technology increased by around 16% between 2023 and 2024, while the LCOE rose by approximately 13% over the same period. This behavior contrasts with the trend observed in sources such as solar photovoltaic or onshore wind, which continued to significantly reduce their costs, reflecting technological and scale gains. The increase in the cost of bioenergy is associated with a number of structural factors. The first is dependence on the price and availability of fuel (feedstock), such as forest biomass, agricultural waste, or pellets, whose volatility has a direct impact on operating costs. Added to this factor is the logistics component, since the transport, storage, and preparation of biomass represent additional costs, especially when sources are located far from power plants or require specific processes. Another critical element relates to efficiency and capacity factors, which are often lower than those of other renewables due to the lower continuous availability of raw materials and the downtime required for maintenance. In addition, bioenergy is heavily influenced by regulatory and environmental factors, including the need for biomass certification, traceability requirements, and sustainability standards, which can add to compliance costs. Financing also plays an important role, as the perceived risk associated with biomass supply tends to raise the cost of capital, putting further pressure on the LCOE.

Distributed Generation

Distributed generation refers to a set of technologies that enable electricity to be produced at or near the point of consumption, such as photovoltaic solar panel systems and cogeneration (EPA, 2024). This approach can be applied to a single facility or integrated into microgrids, providing greater energy autonomy. The adoption of this model gave rise to the concept of prosumers, i.e., consumers who also play the role of energy producers. Among its main advantages are resilience to failures or shortages in the conventional electricity grid and the elimination of intermediaries in the process between generation and consumption. When combined with storage systems, whether batteries or other solutions, distributed generation enhances the flexibility of the electricity system, allowing surplus energy to be stored and made available at times of peak demand.

Between 2019 and 2021, there was a significant expansion in distributed solar generation capacity, with hundreds of gigawatts added globally. By 2024, total solar installation in the EU reached approximately 65.5 GW, incorporating both utility projects and (in part) distributed generation. Markets such as Germany, Brazil, and Turkey continue to show strong distributed solar generation activity. The levelized cost of electricity for utility solar projects fell to around US$0.043/kWh in 2024, confirming a downward trend in costs driven by technological

improvements, supply chain refinements, and reduced installed costs. Although distributed generation projects typically face additional obstacles, such as high fragmented installation costs, less favorable financing, and smaller scale, efficiency standards have improved, which tends to reduce the cost difference between distributed generation and utility projects. The EU predicts that distributed generation will account for 30% of energy consumption by 2030, and its shorter time to market and lower bureaucratic requirements make it a very attractive sector, especially for Greenvolt.

3.5. Industry Outlook

Demand for energy has increased significantly in recent years, particularly in the transportation, manufacturing, and building equipment sectors. Population growth and improved living standards are factors driving this demand, although gains in energy efficiency help to mitigate some of this growth. Demand for energy from renewable sources has grown and shows prospects for continued expansion. In 2024, total energy demand increased by 2.2% compared to the previous year, with the electricity sector leading this growth (+4.3%), driven by the electrification of transport, the increasing use of air conditioning, digitalization, and industrial growth in emerging markets. A significant part of this increase was supplied by renewable sources, reinforcing the trend towards decarbonization of the energy system.

Over the next five years, renewable energy consumption is expected to increase to approximately +46% of total energy consumption compared to 2023, with solar photovoltaic and wind power accounting for almost all of this increase (IEA, The International Energy Agency (IEA), 2025). This growth will be driven mainly by the building and industrial sectors, which will offset the expected reduction in energy consumption associated with transport. On the supply side, shocks to global supply chains, initially caused by the pandemic and later exacerbated by the conflict between Russia and Ukraine, with Russia being one of the main suppliers of natural gas to Europe, have led to a significant increase in raw material prices. This pressure on commodities is likely to continue to be reflected in the costs of renewable energy projects in the coming years, as the effects extend to the interval between the acquisition of inputs and the realization of investments.

Electrification through renewables

Electrification has established itself as a global trend and currently represents the main alternative to fossil fuels. Recognized as the central driver of decarbonization, electricity supply from the grid is estimated to grow at an average annual rate of 2.7% until 2050 (DNV).

At the same time, the share of coal and gas power plants in the energy mix is expected to decline progressively as renewables become more cost-competitive and financial constraints reduce the viability of expanding fossil fuel sources. Nevertheless, fossil fuels are expected to continue to play a complementary role, especially in smaller-scale power plants, operating flexibly to balance the variability of renewable production.

According to the DNV report *(Energy Transition Outlook 2024)*, projections indicate that, by 2050, around 83% of global electricity will come from renewable sources, while fossil fuels will account for only 12% of the total. Within the renewable portfolio, solar photovoltaic energy stands out, accounting for 38% of generation, followed by wind energy, which is expected to account for one-third (75% from onshore projects and 25% from offshore projects). Globally, installed renewable capacity is expected to grow by a factor of 16, while supply variability will increase between two and four times. Bioenergy, in turn, is expected to double its use in the transport sector, although its relevance in the energy consumption of buildings will decrease. Both solar and wind energy are expected to see reductions in the LCOE. In the case of solar, this decrease will be associated with falling investment costs, while wind will benefit from higher capacity factors resulting from technological advances. Despite losing some relative share, solar photovoltaic energy will remain the leading renewable technology in terms of installed capacity, with its power expected to increase 44-fold by 2050. Onshore wind is expected to grow eight times faster than in 2020.

From a geographical perspective, energy demand will tend toward greater global uniformity, with emphasis on the growing role of Greater China, the Indian subcontinent, and other emerging economies as central consumer markets.

It is also predicted that global energy intensity, measured by primary energy consumption as a function of GDP, will follow a downward trajectory, falling by around 2.7% per year over the next three decades.

3.6. Economic Outlook

In recent years, the global economy has faced a succession of external shocks - the COVID-19 pandemic, Brexit, and the Russia-Ukraine conflict - that have left profound marks on the countries where Greenvolt operates. Appendix N presents the evolution of GDP in these regions. In 2020, most of the regions in which Greenvolt is active experienced a significant contraction in economic activity. By 2021, however, there was a broad-based recovery, with growth recorded in nearly all the economies analyzed. In 2022, this recovery trend persisted

but at a more moderate pace, strongly constrained by global inflation. In some countries, growth gave way to stagnation. The Russia-Ukraine conflict worsened this trend by generating inflationary pressures, driven mainly by higher energy prices and disruptions in the supply of gas, oil, and critical raw materials, which raised import costs and affected industrial production.

In 2024, economic performance diverged across countries. In Portugal, GDP grew by 1.9%, driven by domestic consumption and a rebound in economic activity in the final quarter of the year. In Spain, the economy expanded by around 3.2%, benefiting from both internal consumption and positive contributions from external demand. These results exceeded earlier, more modest forecasts, reflecting stronger resilience after the gradual absorption of external shocks. Globally, however, the outlook points to a slowdown: according to the OECD, the global growth rate is expected to decline from 3.3% in 2024 to around 2.9% in 2025. Most economies now face the dilemma of sustaining investment and stimulus measures while contending with persistent inflationary pressures.

The recovery process that began in 2021 led to a significant increase in the Consumer Price Index (CPI) across nearly all regions, reversing decades of historically low inflation. The price surge intensified in March 2022 with the onset of the conflict in Ukraine. Inflation data can be found in Appendix O. To contain inflation, major central banks adopted contractionary monetary policies. The European Central Bank (ECB), for example, revised its strategy in 2021 and set a target of 2% inflation. In response, it launched an interest rate hike cycle in July 2022, raising rates by 2.5 percentage points within just six months, after a long period of near-zero levels. Similar measures were implemented by the Federal Reserve and the Bank of England, with expectations that interest rates will remain elevated until inflation stabilizes. The evolution of interest rates is detailed in Appendix P.

In the labor market, unemployment increased between 2020 and 2024, following the broader economic cycle. Appendix Q presents employment rates for selected countries, while Appendix R illustrates the evolution of wages, respectively. As a result of inflation, real wages stagnated - or even declined in some cases - particularly in 2021 and 2024.

3.7. Porter’s “5 Forces Model”

One of the most widely used models for assessing the attractiveness of an industry is Porter's Five Forces, which seeks to understand the intensity of competition and the potential profitability of a sector. However, this model has some limitations. Among the most recurrent criticisms are: the inability to reflect the differentiated impact that each force can have on

different companies within the same industry, its emphasis on past information, which reduces the usefulness of the analysis for short-term forecasts, and its restricted application to only one sector at a time, which proves ineffective when the company operates in several business fronts simultaneously. Based on these limitations, (Grant, 2014) proposed the introduction of a sixth force - complementary products - recognizing that the existence of goods or services that reinforce the value of the main offering can significantly increase the attractiveness of a market. Furthermore, in the current context, marked by increasing regulation and the active role of states, it is becoming increasingly relevant to also consider the influence of governments and regulatory authorities on the competitive structure of industries.

Given the criticism described above, we chose to conduct an analysis considering seven forces, which incorporates not only the classic elements defined by Porter (internal competition, threat of new entrants, threat of substitute products, bargaining power of customers and suppliers), but also complementary products and government and regulatory action. This expanded structure allows for a more comprehensive and realistic view, especially in the case of the renewable energy sector, where demand forces and cost drivers tend to be common across different segments (wind, solar, biomass, among others), but where factors such as public subsidies, environmental regulation, licensing, and incentive policies play a decisive role in determining its attractiveness.

Threat of new entrants

In 2024, the renewable energy market in Portugal and Europe saw a growing influx of new players, transforming the competitive dynamics of the sector. In Portugal alone, installed renewable energy capacity increased by around 8% compared to 2023, with approximately 86% of this growth attributable to new solar photovoltaic plants, many of which were developed by companies that had not previously had a significant presence in the national energy market. This development demonstrates the attractiveness of the sector to foreign investors and new competitors, who bring with them capital, technology, and innovative business models, reinforcing competitive pressure on traditional operators. At the same time, large incumbent companies, such as EDP and Galp, have been expanding and diversifying their strategies, investing in adjacent areas such as green hydrogen, storage systems, and critical raw materials such as lithium, thus seeking to protect their position in the face of new competitors. This transformation highlights a change in the competitive profile of the sector, characterized by the coexistence of traditional companies with experience and scale and new players that

challenge market rules through digital solutions, distributed generation models, and decentralized investments.

The attractiveness of the sector is reinforced by public policies and ambitious investment plans, such as the approximately €60 billion planned by 2030 in Portugal to strengthen installed capacity in solar and offshore wind power. Such incentives increase opportunities for new competitors to enter the market, but also highlight structural barriers, such as lengthy licensing processes, difficulties in accessing the electricity grid, regulatory requirements, and the need to secure long-term PPAs, factors that limit the financial viability of some projects. The entry of new players into the market where Greenvolt operates represents both an opportunity for innovation and a competitive challenge, forcing the company to strengthen its technological differentiation, its execution capacity, and its integration into global value chains to maintain its position in an increasingly competitive and dynamic sector.

Threat of substitutes

In the market where Greenvolt operates, the threat of substitutes is complex, ranging from alternative energy sources to emerging technological solutions. The main substitutes for renewables are fossil fuels, especially natural gas and coal, which continue to play an important role in the global energy mix due to their high availability, existing infrastructure, and ability to provide baseload energy without interruption. However, in markets such as Portugal and the EU, growing regulatory pressure, climate commitments, and the rising cost of carbon emissions have progressively reduced the competitiveness of these sources. Other transition solutions can also be considered as partial substitutes. Nuclear power, for example, is regaining relevance in some European countries such as France and the UK, where it is seen as a low-carbon alternative that can compete directly with renewables in terms of stable and continuous production. Green hydrogen, meanwhile, is emerging as a potential substitute, not only as a vector for energy storage and transport, but also as a competitor in industrial and mobility applications, segments where renewables alone have limitations. Appendix S

Bargaining power of suppliers

Suppliers' bargaining power is one of the critical forces that can significantly influence the profitability and sustainability of projects. This power stems mainly from dependence on raw materials and strategic components - such as copper, aluminum, nickel, and cobalt - which are essential for manufacturing equipment such as solar panels, wind turbines, and storage systems. In 2024, prices for metals such as copper rose by around 7.66% compared to 2023. This increase reflects upward pressure on supply costs and highlights the growing relevance

of this force. In addition to metals, many suppliers of solar modules, inverters, or turbines are concentrated in key regions (especially China for the solar sector), which limits sourcing alternatives and reinforces buyer dependence. Disruptions in supply chains, evident during and after the pandemic, and increased logistics costs further intensify the risk of shortages or delays that affect project schedules and margins.

Additionally, in the current context, the supply of critical components faces structural tensions: in the OECD report (Miller & Martínez, The changing dynamics in global metal markets:, 2025), it is projected that the metals market (copper, nickel, lithium, cobalt) will remain under pressure as demand from the energy transition continues to grow. These forecasts indicate that supplier power may remain high or even increase, especially for rare materials or those with concentrated production chains. However, Greenvolt may be able to neutralize part of this power through mitigation strategies: contracting multiple suppliers, establishing long-term fixed-price agreements, investing in vertical partnerships, or further integrating into the supply chain.

Bargaining power of buyers

The industry's customer base is composed primarily of institutional entities, including public sector companies and investment firms, which tend to be well-informed and aware of the characteristics and limitations of supply. However, the geographic nature of energy sources and the growing trend toward decentralization make competitiveness more pronounced among companies operating in geographically proximate markets. At the same time, electricity demand has shown consistent growth in recent years, and projections indicate that this trend will continue, supported by government policies promoting renewable energies as central pillars of the energy transition. In this context, utility-scale renewable energy projects have become increasingly attractive to both institutional and individual investors, not only due to their strategic relevance but also because of the progressive reduction in the LCOE, which strengthens their competitiveness compared to conventional sources.

In 2024, it was observed that global renewable energy auctions continued to record historically low benchmark prices, particularly in solar and onshore wind, reinforcing the pressure exerted by buyers. According to IRENA, solar PPA contracts reached values below 0.02 USD/kWh in some emerging regions, reflecting the buyers' power to negotiate advantageous prices given the large number of companies seeking to enter the market. However, this trend shows regional differences. In more mature and competitive markets, such as Europe or the United States, buyers also impose stricter requirements regarding sustainability criteria, supply security, and

flexibility. The growing demand for "green" contracts creates additional pressure on producers, who must ensure quality attributes, stability, and origin certification to meet client expectations.

Industry rivalry

Rivalry in the renewable energy sector is high, driven by the rapid expansion of the market combined with relatively limited differentiation margins among the main players. The sector has attracted a growing number of global and regional companies, ranging from traditional utilities accelerating their transition to renewables to new entrants specialized in solar, wind, biomass, and distributed generation. This increase in competition is evident in public capacity auctions, where projects are frequently awarded at very low prices, putting pressure on returns and forcing companies to optimize costs and operational efficiency. The capital-intensive nature of the projects and the need for access to land, grid infrastructure, and competitive financing further intensify rivalry. Companies that manage to secure long-term contracts (Power Purchase Agreements – PPAs) with corporate or industrial clients gain an advantage, but the rising number of players seeking such agreements increases competitive pressure.

Additionally, geographic factors also influence rivalry: in mature markets such as Western Europe or the United States, the high penetration of renewables generates greater competition for land and permits, whereas in emerging markets such as Latin America or Africa, rivalry is more closely linked to the ability to attract financing and overcome regulatory barriers.

For Greenvolt, rivalry is particularly relevant in segments such as distributed solar photovoltaic and biomass, where competition comes not only from large-scale utilities but also from smaller regional operators. However, it remains a growing market with significant opportunities for expansion.

Complementary products

In 2024, complementary products such as energy storage and green hydrogen strengthened significantly as strategic components in the renewable energy market, offering additional value to the core business of electricity generation. These persistent advancements in complementary products have several impacts. Storage enables intermittent assets (solar and wind) to be better integrated into the grid, reducing losses, mitigating variability, and improving the capacity factor. Green hydrogen, in turn, emerges as a vector for industrial uses, heavy transport, or hard-to-decarbonize sectors, providing new market opportunities for those who already have installed renewable capacity. Therefore, companies such as Greenvolt face a dual opportunity:

not only to continue developing renewable generation but also to position themselves in the reshaping of the energy ecosystem through the integration of these complementary technologies, diversification of supply, and capture of additional value.

Government and Authorities

Governments remain strongly committed to promoting renewable energy as the primary source of power. In the European Union, for example, the "REPowerEU" plan continues to guide the energy transition policy, with the legal objective that at least 42.5% of gross final energy consumption must come from renewables by 2030, with an ambition to reach 45%. The plan also foresees the installation of around 1,236–1,300 GW of renewable capacity (mainly solar and wind) by 2030. One of the most frequently cited challenges by European authorities is licensing, and under "REPowerEU," guidelines have been adopted to accelerate approval processes and designate "renewables go-to areas," where legal requirements will be simplified.

In the United States, the Inflation Reduction Act (IRA), signed in 2022, continues to generate impact in 2024, with tax incentives, subsidies, and credits that foster investments in clean energy, local manufacturing of critical components, energy storage, and distributed generation. Furthermore, in November 2022, the United Nations COP26 event enabled commitment to a Global Energy Alliance for People and Planet by participating countries, aimed at phasing out fossil fuels and promoting renewable energy in economic growth. The Global Methane Pledge, initiated by the EU and the United States, targets a 30% reduction in methane emissions by 2030. This pledge was signed by OECD Member States and represents a collective commitment to accelerate the energy transition. These instruments have stimulated the inflow of private capital and the growth of projects that align economic returns with national decarbonization goals. This reinforced regulatory framework - with binding targets, higher installed capacity objectives, financial incentives, and legal reforms to simplify authorizations - has substantially increased the attractiveness of the renewable energy industry. These factors are critical for companies such as Greenvolt, which depend on legislative stability, market predictability, and institutional support to ensure the economic viability of large-scale projects.

4. IPO Pricing and Underpricing

4.1. Discounted Cash-flow (DCF) Valuation

To determine the appropriateness of the issue price of Greenvolt's IPO, it is justified to carry out a retrospective valuation of the shares from July 2021, corresponding to the moment of market placement

It is important to highlight that this evaluation exercise is subject to a potential retrospective bias, insofar as, on the present date, it is possible to observe the actual performance of the company and the sector, which allows the validation of some of the assumptions projected at the time of issuance. Therefore, the analysis may, although unintentionally, incorporate ex-post knowledge that had not been made available

Considering only the publicly available information at the time of the IPO, the valuation using the DCF method results in a range of value per share between €8.12 (pessimistic scenario) and €11.67 (optimistic scenario). We arrive at a valuation of €9.81

4.1.1. Weighted Average Cost of Capital (WACC)

In this analysis, we will use Greenvolt's accounting figures as of June 2021 as a reference point. The choice of this date is related to the period preceding the company's IPO announcement and its subsequent inclusion in Lisbon's main stock market index, the PSI, on November 21, 2024. This allows for the use of more reliable and realistic data to assess whether the IPO was undervalued or not. Accordingly, we arrived at a capital structure of 31% equity and 69% debt. The risk-free rate, obtained from the Annual Report on Market Risk Premium and Risk-Free Rate (Fernandez, 2021), was 1.4% for Portugal, and the market risk premium was 6.8%.

Considering that we are analyzing data referring to June 2021 and do not have beta values for the sector at that specific date, we used beta figures from December 2020. The unlevered beta (0.69) was obtained from Professor Damodaran's website, referring to the Renewable Energy sector. Considering the company's capital structure, the levered beta is 2.2 (levered using the Hamada equation). The cost of debt was estimated by dividing the interest expenses as of June 2021 by the average financial debt up to that date, resulting in an effective interest rate of 1.32%. The calculated WACC is 5.71%.

4.1.2. Assumptions and Valuation

The sales growth estimates were defined based on data disclosed in 2021 reports, incorporating the information and expectations available at the valuation reference date. Table 4-1 presents the growth rates used, determined through a weighted average that reflects the relative weight of each segment in total revenue.

Business Segments	CAGR until 2030	CAGR until 2050
Biomass	3,6%	1,2%
Solar PV	21,5%	13,08%
Wind	18%	7,6%
Distributed generation	10,9%	10,9%
Weighted Average	6,50%	3,94%

Source: Own estimation

Table 4-1 *Projected Growth Rates as of July 2021*

The EBITDA margin was determined based on the average margins achieved in previous years, reaching a value of 36.3%. Given the historical stability observed in the company's results, this average represents a reliable approximation of the company's operational profitability and future performance. For the tax credit arising from depreciation, the previous year's depreciation was considered as a percentage of capital expenditures (Capex). Excluding the results from 2020, when Capex was exceptionally low, an average of 32.0% of Capex was obtained. Considering that in Portugal the corporate income tax rate is 21%, and that, according to the values observed in 2019 (25.6%) and 2020 (25.2%), municipal tax (+1.5%) and autonomous taxation on certain expenses are also applied — as provided by Portuguese tax law — the effective tax rate adopted was 25%. Capital expenditures were determined based on the average (as a percentage of sales) of the figures recorded in 2020 and in the first half of 2021, resulting in 28.1% of sales. Changes in working capital needs showed an average negative value of -5.1% (as a percentage of sales), if this trend continues in the future.

Based on the assumptions defined in the previous two paragraphs, three scenarios (optimistic, neutral, and pessimistic) were developed to describe sales evolution, considering three different growth rates. The optimistic scenario assumes an average annual growth rate (CAGR) of +3.94%, reflecting the continuation of stable long-term growth. The neutral scenario assumes a CAGR of +2.93%, corresponding to the average implicit rate between 2030 and 2050, assuming a natural slowdown in expansion. In the pessimistic scenario we assume a CAGR of +1.62%, aligned with the real global GDP growth projected by the OECD for 2050. Table 4-2 presents the results obtained from this analysis. Considering that all three scenarios

have equal probability, the estimated intrinsic value of Greenvolt's shares in July 2021 was €5.48, calculated using the DCF methodology, as detailed in Appendix T.

Scenarios	CAGR until 2050	Stock Price
Optimist	3,9%	**7,58 €**
Neutral	2,9%	**5,24 €**
Pessimist	2%	**3,61 €**
		5,48 €

Source: Own estimation

Table 4-2 *Scenario Analysis of the July 2021 DCFF Valuation*

Compared to the previous methodology, the multiples method (PER) resulted in an estimated price of €5.55 per share. The earnings per share (EPS) used were those reported by comparable companies in their most recent financial disclosures available at the time (July 2021), as presented in Appendix U. These values were annualized, assuming stable results throughout the fiscal year. After excluding outliers, an adjusted average of the PER ratios was calculated, leading to a final average price of €5.52 per share.

4.2. Underpricing

The literature presented in Section 2 clearly defines the concept of underpricing as the occurrence of positive returns on the first day of trading in the secondary market. In Greenvolt's case, the analysis of daily returns during the first five days following its 2021 IPO allows for an assessment of the initial degree of underpricing and the market's reaction to the issuance. This analysis, detailed in Table 4-3, serves as an essential reference for understanding the market's perception at the time of the company's stock market debut and for supporting a more accurate assessment of a potential future IPO by Greenvolt.

	Daily return	Cumulative return
Day 1	9,6%	9,6%
Day 2	0,2%	9,9%
Day 3	-4,2%	5,3%
Day 4	1,6%	6,9%
Day 5	4,1%	11,3%
Day 6	0,2%	11,5%

Source: Own estimation

Table 4-3 *Greenvolt Stock Daily Returns*

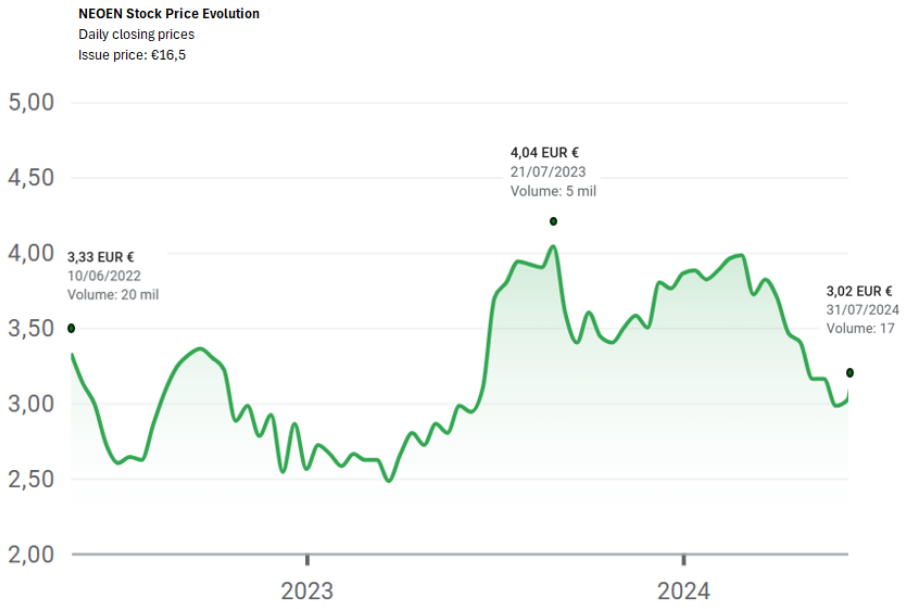
On the first trading day following Greenvolt's IPO, the shares recorded a positive return of 9.6%, indicating an immediate appreciation relative to the issue price. By the end of the fifth trading day, the cumulative return had reached 11.5%, showing significant short-term appreciation. These results suggest that, based on both first day and first-week performance, Greenvolt exhibited consistent signs of underpricing in its IPO. However, it is important to note that the market price of the shares only reached the estimated value from the fundamental valuation on August 23, 2021, when the stock closed at €5.40 per share. Thus, based on the comparative analysis between the theoretical value determined by the valuation and the observed market price behavior, it can be concluded that Greenvolt's initial offering showed clear signs of underpricing. This finding allows for the application and testing of the main theoretical explanations for IPO underpricing discussed in the previous chapters, assessing their relevance in Greenvolt's specific context. In this regard, a comparative analysis was carried out with the IPO of EDP Renováveis (EDPR), a direct competitor of Greenvolt, headquartered in Spain and with a strong presence in the Portuguese market. EDPR launched its IPO in 2008, in a different economic context, but shared similar structural characteristics in terms of industry and geographic scope, making the comparison relatively reliable. Unlike Greenvolt, EDPR's initial stock performance was negative: the issue price was set at €8.00, and the market value declined by 4.3% on the first trading day. The stock only recovered its issue price in 2018 — ten years after the initial offering — having reached a historical low of €2.31 during that period. Figure 4-1 illustrates the evolution of EDPR's share price, highlighting the company's prolonged recovery trajectory after the IPO, in contrast with Greenvolt's immediate and consistent appreciation. This comparison reinforces the conclusion that, despite differing economic contexts, Greenvolt benefited from a more favorable market perception, reflected in initial underpricing that was quickly corrected, whereas EDPR faced a prolonged adjustment path typical of offerings made under greater macroeconomic uncertainty.



Source: Google Finance (2025)

Figure 4-1 *EDPR Stock Price Evolution*

Another relevant case in the renewable energy sector is that of Neoen, one of the leading independent renewable energy producers in France and one of the largest European operators in installed solar and wind capacity — a direct competitor of Greenvolt. Neoen launched its IPO in October 2018 on Euronext Paris, with an issue price set at €16.50 per share. On the first trading day, the shares recorded an initial increase of 3.6%, reflecting strong investor interest and a positive perception of the company's growth potential within the context of an accelerating energy transition. By the end of the first week, the cumulative return had reached 9.0%, showing a pattern similar to that observed in Greenvolt's case. In the following months, Neoen's share price maintained an upward trajectory, reaching an all-time high of €64.03, representing an increase of over 280% relative to the issue price. However, after this peak, the stock experienced a prolonged period of volatility, characterized by significant corrections and a general downward trend, although prices consistently remained above the IPO issue value (Figure 4-2). This evolution illustrates a common pattern among publicly listed renewable energy companies: strong initial market enthusiasm driven by expectations of sustainable growth and decarbonization incentives, followed by valuation adjustments as the market prices in regulatory uncertainties and profitability pressures within the sector. Thus, similar to Greenvolt, Neoen's post-IPO performance reflects both investor optimism regarding the energy transition and the cyclical and sensitive nature of the sector to macroeconomic and political factors.



Source: Google Finance (2025)

Figure 4-2 *Neoen Stock Price Evolution*

4.2.1. Winner's Curse, Ownership Dispersion and Liquidity

According to Rock (1986), one of the underlying reasons for IPO underpricing lies in the need to encourage the participation of less-informed investors, thereby promoting a broader dispersion of share ownership and, consequently, greater liquidity in financial markets. In this sense, underpricing represents an individual cost to the issuing company but simultaneously a collective benefit for the efficient functioning of capital markets. This interpretation applies to the cases of Greenvolt and Neoen, both of which exhibited significant shareholder dispersion following their stock market listings. In contrast, the case of EDPR shows a more concentrated ownership structure in the period immediately after its issuance. While only 58.7% of Greenvolt's capital and 50% of Neoen's capital remained under the control of their respective parent companies, EDPR retained 62% of its capital in the hands of its parent company, EDP. Additionally, no other individual shareholder held more than 10% of the equity in either Greenvolt or Neoen.

Currently, EDP Renováveis (EDPR) continues to exhibit a highly concentrated ownership structure, in contrast with Neoen, whose ownership remains more dispersed, with around 45.1% free float compared to 22% in the case of EDPR. Although Greenvolt is no longer listed, an analysis of the period following its IPO reveals that the company had a higher level of shareholder dispersion than EDPR, reaching a free float of approximately 32.5% before delisting. This contrast suggests that both Greenvolt and Neoen may have deliberately practiced underpricing at the time of issuance to broaden their shareholder base and increase market liquidity. Thus, it is plausible to argue that Greenvolt's IPO was strategically underpriced to diversify its ownership structure, whereas EDPR, by favoring a more concentrated control structure, did not face the same need to pursue such a strategy. The motivations behind this approach may relate both to the pursuit of greater liquidity and to the balance of corporate control. In both cases, the parent companies retained at least 50% of the capital immediately after the offering, although they later reduced their stakes. Therefore, maintaining control can be ruled out as the primary motivation for underpricing.

On the other hand, Stoughton and Zechner (1998) present an alternative perspective to Rock (1986), arguing that a concentrated blockholder ownership structure can be advantageous for a company. According to the authors, large shareholders have stronger incentives to monitor management and generate relevant information, assuming supervision costs that would otherwise fall on the company itself. This line of reasoning may explain the strategy adopted by EDPR, which was more conservative and oriented toward shareholder stability.

It is also worth noting that, prior to the issuance, Greenvolt announced an indicative price range between €4.25 and €5.00 but opted for the lower end. This decision reinforces the hypothesis that underpricing was deliberately used as a strategic tool to achieve shareholder dispersion and increased liquidity. However, it is important to acknowledge that it is not possible to establish a direct causal relationship between underpricing and the observed ownership structure, nor to claim that this evidence fully confirms the theory proposed by Rock (1986).

4.2.2. Underpricing as a Signaling Tool for SEO Profit Maximizing

According to Ibbotson (1975), IPO underpricing can be used as a deliberate strategy by companies to benefit from investors' favorable perceptions regarding their image and growth potential. The author argues that by setting the issue price below the expected market value, the company creates a sense of optimism and confidence among investors, resulting in high initial returns and an enhanced reputation for credibility in the capital markets. This dynamic can facilitate the success of subsequent equity offerings (SEOs), allowing the company to set higher issue prices and thereby maximize the capital raised.

In the specific case of Greenvolt, market behavior suggests that this theory does not directly apply. The company announced an SEO with an issue price set at €5.62 per share, at a time when the shares were trading at €7.33 on the secondary market. Moreover, the estimated target price for the shares was €8.14, according to data published by MarketScreener. The observed difference suggests that Greenvolt did not seek to capitalize on any potential reputational effect resulting from the IPO underpricing, as it did not take the opportunity to set a higher price for the subsequent issuance. Thus, it is unlikely that the motivation for the initial underpricing was linked to a strategy of future profit maximization through the SEO. Nevertheless, it can be argued that the potential economic benefit of an underpricing policy does not end with the immediate subsequent issuance and may instead help capitalize on the positive reputation built during the company's market debut in future capital increases — benefiting from greater investor confidence and a stable performance track record. A similar scenario can be observed in the case of Neoen, which announced its SEO on March 7, 2023, with an issue price of €20.45 per new share, while the market price stood at €27.63. This behavior reinforces the hypothesis that the initial underpricing was not used for immediate financial gain but may have played an indirect role in building long-term reputation and trust among institutional investors

4.3. Post-IPO and Long-Run Performance

After its listing on the Portuguese Stock Exchange, Greenvolt outperformed the main benchmark indices, showing a cumulative appreciation of approximately +37%. This result represents an excess return of about +22 p.p. relative to the PSI, +36 p.p. relative to the STOXX 600, and +40 p.p. compared to the S&P 500.

To better understand this performance, we will analyze and compare the evolution of Greenvolt's share price against the trajectory of a market index. In this analysis, we will consider a European index as the benchmark for two main reasons: (i) the small size of the Portuguese stock market index (PSI), whose limited composition makes it particularly sensitive to Greenvolt's own price fluctuations; and (ii) the international nature of the company's operations, with a geographic presence predominantly concentrated in the European market. Appendices V and W illustrate this relationship, showing the evolution of Greenvolt's weekly returns alongside the PSI. The data analysis reveals a visible correlation between both movements, although Greenvolt's shares display greater volatility—an expected outcome given their lower diversification and, consequently, higher individual risk compared to an index composed of multiple companies across various industries.

Considering the calculated correlation coefficient (0.45), which indicates a low degree of association between Greenvolt's returns and those of the PSI index, it can be concluded that the PSI provides limited explanatory power for the variation observed in Greenvolt's share price. Therefore, a broader and more diversified benchmark—the Euro Stoxx 600—was used for comparison. This index showed an even lower correlation with Greenvolt (0.29), allowing for a more representative analysis of the company's relative performance in the European market. The comparison between Greenvolt's returns and those of the Euro Stoxx 600 is detailed in Appendices W and X.

To isolate the specific effects of the industry from the idiosyncratic factors of the company itself influencing stock performance, a comparative analysis was also conducted between Greenvolt and a group of peer companies in the same sector—namely EDPR, Neoen, and Iberdrola.

Between August and October 2021, energy markets experienced strong upward pressure on prices. The average wholesale energy price in Europe rose by approximately 80%, while the Global Energy Price Index (GPEI) showed a positive variation of 41.5%. In November 2021, the GPEI recorded its first decline in 19 months, accompanied by a slowdown in the growth of

wholesale prices. These fluctuations were reflected in Greenvolt's share performance, influencing its initial appreciation phase as well as the subsequent slowdown. During this period, Greenvolt achieved a cumulative gain of about 45%, while the main index rose only 1.2%, and comparable companies advanced roughly 16%.

Between September 2021 and March 2022, Greenvolt appreciated about 10.5%, compared to a 3.7% decline in the index and a modest 1% increase among comparable companies. This phase coincided with sharp increases in commodity prices relevant to the sector (such as cobalt, nickel, and copper), which, however, did not undermine Greenvolt's performance. Additionally, the GPEI expanded by 55.8% during the same period, supporting optimistic expectations for the energy sector.

The onset of the Russia–Ukraine conflict in late February 2022 marked a turning point for the European energy sector. Nevertheless, Greenvolt's share price did not experience an immediate negative reaction; on the contrary, in March 2022, the company's shares rose by 33.9%, accompanied by gains of 17.3% among comparable firms and 8.7% in the general index. This movement can be interpreted as a market response to the shortage of natural gas supply and the resulting strategic revaluation of renewable energy as a safe and sustainable alternative to European energy imports. From March to mid-August 2022, the upward trend persisted. Greenvolt's shares increased by approximately 48%, significantly outperforming comparable companies (+18%) and the index (−6%), reaching an all-time high of €10.80 on August 16, 2022. This upward movement coincided with persistently high energy prices and stabilized raw material costs, reinforcing investor appetite for renewable energy assets. However, between Mid-August 2022 a, the trend reversed. Greenvolt's share price fell by 31.6%to the 21.2% correction among comparable companies, while the benchmark index rose 10.6%. This behavior reflects the normalization of energy prices and stabilization of commodity costs, which reduced profit expectations across the sector. A similar trajectory was observed in Neoen in January 2021, experienced a cumulative correction of 56.5% by May 2023. The following period, from June 2023 to November 2024, was characterized by moderate fluctuations but an overall Downward trend in Greenvolt's share price, mirrored by similar behavior among its main competitors, EDP Renováveis (EDPR) and Neoen.

This pattern aligns with the Ibbotson and Ritter (1975) hypothesis, which posits the occurrence of long-term underperformance among companies that undergo underpriced IPOs. Greenvolt's stock performance remained broadly consistent with that of comparable firms, although showing greater volatility—possibly explained by informational asymmetry linked to its

innovative business model, rapid international expansion, and short operating history as a listed company. It is important to note that, at the end of 2024, Greenvolt following a buyout operation promoted by the asset manager KKR, which acquired all outstanding shares. By the end of 2024, Greenvolt's share price had fallen by approximately −28% from its 2022 peak, compared to an average decline of −15% for comparable firms and a +7% increase in the benchmark European index (Euro Stoxx 600). This trajectory confirms Greenvolt's higher volatility relative to its peers and its sensitivity to market conditions and sector expectations. Thus, direct comparison with market indices was no longer viable after that date. To determine whether the downward trajectory of the stock until 2024 resulted from structural or circumstantial factors, an additional revaluation will be conducted with a June 2024 base date (given that Greenvolt ceased trading in November 2024 and its most recent financial report before that event refers to the first half of that year), considering on that may have influenced the company's relative performance.

4.4. Valuation as of June 2024

The application of the DCF method requires the projection of the company's FCFF, which will be estimated for two distinct time horizons: an explicit period of six years, covering 2024 to 2030, and the second assuming a perpetual term. The projections were prepared based on the company's historical financial information (available in Greenvolt's reports between 2018 and 2024) and on the growth and performance prospects of the three operational segments in which Greenvolt operates. The discounting of the projected cash flows will be carried out using the WACC as the discount rate. The calculation of this indicator requires the determination of the following components: (i) cost of debt, (ii) cost of equity, (iii) tax rate, and (iv) relative weights of equity and debt in the company's financing structure. The cost of debt will be estimated based on the implicit yield of the bonds issued and traded by the company in financial markets. The cost of equity will be obtained through the Capital Asset Pricing Model (CAPM), which will require a market risk premium, a risk-free rate, and a beta. Both the risk premium and the risk-free rate used will be those disclosed by publicly accessible reference financial sources. In addition to the DCF method, the Market Multiples methodology was also applied, using the PER and EV/EBITDA indicators, which are widely used in comparative valuations. The detailed results of the calculations and projections are presented in Appendix Y, considering the neutral scenario as the basis of the analysis.

4.4.1. DCF Valuation

WACC

As previously mentioned, the determination of the WACC requires the estimation of the cost of debt, the cost of equity, and the relative weightings of each of these components within the company's financing structure. The use of the WACC as the discount rate allows for an integrated reflection of the company's overall average cost of financing, simultaneously accounting for the returns required by both shareholders and debt holders. The estimated WACC for Greenvolt is 6.1%, a figure that incorporates the tax effect associated with the corporate income tax rate, set at 25%. The detailed procedures and underlying assumptions of this calculation are described in the following subsections.

Cost of Debt

A widely used methodology for estimating the market cost of debt is based on the analysis of the company's bond issuances, whose yield to maturity (YTM) reflects the rate of return required by investors and, consequently, the marginal cost of financing in the markets. In the case of Greenvolt, the company has several issuances of green bonds and other corporate debt instruments, allowing for the calculation of a weighted average cost of debt based on the nominal value of each issuance. However, to obtain a more comprehensive and representative estimate of the company's effective financing cost, it is also essential to consider the information presented in its financial reports. According to Greenvolt's Consolidated Quarterly Report and Accounts as of June 30, 2024, the effective average cost of debt stood at 4.5%, with 51% of the debt bearing fixed rates and 49% linked to variable rates. This figure reflects the impact of rising benchmark interest rates in the euro area since 2022, as well as the increasing diversification of the Group's financing structure.

Cost of Equity

The risk-free rate considered in the CAPM model corresponds to the yield on 10-year German government bonds, widely recognized as the benchmark risk-free asset in the euro area. In June 2024, the average yield stood at around 2.45% (according to "Trading Economics" and the "European Central Bank Statistical Data Warehouse"), reflecting the maintenance of high interest rates by the European Central Bank following the monetary tightening cycle that began in 2022.

Greenvolt's beta coefficient was estimated based on the correlation between the daily returns of its shares and the DAX index, considering the period between July 15, 2021, and April 30,

2024. The value obtained, 0.42, shows a slight increase compared to the estimate for the previous corresponding period (0.39), reflecting the higher volatility observed among renewable energy companies during 2023 and 2024, due to rising financing costs and the adjustment in sector valuations.

The company's beta can be calculated using the following equation:

$$\beta = \frac{Cov\ (R_e, R_m)}{VAR\ (R_m)} \qquad (12)$$

(Beta Formula)

For the calculation of the equity risk premium, the estimates published by Damodaran (2024) were used, indicating a premium of 5.75% for the German market and an additional country risk premium of 2.95% for Portugal. Accordingly, Greenvolt's expected return on equity (levered cost of equity) was estimated at approximately 8.1% in June 2024. This cost of equity reflects a moderate level of systematic risk, consistent with the profile of a renewable energy company with significant investment in stable assets (project finance) and long-term contracts (PPAs).

Capital Structure

The market value of equity is obtained by multiplying the total number of outstanding shares by their market price. According to Greenvolt's Consolidated Quarterly Report and Accounts as of June 30, 2024, the company had 163,234,408 ordinary shares issued and admitted to trading on the Euronext Lisbon regulated market. The average share price at the end of the first half of 2024 was approximately €8.32 per share, allowing for an estimated market value of equity of around €1,358 million. It is important to note that part of Greenvolt's financial debt is not traded on the market and therefore does not have a reference quotation. However, based on the average valuation of the company's outstanding bonds (100.52), the market value of debt can be estimated at approximately €1,025 million. Thus, as of June 2024, Greenvolt's capital structure was composed of approximately 57% equity and 43% debt.

Sales and profitability

Greenvolt's future sales projections were developed based on the expected growth trends for each of its business segments, according to specialized market forecasts. Globally, installed solar photovoltaic (Solar PV) capacity is expected to increase approximately 35-fold between 2022 and 2050, while onshore wind energy is projected to grow around sixfold over the same period. For the 2030 horizon, these estimates correspond to a 6.5-fold expansion for Solar PV

and a 1.8-fold increase for onshore wind, translating into a CAGR of 22.1% and 8.0%, respectively (according to the DNV Energy Transition Outlook 2024). The distributed generation segment remains one of the main drivers of the decentralization of the energy system. According to Straits Research (2024), the global distributed generation market is expected to grow at a CAGR of 10.6% between 2024 and 2030, driven by the growing demand for corporate self-consumption solutions and local energy communities. In the absence of specific projections for later periods, growth is assumed to gradually slow to 5.0% between 2031 and 2050, reflecting the natural maturation of the market. Regarding the biomass segment, the DNV Energy Transition Outlook 2024 forecasts more moderate growth, with a CAGR of 3.4% until 2030 and 1.0% until 2050, as it continues to play a complementary and stabilizing role in the context of the energy transition, serving mainly as a baseload source and support for storage. The information is presented in Table 4-4.

Based on Greenvolt's 2024 Annual Report, the structure of consolidated revenue by segment consisted of Sustainable Biomass (41%), Utility-Scale (solar and wind) with 36%, and Distributed Generation (23%). These proportions were used as weightings in the calculation of the company's compound average growth rate. Applying the projected CAGRs for each business area yields an average annual growth rate of 14.7% for the period 2024–2030 and 5.3% for 2031–2050. These results reflect a cycle of strong expansion through 2030, followed by a maturity phase, consistent with the expected evolution of the European and global energy transition.

Greenvolt's operating profitability was assessed based on its EBITDA margin, a metric that robustly reflects the company's cash generation capacity. Between 2021 and 2024, the consolidated EBITDA margin fluctuated between 34% and 40%, with an average of 36.7%, according to the June 2024 Quarterly Report. This margin will be used as a reference for future projections, assuming operational stability and efficiency gains resulting from the expansion of utility-scale projects.

Business Segments	CAGR until 2030	CAGR until 2050
Biomass[1]	3,4%	1,0%
Solar PV[2]	22,1%	8,0%
Wind[2]	8,0%	3,0%
Distributed generation[3]	10,6%	5,0%
Weighted Average	14,7%	5,3%

[1]According to DNV's Energy Transition Outlook 2024

[2]According to DNV's Energy Transition Outlook 2024

[3]According to DNV's Energy Transition Outlook 2024

Source: Own estimation

Table 4-4 *Projected Growth Rates (and respective sources) as of June 2024*

Working Capital Needs, Capex, and Depreciation

Greenvolt's working capital management has adjusted significantly in recent years, accompanying the growth of its portfolio and the Group's international expansion. According to the Consolidated Quarterly Report of June 2024, working capital (WC) requirements increased both in absolute terms and relative to sales, reflecting a higher volume of accounts receivable and inventories, mainly in the Distributed Generation segment and in utility-scale projects under development. While in the early years (2020–2022) Greenvolt reported negative working capital, thus releasing short-term resources, from 2023 onward it began requiring net investment in working capital, consistent with the development of its operational structure and the growing number of subsidiaries. The average variation in working capital requirements as a percentage of sales between 2021 and 2024 was approximately +3.1%, in line with business growth and the capital-intensive nature of the sector. Accordingly, a stable working capital requirement of 3.0% of sales is assumed for the projected periods, reflecting a balance between operational maturity and expected organic growth.

Greenvolt's Capex shows significant volatility, reflecting the cyclical nature of investment in renewable energy. Based on data from the 2024 Annual Report, total Capex reached €439.4 million, equivalent to 142% of annual sales — a sharp increase compared to 2023 (€353.5 million). This trend stems from the expansion of utility-scale projects and the consolidation of assets under construction. Excluding the initial years (2021–2022), during which Capex was particularly high due to the initial investment phase, the average Capex-to-sales ratio between 2022 and 2024 was 118%, highlighting the company's strongly expansionary nature. Considering expectations of investment cycle stabilization after 2030, a short-term average Capex ratio of 120% of sales is assumed, gradually decreasing as projects become operational.

Depreciation, as a percentage of Capex, has shown a declining trend, reflecting increased investment in assets not yet fully operational. Between 2021 and 2024, the depreciation-to-Capexratio fell from 19.7% (2021) to 14.2% (2024), with an average of 16.9% over the period (based on consolidated annual reports). This rate is consistent with the average useful life of energy assets (5–10 years) and will be used as a reference for future projections.

The corporate tax rate is assumed to remain at 25% in both the short and long term. This figure derives from Portugal's basic corporate income tax rate (21%), to which the municipal surcharge is added (1.5% in Porto, where Greenvolt is headquartered), other taxable income

not included in EBT, and, in Greenvolt's case, CESE contributions (specific to the energy sector).

Valuation Result

The valuation obtained for Greenvolt was €9.88 per share (Table 4-5).

The average price, resulting from the scenario analysis (neutral, optimistic, and pessimistic), was determined using a geometric mean, to reduce the impact of extreme values and ensure a more representative central estimate.

Scenarios	CAGR until 2050	Stock Price
Optimist	6,5%	**11,67 €**
Neutral	5,3%	**9,84 €**
Pessimist	4%	**8,12 €**
		9,88 €

[1]Assuming same CAGR of 2024-2050

[2] Assuming same CAGR of 2024-2050

[3] Assuming same CAGR of 2024-2050

Source: Own estimation

Table 4-5 *Scenario Analysis of the June 2024 DCFF Valuation*

4.4.2. Multiples Valuation

For comparative purposes, companies operating in the renewable energy sector with operational and capital characteristics like those of Greenvolt were selected, namely EDP Renováveis (Spain), Neoen (France), Iberdrola (Spain), Orsted AS (Denmark), and Eni S.p.A. (Italy). Regarding valuation indicators, Fernández (2001) highlights the PER and EV/EBITDA as the most widely used multiples in business valuation processes. Accordingly, both multiples will be applied in the present valuation analysis.

$$PER = \frac{Price\ per\ share}{Earnings\ per\ share} \qquad (13)$$

(Price-to-Earnings Ratio (PER) Formula)

$$\frac{EV}{EBITDA} = \frac{Enterprise\ Value}{EBITDA} \qquad (14)$$

(Enterprise Value to EBITDA Ratio Formula)

The financial and market data of the comparable companies were obtained from the Bloomberg and Yahoo Finance databases (data retrieved in July 2024). To estimate Greenvolt's theoretical share price, an equivalence is established between the average multiple of the comparable companies and Greenvolt's corresponding multiple, solving the equation for the share price.

This procedure makes it possible to infer the company's implied market value based on relative valuation metrics, as demonstrated in the following expression.

$$P_{GV} = \left(\frac{Price_{per\ share}}{Earnings_{per\ share}}\right)_{average} * Earnings_{per\ share_{GV}} \quad (15)$$

(Estimated Share Priceo Formula)

The application of market multiples resulted in consistent valuation estimates. Based on the average PER multiple of the comparable companies, the implied value per share of Greenvolt is €10.11. The EV/EBITDA multiple indicates a valuation of €9.05, while the Price/Book Value (P/BV) ratio suggests a price of €8.33 per share. Appendix Z provides details on the companies used and the results obtained. The average share valuation is therefore €9.16, according to the Multiples method. When comparing this result with the value determined through the DCF model (€9.88 per share), a valuation range between €9.1 and €9.8 is obtained, representing significant convergence between both valuation approaches. Considering the average share price of €7.05 recorded on Euronext Lisbon during the first half of 2024, Greenvolt's stock shows an upside potential of around 30% to 40%. This result, combined with the sector's moderate volatility and the company's operational stability, supports a hold recommendation for Greenvolt's stock. Analyst estimates for Greenvolt fall within a range of €7.5 to €11.0 per share, confirming that the valuation obtained here is consistent with market consensus and adequately reflects the company's medium-term growth potential.

4.5. Overall Opinion

After analyzing the evolution of Greenvolt's share price from its IPO to the present date, three main conclusions can be drawn. First, the initial offering was launched at a price below its fair value, indicating undervaluation at the time of issuance. Second, as described in several academic studies on IPO behavior, this initial undervaluation tended to translate into underperformance in the medium term, although the available time horizon does not yet allow this pattern to be confirmed in the long run. Finally, the analysis of the applied valuation methods—both the DCF model and the Market Multiples approach—suggests that the shares continue to trade below their intrinsic value, indicating persistent undervaluation by the market.

The literature on IPO undervaluation presents multiple explanations for this phenomenon, many of which are based on behavioral assumptions and information asymmetry among various market participants. However, the analysis of the Greenvolt case seems to indicate that

the degree of informational transparency, the complexity of its business model, and the emerging nature of the renewable energy sector played a central role in the formation of the initial price and the subsequent trajectory of the shares.

5. Conclusion

The primary objective of this project is to examine the behavior of Greenvolt's share price and to decompose the factors driving its evolution over time. The study begins with an analysis of the company's IPO, in which evidence of underpricing was identified, as reflected in the positive returns observed during the first day and week of trading. The initial valuation, dated July 2021, confirmed this underpricing, estimating an average share value of €5.52, above the IPO price. Following the confirmation of underpricing, several explanatory theories were explored, including the winner's curse hypothesis and the signaling theory of underpricing. Based on the empirical evidence gathered, and using Neoen and EDP Renováveis as comparable firms, it was concluded that shareholder dispersion represents a plausible explanation for the discount observed at issuance. Other behavioral theories examined did not appear to apply directly to the Greenvolt case. Subsequently, the project analyzed the historical performance of Greenvolt's stock, comparing its weekly returns with those of the STOXX Europe 600 index and the selected peer group. The findings reveal that, up until August 2022, Greenvolt outperformed the market benchmark, but later experienced a relative underperformance. This shift can be attributed to the adverse macroeconomic context - characterized by rising interest rates and higher uncertainty in the energy sector - and to the natural correction of an initial overvaluation stemming from post-IPO investor enthusiasm.

The comparative analysis also indicated that, while peer companies exhibited similar overall trends, Greenvolt's stock showed greater volatility, likely reflecting a higher level of perceived risk and uncertainty among investors. A second valuation, based on financial and market data up to June 2024, reaffirmed the presence of market underpricing, estimating an intrinsic value of €9.16 per share. Considering this result, and considering the company's risk profile, the growth prospects of the renewable energy sector, and the innovative nature of Greenvolt's business model, a "hold" recommendation was issued.

This research contributes to a better understanding of Greenvolt's stock market trajectory, shedding light on the drivers behind investor interest and the factors underpinning its initial success. Nevertheless, several limitations must be acknowledged:
(i) the short observation period since the IPO, which constrains long-term performance assessment; (ii) the limited availability of qualitative data, which could strengthen or challenge the theoretical explanations for underpricing; and (iii) the single-case focus, which restricts the generalizability of the findings.

For future research, it would be valuable to extend the analysis to the long-term performance of Greenvolt's shares, benchmarking it against both the broader market and a wider set of renewable energy companies. Furthermore, a qualitative approach, such as conducting interviews with market participants and financial analysts, could provide deeper insights into the behavioral motivations underlying the IPO underpricing - dimensions that quantitative models alone are often unable to capture.

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Appendices

Appendix A

Growth Drivers for Renewable Energy Firms

Driver	Measuring Variable	Significance	Correlation with dependent variable
Firm-Specific Factors			
Size	Natural logarithm of market capitalization	Significant	Positive
Risk	Debt-to-assets ratio	Significant	Positive
Age	In years	Insignificant	-
Capital Intensity	Natural logarithm of CAPEX divided by sales)	Insignificant	-
Growth	Annual sales growth	Significant	Positive
Country-Specific Factors			
Change in electricity prices	Natural logarithm of the electricity price for industrial customers in the EU	Insignificant	-
Market Concentration	Share of largest electricity generation divided by total generation	Insignificant	-
Tradeable Green Certificate (dummy)	Available / Not available	Significant	Positive
Macroeconomic Factors			
Financial Crisis	Observations divided into pre and post financial crisis	Significant	Negative
GDP growth	Annual growth rate	Significant	Positive
Inflation	CPI	Insignificant	

Source: Morina et al. (2021)

Appendix B

Profitability Metrics for Greenvolt

EUR th	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**
Reveneu	50.537	64.283	89.878	141.507	259.742	385.493	344.825
YoY Growth	*n.a.*	27%	40%	57%	84%	48%	-11%
EBIT	6.833	12.078	27.208	30.561	53.564	44.176	-91.909
EBIT Margin	13,5%	18,8%	30,3%	21,6%	20,6%	11,5%	-26,7%
Net Income	5.204	6.792	17.926	12.810	25.492	-3.476	-133.923
Net Margin	10,3%	10,6%	19,9%	9,1%	9,8%	-0,9%	-38,8%

Source: Greenvolt Annual Reports (2018-2024)

Appendix C

Cash-flow Generation Metrics for Greenvolt

EUR	2018	2019	2020	2021	2022	2023	2024
Cash-flow from operating activities	918.027	30.337.547	28.643.596	28.203.613	21.770.989	-1.684.665	-14.132.613
Cash-flow from investing activities	-43.294.845	-31.847.231	-3.777.216	-235.360.867	-220.234.798	-138.650.401	-557.643.775
Cash-flow from financing activities	27.776.856	10.909.494	-26.872.981	450.719.568	326.063.338	70.886.838	433.649.004
Net change in cash	-6.437.962	9.399.810	-2.006.601	243.562.314	127.599.529	-69.448.228	-138.127.384

Source: Greenvolt Annual Reports (2018-2024)

Appendix D

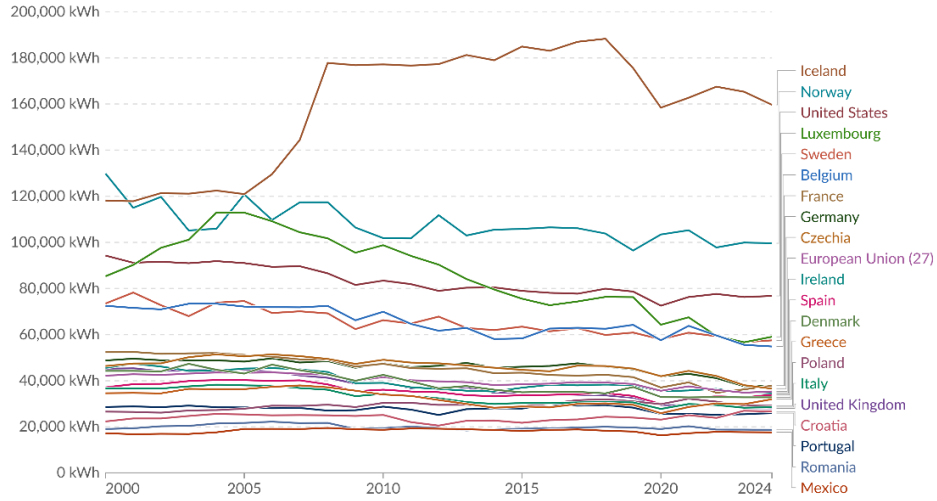
Breakdown of Greenvolt's Balance Sheet

Amounts in €m	2018	2019	2020	2021	2022	2023	2024
Non-Current libilities + Equity	46,82	110,62	137,84	534,41	1.315,34	1.129,86	2.488,90
Fixed Assets	148,79	176,47	174,19	185,81	974,95	832,28	2.544,06
Working Capital	-101,97	-65,85	-36,35	348,59	340,39	289,32	-66,95
Cyclical resources	6,91	11,93	8,54	6,64	34,5	7,5	48,32
Cyclical needs	1,5	3,04	0,02	5,2	48,69	10,04	71,69
Working Capital needs	-5,41	-8,89	-8,52	-1,44	14,19	2,54	23,37
WC - WC needs	-96,56	-56,96	-27,83	350,03	326,2	286,78	-90,32
Cash & Cash equivalents	6,7	16,1	14,1	185,61	380,99	151,84	326,81
EBITDA/Int. Expenses	32,4x	12,1x	18,4x	6,2x	2,6x	6,3x	6,8x
Net debt/EBITDA	5,2x	5,1x	2,5x	4,4x	4,9x	6,3x	6,7x

Source: Greenvolt Annual Reports (2018-2024)

Appendix E

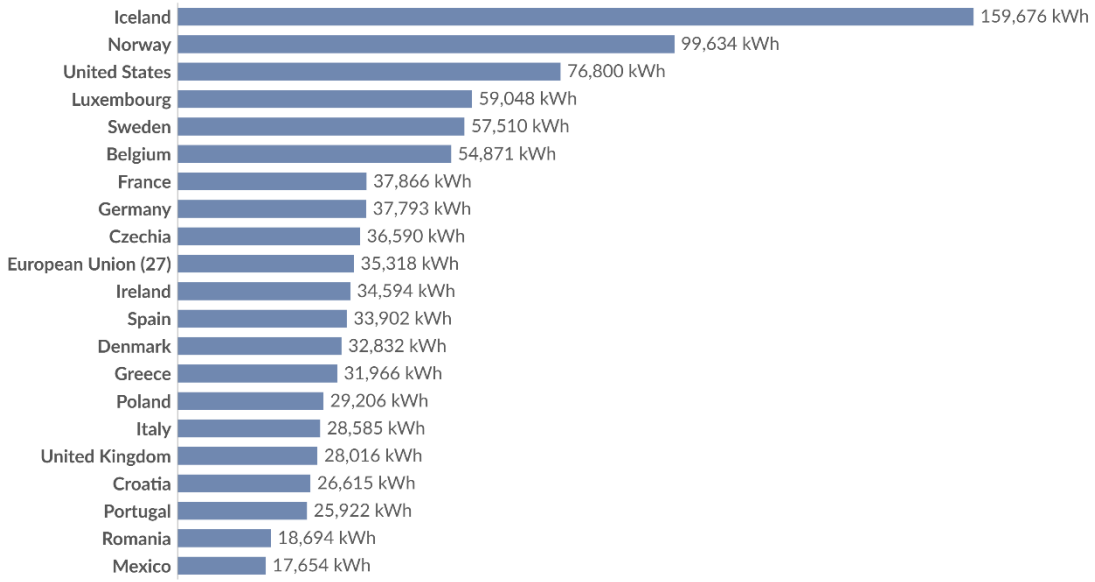
Energy use, *per capita*



Source: U.S. Energy Information Administration (2025); Energy Institute – Statistical Review of World Energy (2025); Population based on various sources (2024)

Appendix F

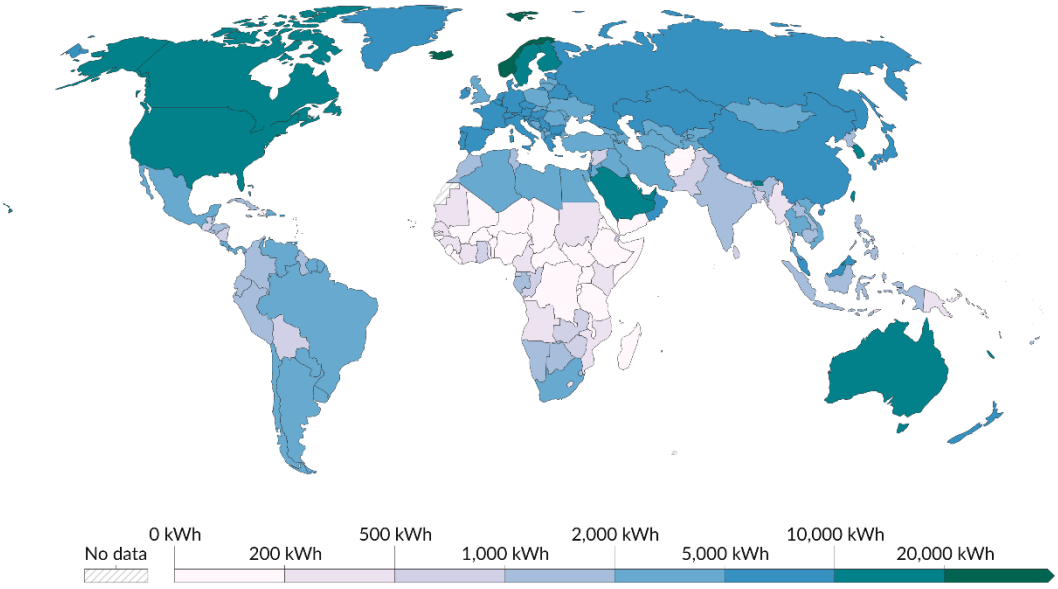
Energy use, *per capita*



Source: U.S. Energy Information Administration (2025); Energy Institute – Statistical Review of World Energy (2025); Population based on various sources (2024)

Appendix G

Energy use, *per capita*

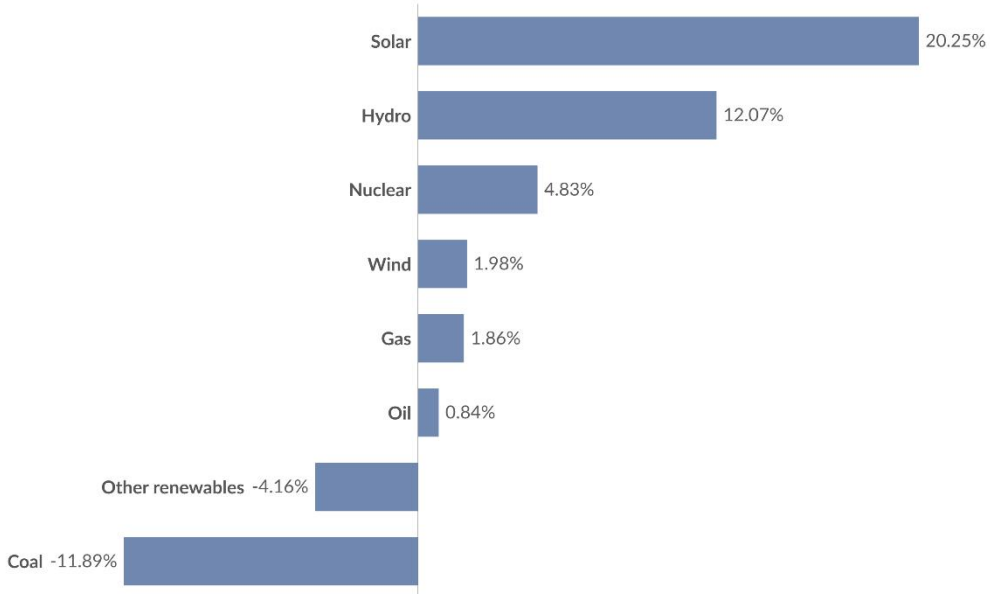


Source: Ember (2025); Population based on various sources (2024)

Appendix H

Year-to-year percentage change in primary energy consumption, European Union (27), 2024

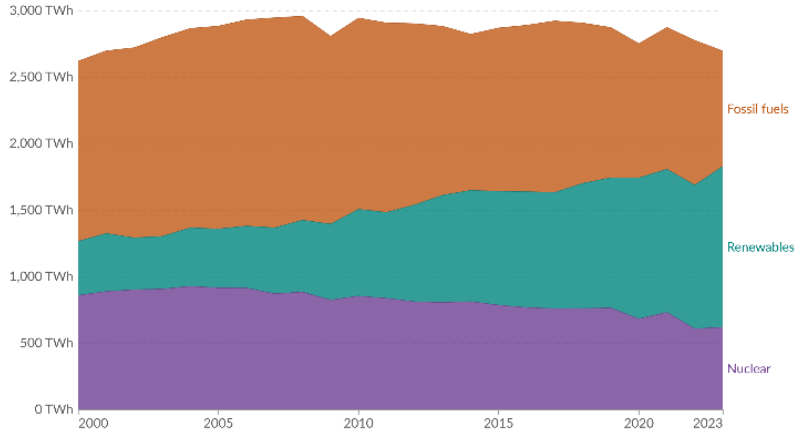
Change in primary energy consumption relative to the previous year, using the substitution method.



Source: Energy Institute – Statistical Review of World Energy (2025)

Appendix I

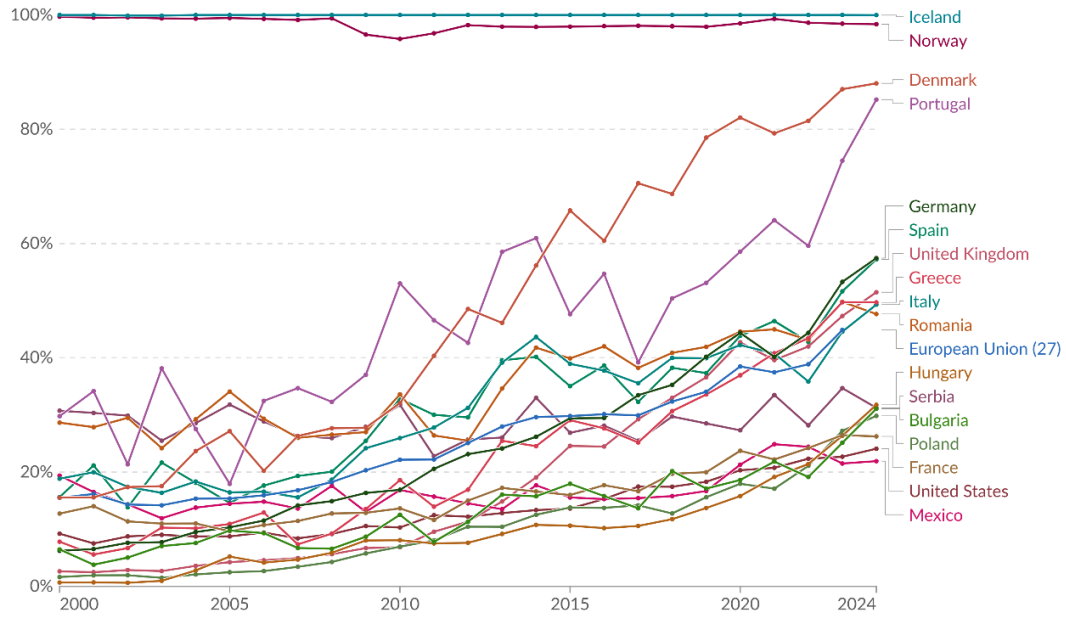
Eletricity produxtion from fossil fuels, nuclear and renewables, European Union (27)



Source: Ember (2025); Energy Institute – Statistical Review of World Energy (2025)

Appendix J

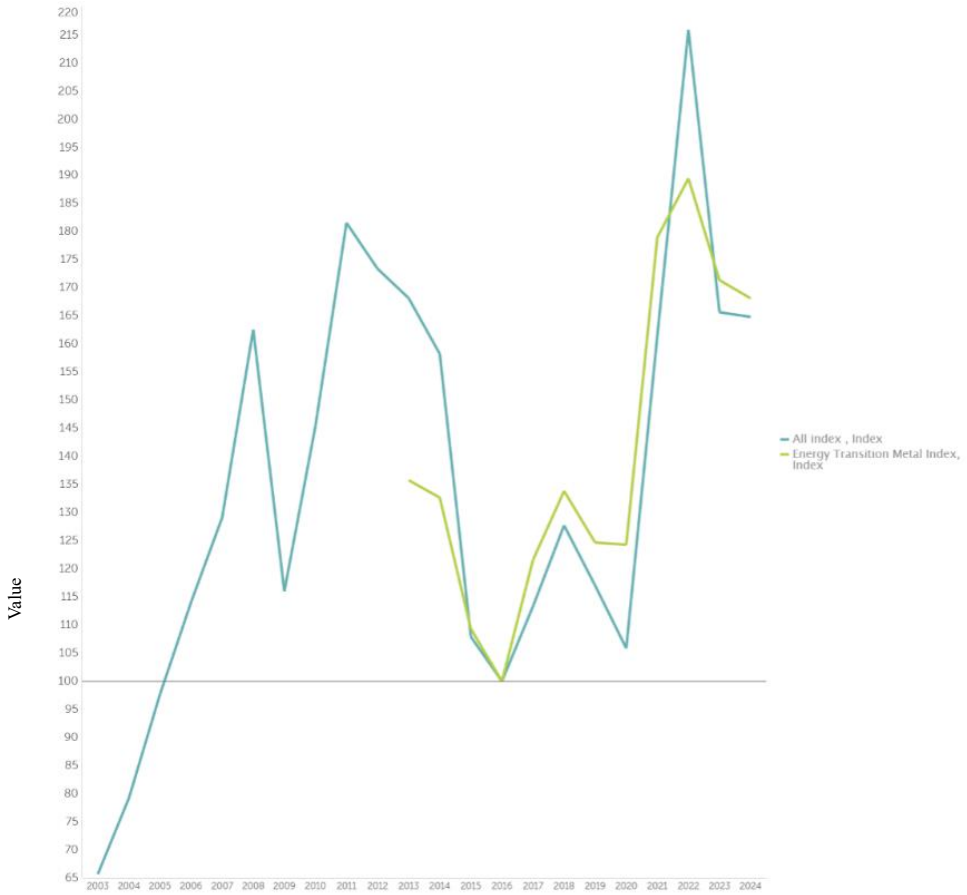
Share of electricity production from renewables



Source: Ember (2025); Energy Institute – Statistical Review of World Energy (2025)

Appendix K

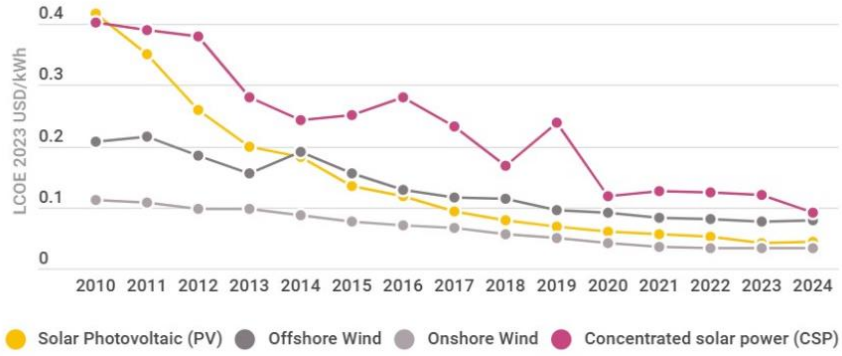
Commodity Indexes (2016=100) (VALUE)



Source: Primary Commodity Price System (PCPS)

Appendix L

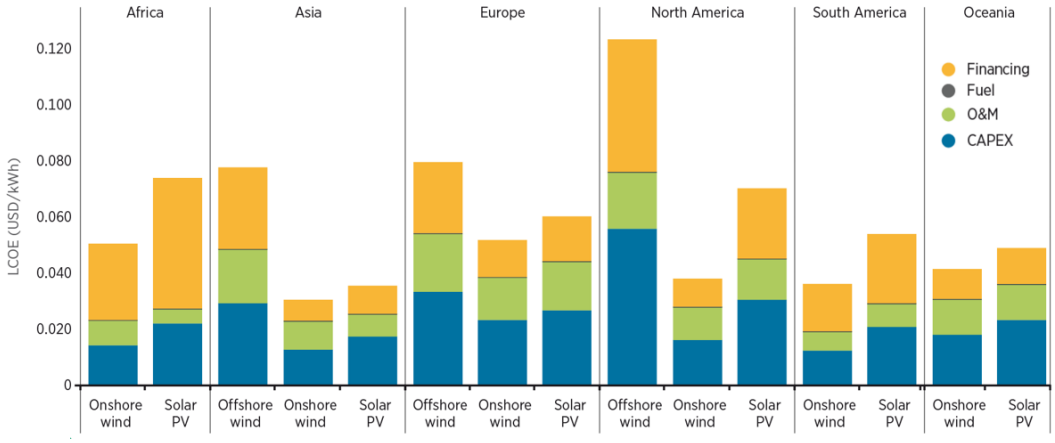
Capacity Factor Weighted Average, by Segment



Source: IRENASTAT (2024)

Appendix M

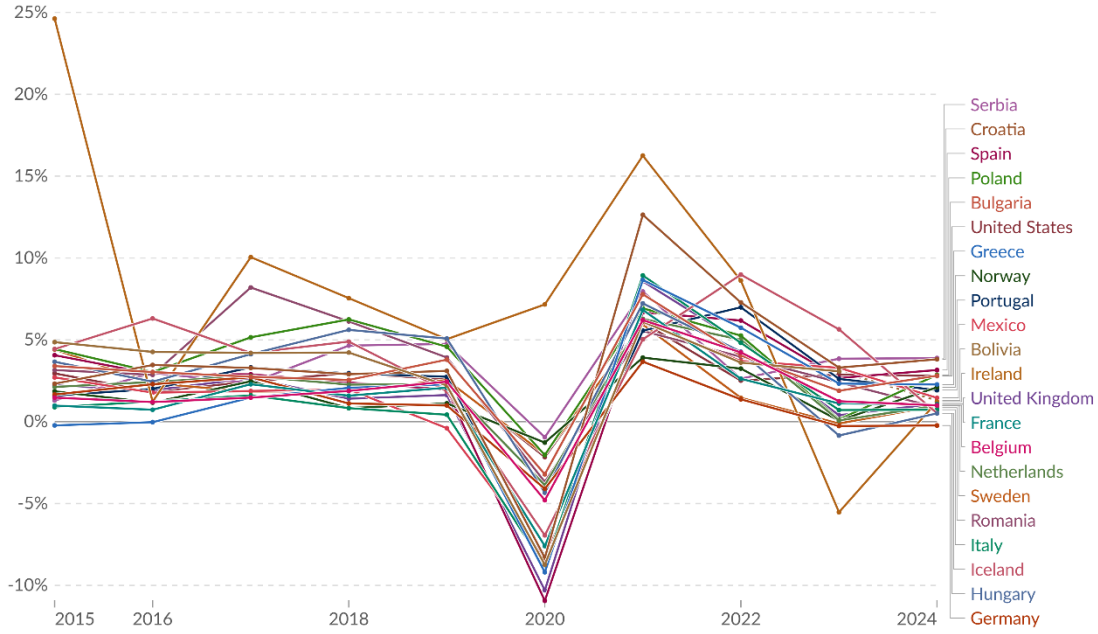
Perceived 'high-risk' countries face higher capital costs, inflating the share of financing costs in LCOE



Source: IRENASTAT (2024)

Appendix N

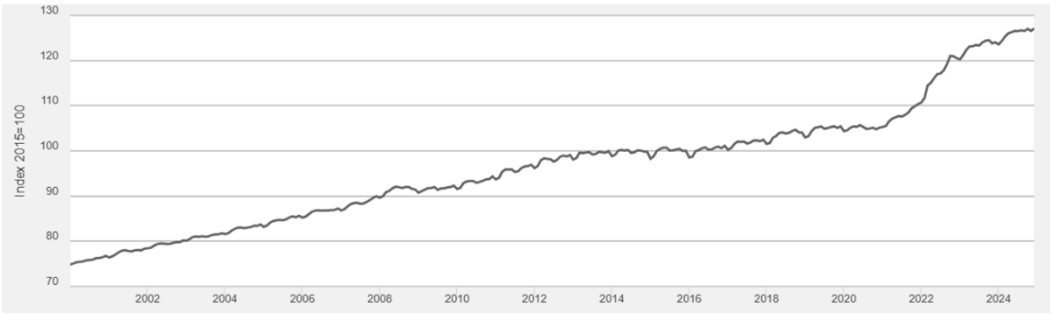
Real GDP Pojection



Source: International Monetary (2025)

Appendix O

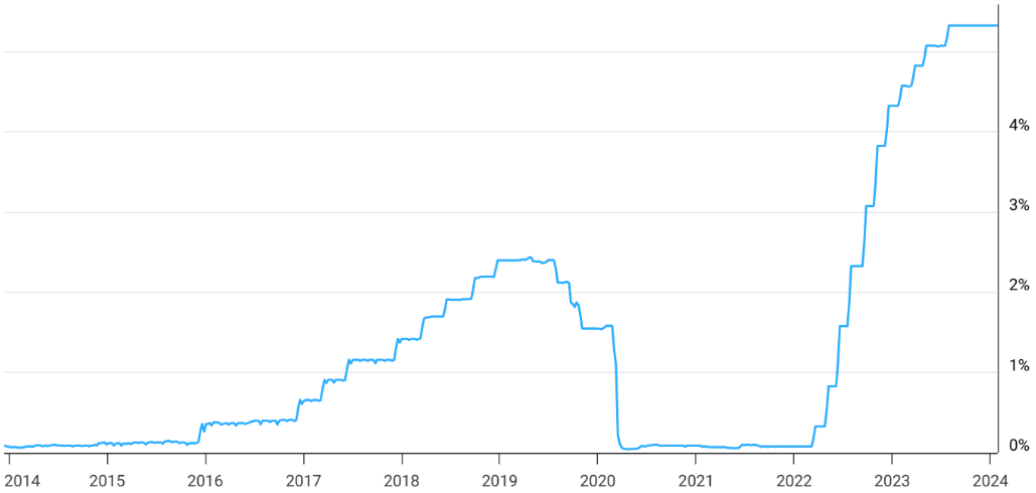
Harmonized Index of Consumer Prices



Source: Eurostat via FRED

Appendix P

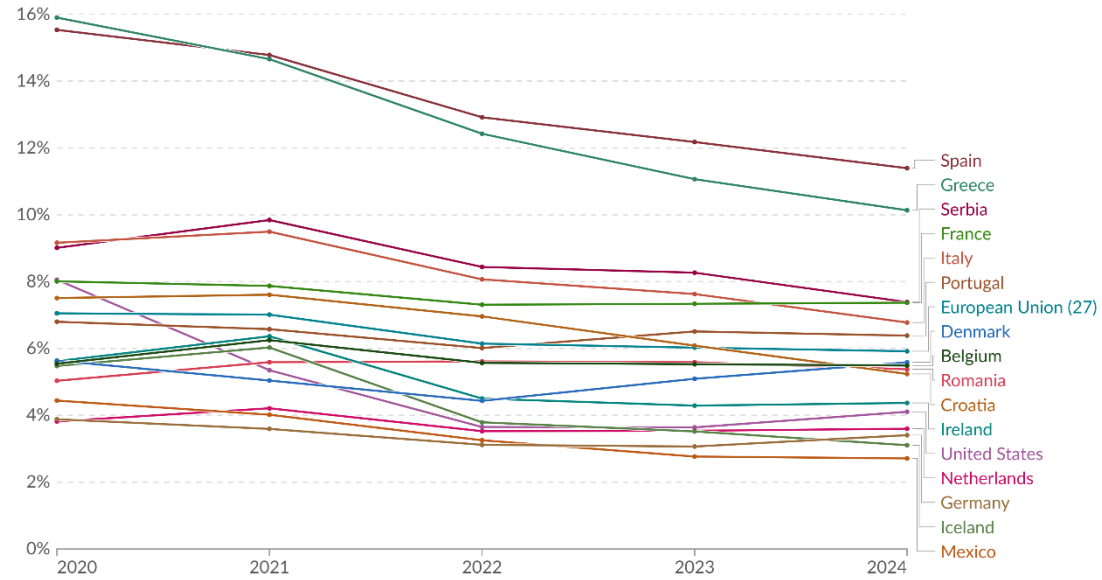
Interest Rates' Evolution



Source: Fed Funds Interest Rate, macrotrends website (2024)

Appendix Q

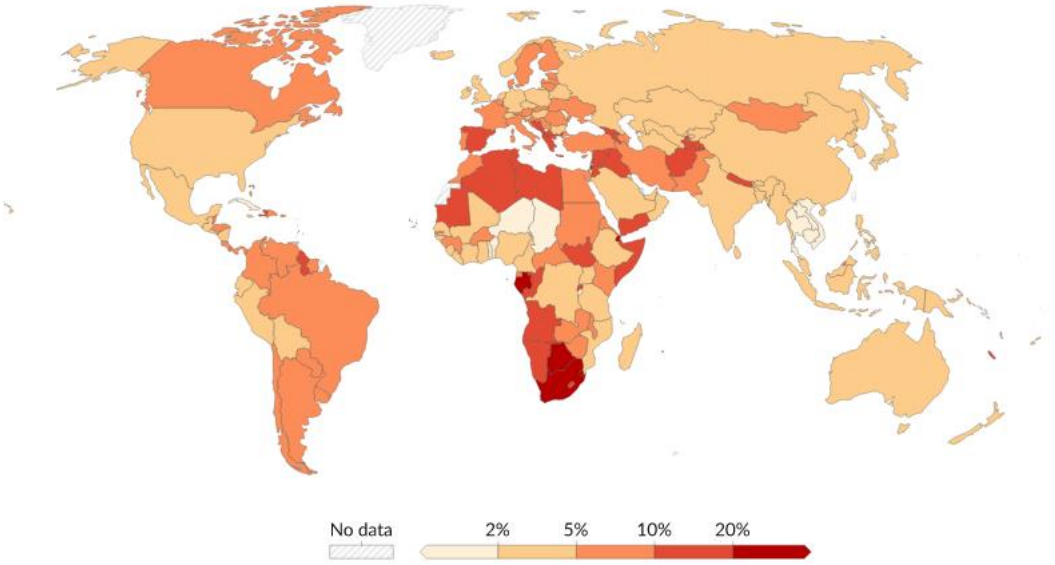
Employment Rate



Source: IOL Modelled Estimates and Projections database (ILOEST) – ILOSTAT, via World Bank (2025)

Appendix R

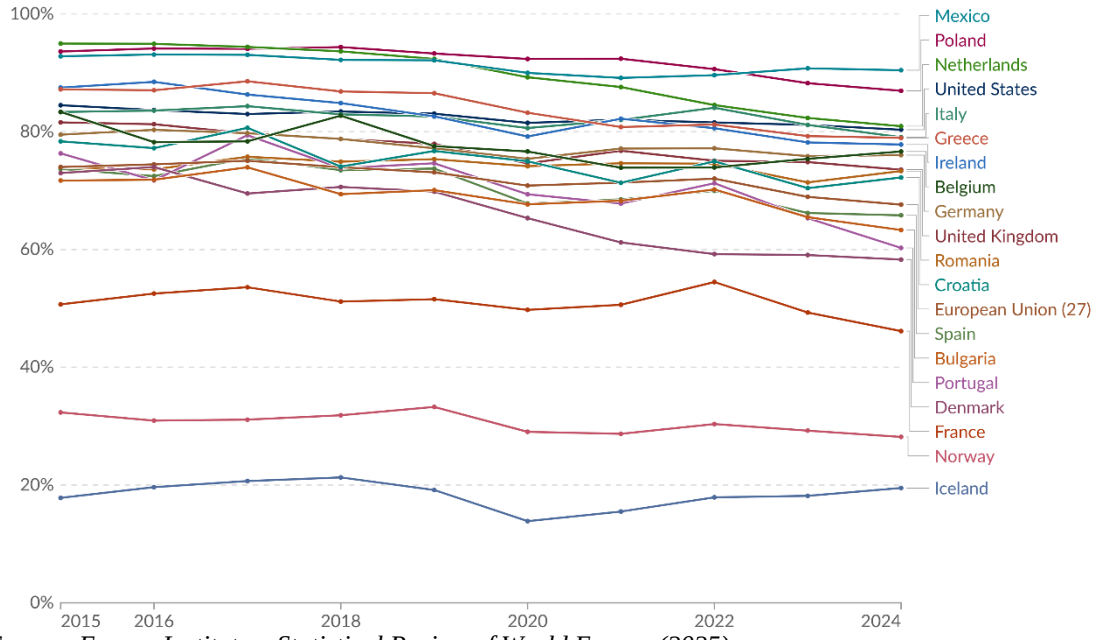
Growth of Unemployment rate, 2024



Source: IOL Modelled Estimates and Projections database (ILOEST) – ILOSTAT, via World Bank (2025)

Appendix S

Share of primary energy consumption that comes from fossil fuels



Source: Energy Institute – Statistical Review of World Energy (2025)

Appendix T

Valuation through DCF (July 2021)

Amounts in €m	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Sales	53.850.471,00 €	65.134.803,00	90.100.056,00 €	95.956.559,64 €	102.193.736,02 €	108.836.328,86 €	115.910.690,23 €	123.444.885,10 €	131.468.802,63 €	140.014.274,80 €	149.115.202,66 €	158.807.690,84 €	169.130.190,74 €
EBITDA	20.099.063,00 €	22.700.855,00 €	33.021.107,00 €	34.808.346,33 €	37.070.888,84 €	39.480.496,62 €	42.046.728,90 €	44.779.766,28 €	47.690.451,09 €	50.790.330,41 €	54.091.701,88 €	57.607.662,50 €	61.352.160,57 €
Depreciation*t	2.156.682,40 €	2.723.562,18 €	1.466.540,07 €	2.155.158,75 €	2.295.244,07 €	2.444.434,93 €	2.603.323,20 €	2.772.539,21 €	2.952.754,26 €	3.144.683,29 €	3.349.087,70 €	3.566.778,40 €	3.798.619,00 €
WC needs Var.	3.239.016,00 €	8.858.232,00 €	3.129.639,00 €	4.858.438,74 €	5.174.237,26 €	5.510.562,68 €	5.868.749,25 €	6.250.217,95 €	6.656.482,12 €	7.089.153,46 €	7.549.948,43 €	8.040.695,08 €	8.563.340,26 €
Tax Rate	16,30%	25,60%	25,20%	25,00%	25,00%	25,00%	25,00%	25,00%	25,00%	25,00%	25,00%	25,00%	25,00%
CAPEX	43.395.327,00 €	31.829.710,00 €	2.955.492,00 €	26.963.793,26 €	28.716.439,82 €	30.583.008,41 €	32.570.903,96 €	34.688.012,71 €	36.942.733,54 €	39.344.011,22 €	41.901.371,95 €	44.624.961,12 €	47.525.583,60 €
FCFF	21.168.441,25 €	3.367.051,25 €	20.071.335,78 €	6.156.063,98 €	6.556.208,14 €	6.982.361,67 €	7.436.215,17 €	7.919.569,16 €	8.434.341,16 €	8.982.573,33 €	9.566.440,60 €	10.188.259,24 €	10.850.496,09 €

Enterprise Value	**235.711.655,00 €**	**PV Perpetuity**	**302.170.835,88 €**
debt	75.915.586,00 €		
Value	**159.796.069,00 €**		
Share Price	**5,48 €**		

Source: Own estimation

Appendix U

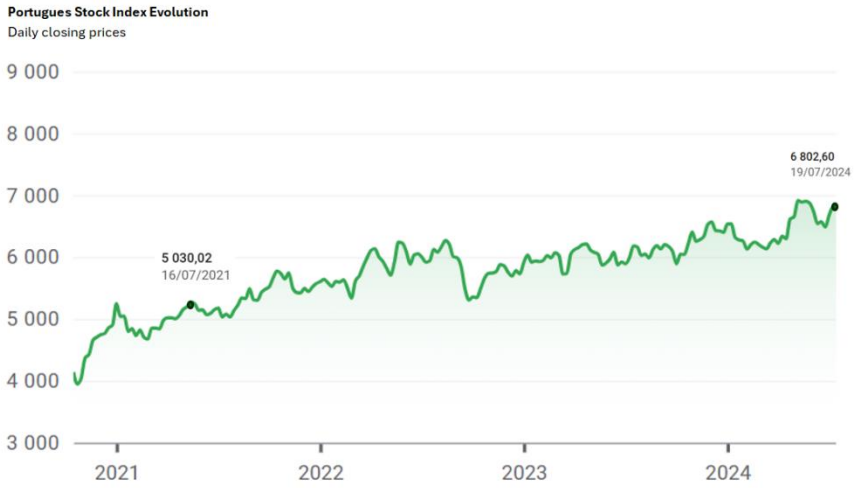
Valuation through the Multiples Methodology

Comparable Firms	PER
Orsted AS	29,03 €
Enphase Energy, Inc.	155,94 €
Adani Green Energy Limited	803,06 €
Eni S.p.A.	38,83 €
Longi Green Energy Technology	35,76 €
Iberdrola S.A.	17,66 €
The Southern Company	44,76 €
Duke Energy Corporation	N/A
Enbridge, Inc.	24,06 €
Equinor ASA	8,50 €
TotalEnergies SE	10,58 €
NexEra Energy, Inc.	27,83 €
Average	**42,72 €**
Valuation	**5,55 €**

Source: Yahoo Finance (2025) and own estimation

Appendix V

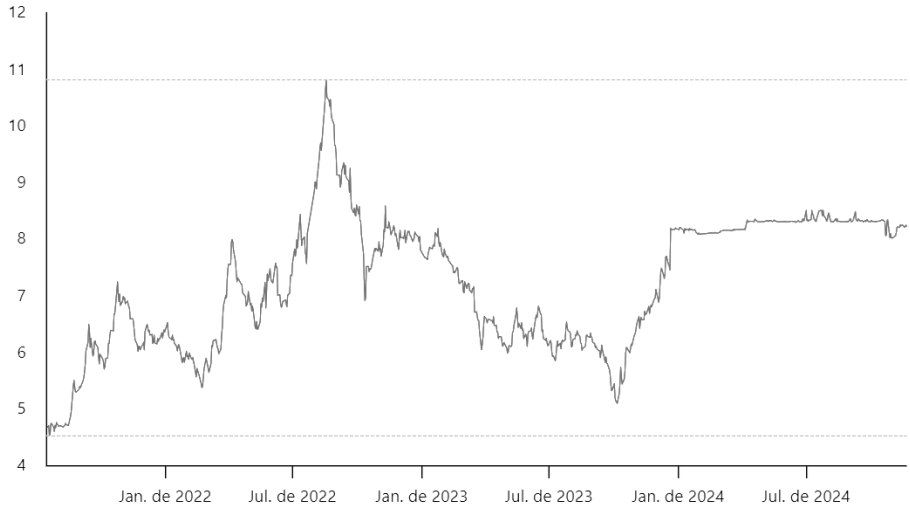
Portuguese Stock Index Evolution



Source: Google Finance (2025)

Appendix W

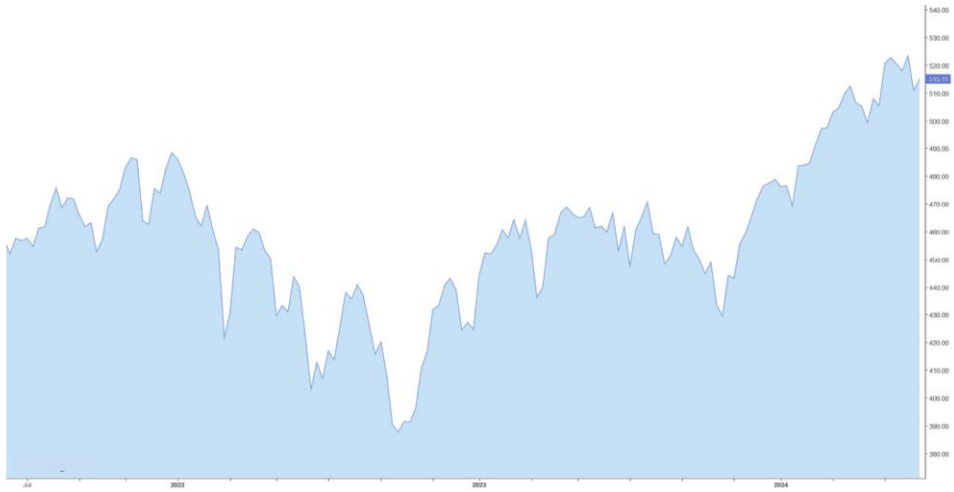
Greenvolt Returns



Source: Jornal de Negócio (2024)

Appendix X

Euro STOXX 600 Index Returns



Source: Investing.com (2025)

Appendix Y

Valuation through DCF (June 2024)

Amounts in €m	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Sales	53.850.471,00 €	65.134.803,00	90.100.056,00 €	141.506.540,00 €	274.739.824,00 €	292.597.912,56 €	311.616.776,88 €	331.871.867,37 €	353.443.538,75 €	376.417.368,77 €	400.884.497,74 €	426.941.990,09 €	454.693.219,45 €
EBITDA	20.099.063,00 €	22.700.855,00 €	33.021.107,00 €	56.541.177,00 €	91.964.246,00 €	106.654.936,03 €	113.587.506,87 €	120.970.694,82 €	128.833.789,99 €	137.207.986,33 €	146.126.505,45 €	155.624.728,30 €	165.740.335,64 €
Depreciation*t	2.156.682,40 €	2.723.562,18 €	1.466.540,07 €	10.078.302,61 €	8.377.942,16 €	12.421.366,58 €	13.228.755,40 €	14.088.624,50 €	15.004.385,10 €	15.979.670,13 €	17.018.348,69 €	18.124.541,35 €	19.302.636,54 €
WC needs Var.	3.239.016,00 €	8.858.232,00 €	3.129.639,00 €	2.842.596,00 €	7.906.478,00 €	3.832.824,23 €	4.081.957,80 €	4.347.285,06 €	4.629.858,59 €	4.930.799,40 €	5.251.301,36 €	5.592.635,95 €	5.956.157,28 €
Tax Rate	16,30%	25,60%	25,20%	37,80%	21,80%	25,00%	25,00%	25,00%	25,00%	25,00%	25,00%	25,00%	25,00%
CAPEX	43.395.327,00 €	31.829.710,00 €	2.955.492,00 €	14.951.141,00 €	84.425.482,00 €	68.352.780,96 €	72.795.711,72 €	77.527.432,99 €	82.566.716,13 €	87.933.552,68 €	93.649.233,60 €	99.736.433,79 €	106.219.301,98 €
FCFF	21.168.441,25 €	3.367.051,25 €	20.071.335,78 €	27.472.802,86 €	12.054.063,68 €	27.892.611,87 €	29.705.631,64 €	31.636.497,69 €	33.692.870,04 €	35.882.906,60 €	38.215.295,53 €	40.699.289,73 €	43.344.743,57 €

Enterprise Value	1.594.557.587,00 €	PV Perpetuity	2.044.712.940,00 €
net debt	371.504.633,00 €		
Equity Value	1.223.052.954,00 €		
Share Price	9,42 €		

Source: Own estimation

Appendix Z

Valuation through Multiples Method

	Ratios		
Comparable Firms	**PER**	**EV/EBITDA**	**PBV**
Orsted AS	18,86	9,67	2,84
Enphase Energy, Inc.	48,23	46,22	31,16
Adani Green Energy Limited	310,41	53,56	22,13
Eni S.p.A.	3,46	1,71	0,80
Longi Green Energy Technol	20,22	12,57	4,02
Iberdrola S.A.	16,39	8,45	1,78
The Southern Company	24,33	13,21	2,64
Duke Energy Corporation	20,78	12,47	1,62
Enbridge, Inc.	42,02	11,95	2,04
Equinor ASA	3,34	0,97	1,67
TotalEnergies SE	7,63	2,99	1,27
NexEra Energy, Inc.	22,34	16,99	3,67
Average	**22,41**	**13,62**	**4,37**
Valuation	2,91	6,20	15,67
Average valuation		**8,26**	

Source: Yahoo Finance (2024)