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Equity Valuation: Greenvolt Energias Renováveis S.A.

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Master in Finance

Supervisor:
PhD Luís Miguel da Silva Laureano, Professor Auxiliar
ISCTE-IUL

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BUSINESS
SCHOOL

Department of Finance

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Abstract

This research was developed with the objective of estimating the fair value of Greenvolt shares at 31st December 2021. Also, to understand if at the time the firm was undervalued or overvalued by the market, while comparing the actual market value with the estimated fair value.

Greenvolt Energias Renováveis S.A. is a Portuguese company that produces energy from renewable sources, such as forestry biomass, solar and wind. It aims to become one of the main players in the production of renewable energy. In July 2021 it did its Initial Public Offering by listing in the EuroNext Lisbon stock exchange.

In this dissertation it was made a valuation on Greenvolt using the Discounted Cash Flows (DCF) applying the Free Cash Flow to the Firm (FCFF) method, and Relative Valuation. The assumptions made are supported by both the firms' own projections and its historical performance, as well as, an analysis of the macroeconomic environment and industry.

The results obtained in the two methodologies used suggest different conclusions. However, the DCF method suggests that the market price Greenvolt was lower than the fair value, at 31st December 2021.

Keywords: Greenvolt; Valuation; Discounted Cash Flows; Relative Analysis.

JEL Classification: G30; G32.

Resumo

Este relatório foi desenvolvido com o intuito de estimar o justo valor das ações da Greenvolt a 31 de dezembro de 2021. Tal como, verificar se à data a empresa estava subvalorizada ou sobrevalorizada pelo mercado, ao comparar o preço real do mercado, com o justo valor estimado da empresa.

A Greenvolt Energias Renováveis S.A. é uma empresa portuguesa de produção de energia através de fontes renováveis, como a Biomassa, a energia solar e eólica. Espera nos próximos anos tornar-se um dos principais participantes no mercado de produção de energia renovável. Em julho de 2021 estreou-se na bolsa de valores EuroNext Lisbon ao fazer uma Oferta Pública Inicial.

Nesta dissertação procedemos a avaliação da Greenvolt através dos modelos de Fluxos de caixa descontados, mais concretamente o Free Cash Flow to the Firm (FCFF), e a avaliação de comparáveis através de múltiplos. Os pressupostos foram fundamentados pelo desempenho histórico e pelas projeções da própria empresa, tal como pela análise do contexto macroeconômico e do sector.

Os resultados obtidos nas duas metodologias sugerem resultados diferentes. No entanto o modelo dos fluxos de caixa descontados sugere que o valor das ações da Greenvolt estavam cotadas abaixo do seu justo valor, em 31 de Dezembro de 2021.

Palavras-chave: Greenvolt; Avaliação; Fluxos de caixa; Múltiplos.
Classificação JEL: G30; G32.

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Glossary

Altri	Altri SGPS S.A.
B2B	Business to Business
B2C	Business to Consumer
CAGR	Compounded Annual Growth Rate
CAPM	Capital Asset Pricing Model
COD	Commission on Date
CPI	Consumer Price Index
DCF	Discounted Cash Flows
DIO	Days of inventory Outstanding
DPO	Days Payable Outstanding
DSO	Days of Sale Outstanding
GDP	Gross Domestic Product
ECB	European Central Bank
EV/EBITDA	Enterprise Value to EBITDA ratio
FiT	Feed-in Tariffs
Greenvolt	Greenvolt Energias Renováveis S.A.
GW	Gigawatt
GWh	Gigawatt hour
HICP	Harmonized Index of Consumer Prices
IPO	Initial Public Offering
IRENA	International Renewable Energy Agency
LCOE	Levelized Cost Of Energy
MIBEL	Mercado Ibérico de Energia Liberalizado
MW	Megawatt
MWh	Megawatt Hour
NOPLAT	Net Operating Profit Less Accumulated Taxes
NOCF	Net Operational Cash Flows
NCF	Net Cash Flow
P/BV	Price to Book Value Ratio
P/E	Price to Earnings Ratio
PPA	Purchase Price Allocation
ROC	Renewable Obligation Certificates
RPI	Retail Price Index
Solar PV	Solar Photovoltaics
V-Ridium	V-Ridium Europe
YoY	Year on Year

Introduction

This valuation project is executed as the dissertation for the Finance Master's Degree. This project intends to determine the fair value of Greenvolt Energias Renováveis S.A. at the end of December 2021. The stock price of the company is going to be compared with the fair stock price value, in order to assess if shareholders had an overvalued or undervalued asset. The firm is a developer and an independent power producer focused on regulated biomass, expanding its presence into solar photovoltaics and wind technologies in Europe, with a focus on sustainable and profitable growth.

Greenvolt started in 2005 when the Portuguese company Altri SGPS decided to make a strategic bet in the use of forestry resources, by developing an area of energy production through the use of biomass. Greenvolt has five forestry biomass power plants in Portugal with a combined capacity of around 143 GW. Greenvolt is the national market leader in this segment producing 873 GWh in 2021. In the end of 2021 total income reached 141,5 M€ and Net Income ascended 11,4 M€.

This report firstly contains a literature review segment, where different financial valuation techniques are analyzed. Secondly, external factors of the company are discussed. Those include macroeconomic indicators and the energy industry market, focusing on the biomass, solar and wind sectors. Thirdly, an overview of the company is presented, namely the history of the company, the shareholder structure, the different areas of the business and a financial analysis. Afterwards the valuation model is introduced. The main assumptions of the model are described, and forecasts are presented. Lastly, a summary of the results is detailed and an action on the share price is recommended.

1. Literature Review

1.1 Introduction to Valuation

Valuation is useful in a wide range of tasks. The role it plays, however, is different in different areas of finance. For instance, in corporate finance, where the relationship among financial decisions, corporate strategy and firm value has to be delineated, in order to maximize the value of a firm. According to Damodaran (2002), in acquisitions analysis, where firms and individuals bid for the value of a target company, while the target firm tries to determine a reasonable value for itself before deciding to accept or reject the offer.

As Depamphilis (2019) stated, some argue that a firm current price publicly traded share price reflects all relevant information about earnings and risk of a certain security. Others believe that over long periods of time markets are efficient but at any moment in time a firm share price can be above or below its true value.

According to Damodaran (2002) in general, there are three approaches to valuation. These are: the Discounted Cashflow Valuation (DCF), which establishes the value of an asset to the present value of expected future cashflows on that asset; Relative Valuation estimates the value of an asset by looking at the pricing of 'comparable' assets; and Contingent Claim Valuation, which uses option pricing models to measure the value of assets that share option characteristics.

1.2. Discounted Cash Flow Approach

The DCF method is one of the most used valuation tools, as it relies on the flow of money coming in and out of the company. The DCF approach seeks to determine the company's value by estimating all future free cash flows and discounting them at a discount rate matched to the flows' risk (Wilson, 1997). Thus, the value can be generally obtained in the following way:

$$\sum_{t=1}^{t=n} \frac{CF_t}{(1+r)^t} \qquad (1)$$

where:

- n is the life of the asset;
- CF_t is the cash flow at period t;
- r is the discount rate reflecting the riskiness of the cash flows.

It provides a value estimate through discounting future cash flows to the present, using the relevant discount factor. There are two main variants of the DCF methodology, depending on the nature of the cash flows which are being discounted: Free Cash Flows to the Firm (FCFF) or Free Cash Flows to Equity (FCFE).

1.2.1 Free Cash Flow to the Firm (FCFF)

To value a company's operations, we discount projected free cash flows (FCF) at a company's weighted average cost of capital (WACC).

The Free Cash Flow is the sum of the cashflows available to all claim holders in the firm, including stockholders and bondholders. To compute it, we begin with the earnings before interests and taxes, clear out taxes, reinvestment needs and arrive at an estimate of the free cash flow to the firm. According to Koller (2020, p. 209) "FCFF can be thought of as the after-tax cash flow that would be generated if the company held only core operating assets and financed the business entirely with equity".

$$FCFF = EBIT(1-t) + D\&A - CAPEX - \Delta WC \qquad (2)$$

Earnings Before Interests and Taxes (EBIT) is an indicator of profitability. It indicates the margin generated from all operating activities. It is generally given by:

$$EBIT = Revenues - Cost\ of\ Goods\ Sold - Operating\ Expenses \qquad (3)$$

Tax rate (t) is the percentage of taxable income that is owed to the state. This rate varies according to countries and regions where firms operate in; Depreciations and Amortizations (D&A) are two methods of tracking the value of assets over time. It calculates the expenses of a fixed or intangible asset over its useful life; Capital Expenditures (CAPEX) refers to the expenditures made in investment capacity, directly related to the operating activity of the firm and they are net of disposals. Working Capital (WC) allows to understand the business ability to cover all the short-term obligations. Tracking the changes over time give an understanding of financial health.

$$WC = Current\ Assets - Current\ Liabilities \qquad (4)$$

where:

- Current Assets = Cash and Cash Equivalents + Accounts Receivable + Inventory;
- Current Liabilities = Accounts Payable + Short-Term Debt + Other Current Liabilities.

Changes in Working Capital (ΔWC) is the difference in working capital between one accounting period and the previous one.

1.2.2. Weighted Average Cost of Capital (WACC)

In valuation we should be careful when discounting cash flows, as they need to be consistent with the discount rate used.

In an enterprise valuation, free cash flows are available to all investors. Thus, the discount factor for free cash flows must represent the risk faced by every investor. The weighted average cost of capital (WACC) blends the rates of return required by debt holders and equity holders (Koller, 2020). It can be defined as follows:

$$\text{WACC} = r_E \times \frac{E}{E+D} + r_D \times \frac{D}{E+D} \times (1 - t_m) \qquad (5)$$

where:

- r_E - return demanded by the shareholders (cost of equity);
- r_D – cost of debt;
- E – Market Value of Equity;
- D – Market Value of Debt;
- t_m – Marginal Tax Rate.

According to Modigliani (1958) proposition II without taxes, the cost of equity increases as a company increases its use of debt financing to maintain a constant WACC. This is, higher leverage will increase the cost of equity. Modigliani (1958) proposition I introduces the idea of tax shields. In the context of WACC, the tax shield is the savings that result from the interest expense, that will increase the value of a firm.

Although WACC based models are simple to use, there are some downsides while using it. It is suitable only for the simplest and most static of capital structures. However, if a company increases its debt-to-equity ratio the current cost of capital will understate the expected tax shields. In other cases, it needs to be adjusted extensively, not only for tax shields but also for issue costs, subsidies, hedges, exotic debt securities, and dynamic capital structures. In situations where the capital structure changes it is possible to accommodate the use of WACC,

but it is harder. In this situation the adjusted present value (APV) model is a better alternative (Luehrman, 1997).

The Market Value of Debt (D) includes the financial debt, this is interest bearing liabilities, and other non-operating liabilities related to obligations assumed by the company.
Short-term debt includes commercial paper, notes payable, and the current portion of long-term debt. Long-term debt includes fixed debt, floating debt, and convertible debt with maturities of more than a year (Koller, 2020). Items that are included in Working Capital such as accounts payable, credit given to suppliers, and other credit accounts should be excluded from the Market Value of Debt.

The Market Value of Equity (E) is usually estimated by the market capitalization of the firm at the time of the valuation. The Market Capitalization is calculated by multiplying all outstanding shares by its share price.

1.2.3 Capital Asset Pricing Model (CAPM) – Cost of Equity

As previously mentioned, the cost of equity is a component of WACC. The cost of equity is the required rate of return investors expect to have by holding an equity investment on a firm. The CAPM is usually used to arrive at the expected return on an equity investment (Damodaran 2002).

The risk and return model that has been in the use the longest and is still the standard is the Capital Asset Pricing Model (CAPM). The CAPM model is a regression model with a single explanatory variable, the market portfolio. Introduced by Sharpe (1964), and further developed by Lintner (1965) and Mossin (1966), is a standard for pricing risky assets. Other multivariable risk and return models have been added, such as the Fama-French (1992) model.
Under the CAPM model, the portfolio that holds all the traded assets it is called the market portfolio. In the CAPM every investor holds a portfolio with a combination of the market portfolio and the riskless asset (risk free rate). The CAPM model is given by the following equation:

$$E(r_i) = r_F + \beta_i \times (E(r_M) - r_F) \qquad (6)$$

where:

- $E(r_i)$ – is the expected return of security i;
- β_i – security i sensitivity to the market portfolio;
- $E(r_M)$ – expected return of the market portfolio;
- r_F - represents the risk-free rate.

Risk-free asset

Most risk and return models in finance start off with an asset that is defined as risk free and use the expected return on that asset as the risk-free rate. The first is that there can be no risk of default associated with its cash flows. The second is that there can be no reinvestment risk in the investment, as mention in Damodaran (2008).

The risk-free rate (r_F) represents the rate of return of an investment with zero risk. As stated in Damodaran (2002), the riskless asset is defined to be an asset for which the investor knows the expected return with certainty for the time horizon of the analysis. Usually, it can be used the rate of the treasury bills which are assumed to be default-free, as they are backed by the US government.

In most developed markets, the government can be viewed as a default free entity, at least when it comes to borrowing in the local currency. the appropriate risk-free rate to use to obtain expected returns should be a default-free (government) zero coupon rate that is matched up to when the cash flow or flows that are being discounted occur.

Often if the country risk matters and leads to higher premiums for riskier countries, an additional premium is added to the risk-free asset. This rate builds on default spreads on country bonds issued by each country (Damodaran, 2002).

Equity Risk Premium

The risk premium is the demanded rate of return for investing in the market portfolio, which includes all risky assets, instead of investing in a riskless asset. Riskier investments should have a higher expected return than safer investments. Thus, the expected return on any investment can be written as the sum of the risk-free rate and an extra return to compensate for the risk (Damodaran, 2002).

In a portfolio, only the risk that an investment adds on to a diversified portfolio should be measured and compensated. This risk is firm-specific, and it is a measure of the risk that is related to that particular investment.

Although there is no consensus in how to measure it Damodaran (2012), suggests that, an historic risk premium earned by stocks over default-free securities over long periods is a good estimate for the Equity Risk premium. These approaches might yield reasonable estimates in markets like the United States and in Europe, with a large and diversified stock market and a long history of returns on both stocks and government securities.

Beta of an investment

Regarding Beta (β_i), it is a measure of the systematic risk (or market risk) of a security. If a company has a higher Beta it means that its share price is more sensitive to the changes in the market. The Beta is given by: $\beta_i = \frac{\sigma_{im}}{\sigma_m^2}$ (7)

where:

- σ_{im} is the covariance between the rate of return of a security i and the return of the market;
- σ^2_m is the variance of the return of the market.

Damodaran (2002) suggests three approaches to estimate the beta: the first is to use historical data on market prices on individual investments; the second is to estimate the betas from the fundamental characteristics of the investment; and the third is to use accounting data.

Although it is conventional estimating the beta using a linear regression there are also some limitations. The historical returns on the investment against the historical returns on a market index. Choosing the period length, the market index used in the comparison and the different adjustments may lead to different estimation. Thus, a more general approach to apply to all companies is needed.

The bottom up betas breaks-down into their business risk and financial components. To develop this approach, it is necessary to add a property of the betas and a relationship between different betas. The beta of two assets is the weighted average of the individual asset betas. There is a relationship between beta levered and unlevered, which is the following:

$$\beta_l = \beta_u \left(1 + (1 - t)\left(\frac{D}{E}\right)\right) \quad (8)$$

where:

- β_l is the levered beta for Equity in the firm;
- β_u is the unlevered beta of the firm; t is the corporate rate; and
- D/E is the debt to equity ratio.

A selection of comparable firms is selected and the weighted average of the unlevered beta of comparable firms is reached. By levering the beta through the formula above we achieve the estimate for the beta of the firm.

1.2.4. Cost of Debt

To estimate the cost of debt for investment-grade companies, the yield to maturity of the company's long-term, option-free bonds can be used. Multiply the estimate of the cost of debt by 1 minus the marginal tax rate to determine the cost of debt on an after-tax basis (Koller, 2020). It can be determined by the following:

$$\text{After-tax cost of Debt} = \text{Pre-tax cost of Debt } (1 - \text{Tax Rate}) \quad (9)$$

To estimate the pre-tax cost of debt, often a firm long-term bond outstanding is used. However, when they do not get traded regularly, one can estimate those costs by using their ratings and associated default spreads. If they do not get rated either (Damodaran, 2002) suggests estimating a synthetic rating.

This technique requires that we play the role of rating agencies and assign a rating to a firm based upon its financial ratios. Damodaran (2002) proposes the interest coverage ratio to determine the rating of the firm. Hence the pre-tax cost of debt is given by the sum of the firm default spread and the riskless security.

1.3. Free Cash Flow to Equity (FCFE)

The Free Cash Flow to Equity (FCFE) describes the cash flows available to the firm's shareholders after all obligations are met. Usually, those cash flows are discounted at the equity required rate of return. These obligations include debt payments, and after covering CAPEX and working capital needs. In general, Free Cash Flow to Equity can be given be the following:

$$\text{FCFE} = \text{Net Income} + \text{D\&A} - \text{Changes in WC} - \text{Changes in Capex Net of Disposals} - \text{Debt Variations} \quad (10)$$

The differences between FCFF and FCFE arise primarily from cashflows associated with interest payments, principal repayments, new debt issues and other non-equity claims such as preferred dividends. For firms at their desired debt level, which finance their capital expenditures and working capital needs with this mix of debt and equity.

1.4. Equity Value and Enterprise Value

As mentioned previously, the free cash flow to the firm is the valuation tool which takes in account the sum of the cashflows to all claimholders in the firm, bondholders and preferred stockholders. The equity value can be described as the sum of expected future cashflows discounted at the WACC.

$$\text{Enterprise Value} = \sum_{t=1}^{n} \frac{FCFF_t}{(1+WACC)^t} + \frac{\text{TV}_n}{(1+\text{WACC})^n} \qquad (11)$$

where:

- n is the number of forecasted periods;
- t is a given year between 1 and n;
- $FCFF_t$ is the free cash flow to the firm in the time period t;
- WACC is the weighted average cost of capital;
- TV_n is the terminal value at the period n.

The Enterprise value represents the value of the entire company, while the equity value represents the portion owned by shareholders. To determine the equity value, we need to add non-operating assets and deduct nonequity claims.

$$\text{Equity Value} = \text{Enterprise Value} + \text{Non-Operating Assets} - \text{Non-Equity Claims} \qquad (12)$$

Non-operating assets include cash and near-cash securities, investments in equities and bonds of other firms, holdings in other firms either public or private, among others. Given their different accounting treatments, each non-operating asset type should be valued separately. Although they can be divided in a long array of items, non-equity claims should include the following items: financial debt, operating leases, pensions, provisions, convertible bonds, employee stock options, and minority interests (Koller 2020).

For the free cash flow to equity, the equity value is given by the following:

$$\text{Equity Value} = \sum_{t=1}^{n} \frac{FCFE_t}{(1+r_e)^t} + \frac{\text{TV}_n}{(1+r_e)^n} \qquad (13)$$

where:

- n is the number of forecasted periods;
- t is a given year between 1 and n;

- FCFE is the free cash flow to equity from 1 to n;
- r_e is the required rate of return;
- TV_n is the terminal value at the period n.

To estimate the value per share, we divide the value of equity by the number of shares outstanding. Even though there might be adjustments to different types of options, and stocks with different voting rights.

Terminal Value (Continuing Value)

According to Koller (2020) when building a forecasting model, we forecast each financial statement account over a period reflecting visible trends. This period is called the cash flow projected period. However, there comes a point in time where predicting the yearly value of operations becomes impractical. Thus, a perpetuity is often used to value operations by assuming an infinite lifespan, this is called the terminal value.

We obtain terminal values by calculating a terminal capital cash flow and assuming that this terminal capital cash flow will grow at a constant nominal rate in perpetuity (Kaplan and Ruback, 1995). The calculation of the terminal capital cash flow begins with the capital cash flow in the last forecast year and adjusts for the difference between capital expenditures and depreciation and amortization.

$$\text{Terminal Value} = \frac{CF_{n+1}}{\text{r} - \text{g}} \qquad (14)$$

where:

- CF_{n+1} is the cash flow at the end of the period of the beginning perpetuity;
- r is the discount rate used to discount cash flows;
- g_n is the stable growth rate.

1.5. Market Multiples (Relative Valuation)

The objective of this method is to value assets based upon how similar assets are currently priced in the market. To perform this valuation prices have to be standardized, usually converting into multiples of earnings, growth and cash flows. Then a set of similar firms must be found (the peer group), in order to estimate the value. This is difficult task, as there are no two identical firms in terms of growth and cash flow potential or risk.

According to (Damodaran 2002), when using multiples there are four steps to ensure that the multiples are used wisely and to detect misuse:

1. Ensure that the multiple is defined consistently and that it is measured uniformly across the firms being compared;
2. Be aware of the cross-sectional distribution of the multiple, not only across firms in the sector being analyzed but also across the entire market;
3. Analyze the multiple and understand not only what fundamentals determine the multiple but also how changes in these fundamentals translate into changes in the multiple;
4. Finding the right firms to use for comparison and controlling for differences that may persist across these firms.

There are different multiples available to value such as multiples of earnings, growth, and cash flows. To analyze a company value, the following multiples will be used:1. Price to Earnings Ratio (PER), 2. Price to Book Value (P/BV), and 3. Enterprise Value to EBITDA (EV/EBITDA).

1. The Price to Earnings Ratio (PER) establishes a relationship between the current share price and the earnings per share. This formula may be adapted to compare Market Capitalization of the firm and the total net earnings observed in the last accounting year. PER shows the expectations of the market and is the price one must pay per unit of current earnings.

$$\text{Price to Earnings Ratio (PER)} = \frac{Share\ price_N}{Earnings\ per\ Share_N} = \frac{Market\ Capitalization_N}{Total\ Net\ Income_N} \qquad (15)$$

2. The Price to Book Value (P/B) is a metric that derives the current market valuation in relation of the Book Value of a firm. This ratio is used to indicate how much are equity investors willing to pay for a unit of net assets.

$$\text{Price to Book Ratio (P/BV)} = \frac{Market\ Capitalization_N}{Total\ Book\ Value_N} = \frac{Share\ Price_N}{Book\ Value\ per\ Share_N} \qquad (16)$$

3. The Enterprise Value to EBITDA (EV/EBITDA) is used to compare the entire value of businesses with the amount of EBITDA it earns on an annual basis.

$$\text{EV/EBITDA} = \frac{Enterprise\ Value_N}{EBITDA_N} \qquad (17)$$

Damodaran (2007) believes that in relative valuation you assume that while markets make mistakes on valuing individual stocks, they are correct on average. This is, we believe that the

market has priced companies correctly, on average, even though it might have mistaken the pricing of each of them individually.

When we use comparative analysis in a careful and well-reasoned way, it not only serves as a useful check on the DCF forecasts, but also provides critical insights into what drives value in a given industry (Koller, 2020).

2. Macroeconomic Outlook

Two years after the COVID-19 pandemic, Russia's war against Ukraine poses challenges to the EU (European Union) economy and its recovery after a 2-year slowdown. In the beginning of 2022, all events seem to favor an expansionary period, with the pandemic situation improving, while most of the challenges with logistics and supply bottlenecks on the price of energy and other commodities were expected to fade. Economy activity would continue improving with favorable labor conditions, large accumulated savings, and the deployment of the Recovery and Resilience Facility (RRF).

However, the war brought new disruptions in global supply, fueling further commodity price pressures and heightening uncertainty. Due to the geographic proximity with Russia and Ukraine and high integration with global value chains, the EU is expected to take a hit in the economy. To add to this, as of July 2022 more than 12 million Ukrainians have fled their homes and more than 5 million have left for neighboring countries.

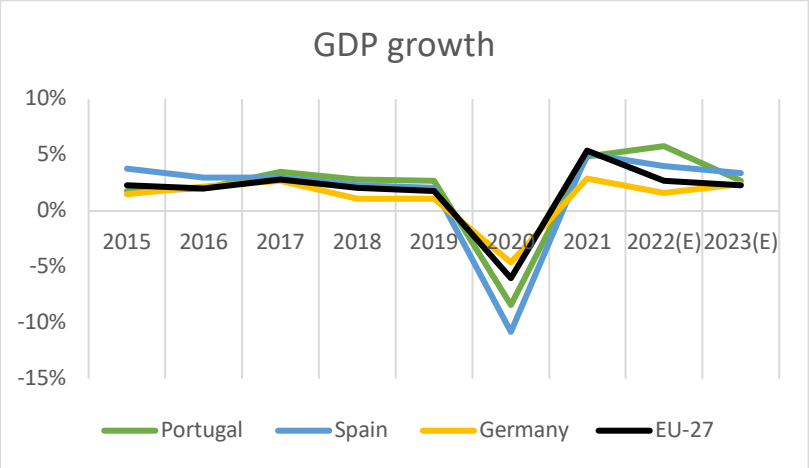

Figure 2.1. GDP growth in European economies, from 2015 to 2023 source: Eurostat

According to the Eurostat, EU (European Union) real GDP (Gross Domestic Product) in 2021 grew 5,4% and is now expected at 2,7% and 2,3% in 2022 and 2023, respectively. Whereas the Portuguese real GDP increased 4,9% in 2021 and is expecting a growth of 5,8% and 2,7% in 2022 and 2023, respectively.

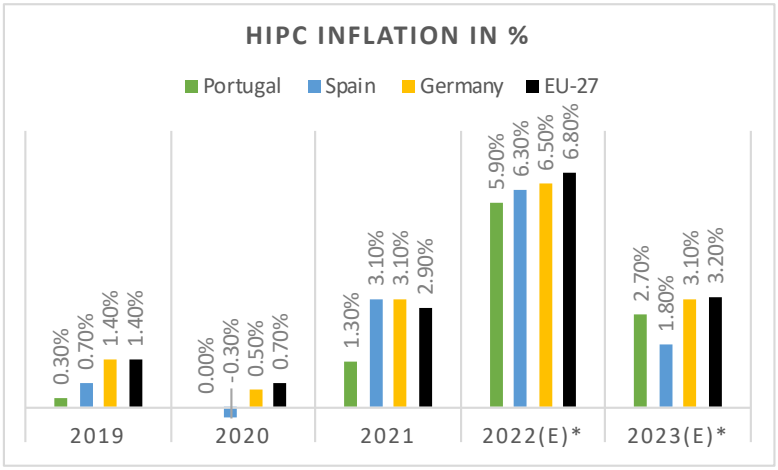

Figure 2.2. HIPC in European economies from 2019 to 2023, source: Eurostat and Banco de Portugal

HICP (Harmonized Index of Consumer Prices) inflation, in the EU, is expected to average an all-time high of 6,8% in 2022, before declining to 3,2% in 2023. In Portugal HICP is expected to be 5,9% in 2022, decreasing in 2023 to 2,7%, according to Banco de Portugal.

There were several goods which increased the price significantly, within them energy prices were the most impactful. In Europe, between October and December of 2021, energy prices had been trading at record prices. Given the importance of Russia as a major fossil fuel exporter, the war brought upward pressure on energy commodity prices.

The rise in prices does not rely solely on energy cost, but on other items as well. The rise of energy cost and fertilizers has started to set food prices under pressure. This places the production and export of grains at risk, and the war escalated them. Other items such as industrial metals, nickel and copper, and neon have seen their prices rise. Consumers and companies are now faced with unpredictable prices, provoking policy-makers decisions to deliver tangible solutions, even if there is little they can do in the short term to make a difference.

The ECB (European Central Bank) will directly change the deposit facility rate, which sets the interest that other banks receive for depositing money with the ECB overnight. In July 2022, the rates went up to 0,00% and in September 2022 they went to positve territory, 0,75%. For businesses and households this means that the cost of borrowing funds will increase.

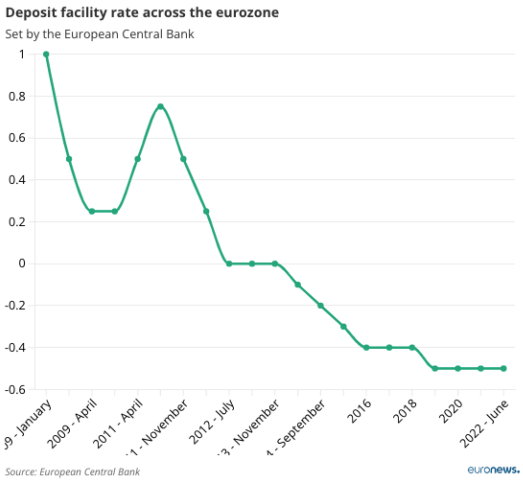

Figure 2.3. Deposit facility rate across eurozone, Source: euronews; variation on S&P500

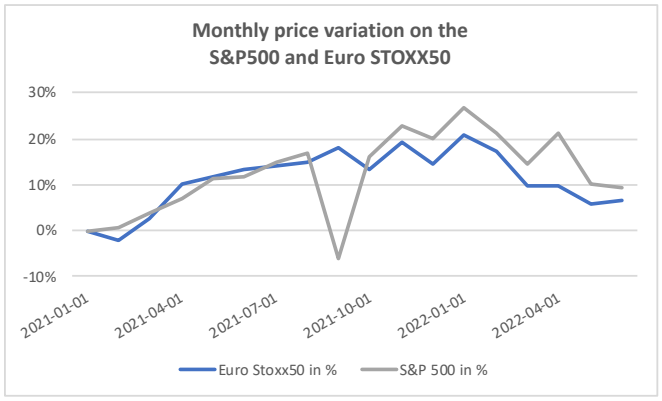

Figure 2.4. Monthly price Euro STOXX50 and S&P500 indices (in %), source: Yahoo Finance

The stock market in 2021 had surprisingly good results, as the global economy recovered from the COVID-19 lockdown and restrictions, while the ECB and the Federal Reserve maintained supportive measures first implemented at the beginning of the pandemic. The S&P 500 rose 26,89% whilst the Euro Stoxx50 grew 20,97%. In 2022, there has been a contraction both in the S&P 500 and in Euro Stoxx50 of 12,76% and 12,52% respectively (as of 1 June 2022).

As European economies recovered from the economic crisis of COVID-19 a new crisis might emerge with the Russian invasion of Ukraine. Fears of a long-term inflation appear, as energy prices and food prices remain high.

3. Industry Outlook- Energy Market

The European electricity system is undergoing considerable changes at the moment. The transition towards a low-carbon economy means a growing role for renewable energy sources, greater energy efficiency and the electrification of transport and other sectors.

The transition to a low carbon economy is expected to involve consumers giving them a more meaningful role, allowing consumers to manage their demand actively, produce electricity for self-consumption and feed the excess into the energy grid.

In this context, electricity markets, regulations and technical infrastructures need to be adapted to a world in which large utilities no longer dominate the market. Furthermore, markets need to be redesigned in such a way as to encourage investment in low-carbon technologies, while at the same time safeguarding security of supply and keeping costs for households and industry under control.

3.1. European Electricity Market

The Paris Agreement in 2015 and the Glasgow's COP 26 in 2021 have increased the international commitments and cooperation for a green energetic transition. The European Green Deal makes the EU ambition for Renewable ambitious. The EU with this plan wants to Become the world's first climate-neutral continent by 2050.

Since 2004, the renewable energy's share on the gross final energy consumption has increased significantly across the EU. From 9,63% in final consumption, to more than doubling in size in 2020. The share of renewable energy consumed in 2020 in the EU was 22,1%, above the targeted 20% for 2020. The exceptional circumstances of 2020, marked by disruptions in all economic sectors due to the pandemic, have facilitated meeting the renewable energy target, by lowering total energy consumption.

The growth of electricity generation from renewable sources in the EU reflects the expansion of three sources, wind, solar and solid biofuels. In 2020, renewable energies made up 37,5% of gross electricity consumption in EU. Hydro which always had a big representation in green energy production didn't grew significantly.

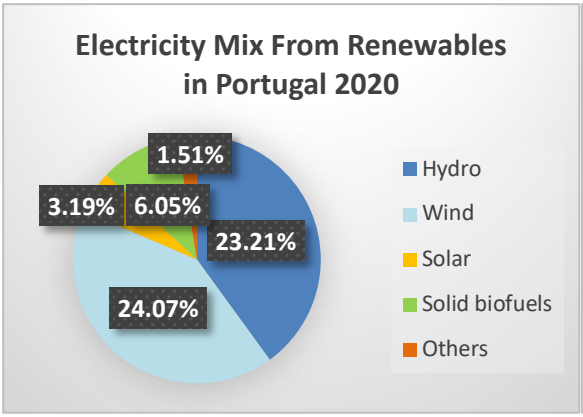

Figure 3.1. Electricity mix from renewables in Portugal source: Pordata,

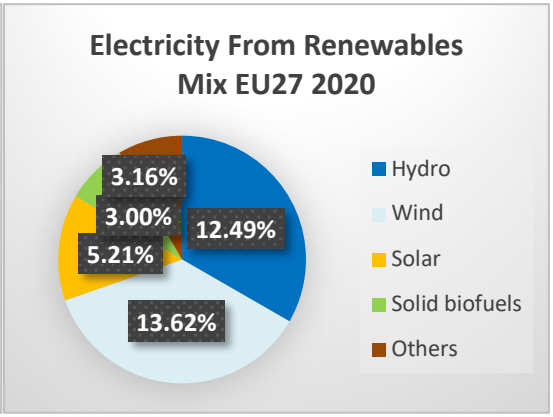

Figure 3.2. Electricity mix from renewables in EU27, source: Eurostat

According to the EuroStat, the electricity consumption in 2020 from renewable sources in Portugal represented 58,03%. Wind energy is 24,07% from all the electric production, followed by 23.21% of hydro, 6,05% solid Biofuels and the Solar represented 3,19%. The overall proportion of Electricity consumption from Renewables in the EU-27 was lower than in Portugal, representing 37,48%. The main source of renewable electric production come from Wind with 13,62% of all electricity consumed, followed by Hydro with 12,49%, Solar with 5,21% and Solid biofuels with 3%. Other sources represented 3,16%.

3.2 Renewable Energy Industry Perspective

According to the International Renewable Energy Agency (IRENA), the use of all renewable sources and in all geographies is expected to grow.

Biomass Energy

The EU classifies Bioenergy as an environmentally sustainable activity, provided that it only uses biomass residues. The production of energy through biomass under these circumstances allows to clean the forest and to avoid the gradual decomposition of biomass in landfills, enhancing the circular economy and preventing wildfires. Thus, EU considers bioenergy as a relevant tool in the EU's low carbon transition.

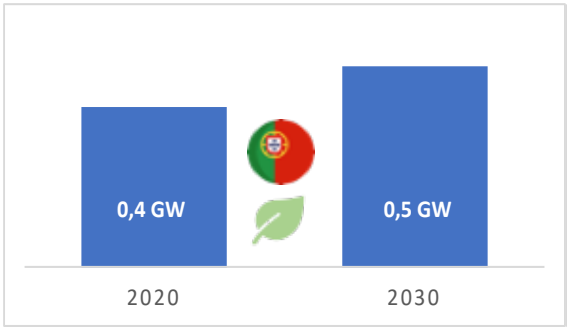

Figure 3.3. Installed biomass capacity in Portugal, source: Portuguese NECP

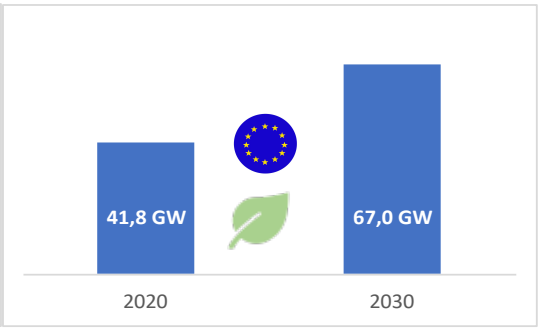

Figure 3.4. Installed biomass capacity in the EU, source: EU27 NECP

According to IRENA, in 2018, biomass represented 17% of renewable energy generation in Europe and 11% in Portugal. The National Energy and Climate Plan published that in 2020 the total installed capacity in EU-28 was 41,8 GW and it is expected to grow to 67 GW in 2030, representing a 5% compounded annual growth rate (CAGR). In Portugal, the 2020 installed capacity is 0,4 GW and is expected to grow to 0,5 GW until 2030, representing a 2% CAGR.

Solar Photovoltaics and Wind Energy

Increasing political and regulatory support for global decarbonization is improving solar PV (PhotoVoltaics) and wind Energy prospects. As mentioned previously, future growth in the use of renewables is expected to mostly come from wind and solar.

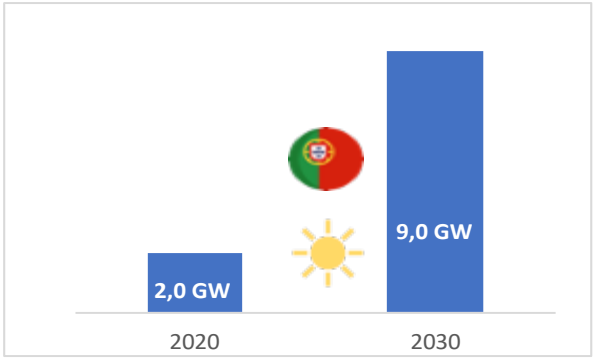

Figure 3.5. Installed solar PV capacity in Portugal, source: Portuguese NECP Installed

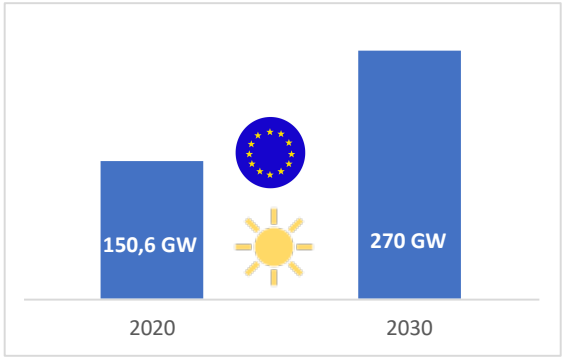

Figure 3.6. solar PV capacity in the EU, source: EU27 NECP

Solar PV in the EU and in Portugal is also expected to grow rapidly. In Portugal it is expected for the total capacity to more than quadruple between 2020 and 2030, from the current 2,0 GW to 9,0 GW in 2030. In the EU, solar capacity is expected to have a $CAGR_{2030\text{-}2020}$ of 6%, which represents a 79% increase.

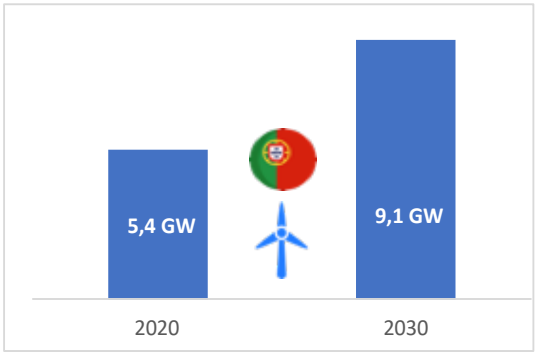

Figure 3.7. Installed wind capacity in Portugal, source: Portuguese NECP

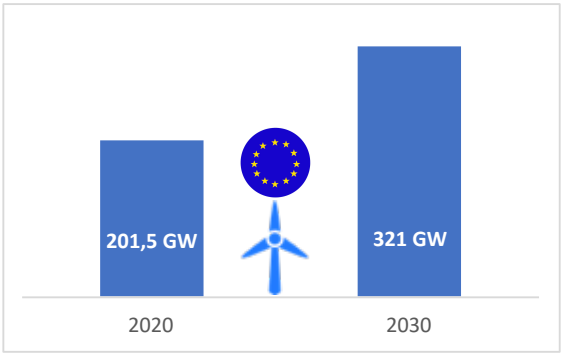

Figure 3.8. Installed wind capacity in the EU, source: EU27 NECP

The wind capacity is also expected to increase rapidly both in Portugal and in the EU. Portugal expects an increase in the installed capacity from the 5,4 GW in 2020 to 9,1 GW in 2030, representing a $CAGR_{2030\text{-}2020}$ of around 5%. In the EU the Wind capacity is expected to increase 62%, making its $CAGR_{2030\text{-}2020}$ 5%, as the total capacity could reach 321 GW in 2030.

Levelized Cost of Electricity (LCOE)

As a result of a sharp decline in renewable power costs, electricity produced by renewables is becoming very competitive compared with other technologies. The cost of electricity from solar PV dropped significantly since 2010, as Lazard Report show.

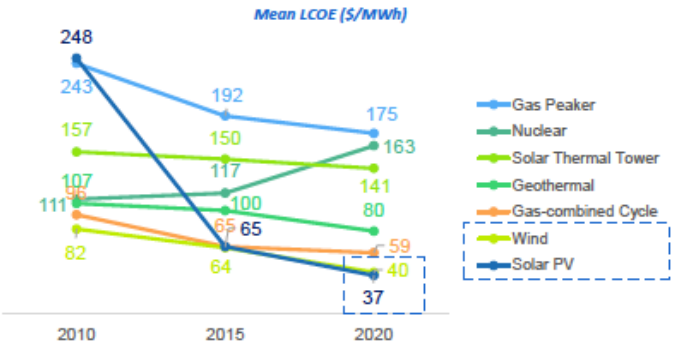

Figure 3.9. LCOE for different energy sources, source: Lazard 2020 and Greenvolt Presentations

Wind LCOE has drop considerably, from around 82 $/MWh to 40 $/MWh in 2020. A lower LCOE for wind is a result of improved technologies, higher capacity factor, larger turbines, further economies of scale, and access to cheaper funding.

Solar has seen even a faster decline in prices as the module costs decreased considerably. The LCOE went from $248 MWh in 2010 to $37 MWh in 2020, and LCOE is expected to continue declining, as EIA energy outlook report shows.

3.3. Wholesale Prices

The European electricity sector is liberalized with interconnected zonal wholesale electricity markets. The day-ahead market is a key wholesale market made up from each of the 24 hours of the next day. Due to transmission network interconnection and integrated power exchanges, day-head prices are highly correlated across central Europe, following the same daily or yearly patterns.

The average day-ahead electricity price between 2017 and 2021 of Portugal has not been stable according to MIBEL prices, which can be observed in Figure 3.10. The average price in Portugal in 2017 was 52,48 €/MWh, then it increased to 57,45 €/MWh in 2018, and in the following two years it decreased to 47,87€/MWh and after it dropped to 33,99 €/MWh. In 2021 prices soared to 100,20€/MWh.

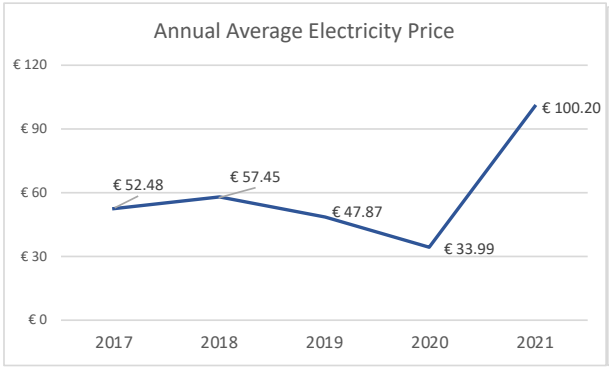

Figure 3.10. Annual day-ahead electricity prices in the Portuguese market from 2017 to 2021, source REN;

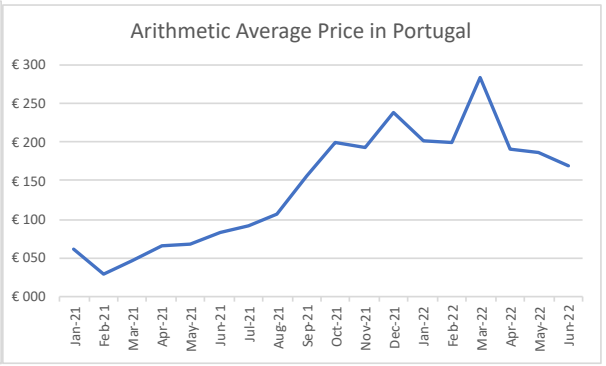

Figure 3.11. Monthly average electricity price in Portugal from 2021 to June 2022, source: REN.

In the year 2021 the wholesale day-ahead prices have been increasing significantly, as can be observed in Figure 3.11. During 2021 there were a few months where the electricity average price of the day-ahead went above the 200 €/MWh. The two major drivers of this upward trend are carbon dioxide allowance prices, which doubled in 2021, and the natural gas prices. Natural gas prices had been relatively stable, however they roughly tripled between April and September. A post COVID-19 economic recovery, particularly the high demand for gas from China and low gas reserves in Europe, have been responsible for the electricity price increase. The high price trend was aggravated in February 2022 following Russia's invasion in Ukraine, as prices peaked in March 2022, at over 283 €/MWh.

4. Company Overview

In this chapter this chapter the story of Greenvolt will be explained as well as the different sectors the company is in. To add to this we are also explaining the strategies and approaches in the market.

4.1 History of the company

Greenvolt started in 2005 when the Portuguese company Altri SGPS decided to make a strategic bet in the use of forestry resources, by developing an area of energy production through the use of biomass.

Greenvolt has five forestry biomass power plants in Portugal with a combined capacity of around 100 GW. Greenvolt is the national market leader in this segment producing 733 GWh in 2020, representing around 48% market share.

The company aims to be a major international wind and solar developer combined with biomass expertise. According to the company there are three main segments in which it wants to focus on: biomass sector, utility scale wind and solar project development, and decentralized generation. Following its internationalization strategy in Biomass, in June 2021 Greenvolt acquired 51% of Tilbury Green Power, a biomass power plant in the United Kingdom.

In July 2021, Greenvolt acquired 100% of the capital of V-Ridium, a project promoter in solar PV and wind energy, with pan-european ambitions. The company has a 5,8 GW pipeline across Europe in project-scarce and high-potential geographies.

In the decentralized generation segment, Greenvolt acquired 70% and 42% of Profit Energy, and Perfecta Energía, respectively. Decentralized generation is one of the most dynamic sectors in renewable energy, having grown 1,8 times between 2018 and 2020. The Iberian Peninsula has the higher irradiation levels in Europe, and the level of installation of decentralized generation per capita is one of the lowest. Greenvolt seeks to take advantage of markets with low competition and capture significant growth opportunities available.

On the same month of 2021 Greenvolt made its Initial Public Offering raising 197,1 M€, selling 4,25€ a share, and issuing 46,376 M new shares. During 2021, the maximum price for the shares was 7,24€ and the price in 31st of December 2021 was 6,35€. This makes the market value for Greenvolt in the end of 2021, of 77,741 M€. In 2021 the energy exported was 873

GWh, it generated revenues of 141,5 M€ and had a recurring EBITDA of 61,6 M€, excluding transaction costs.

The Table 4.1. shows the most relevant events of the history of Greenvolt, between the inauguration and 31st December 2021.

1999	2002	2005	2006	2009	2018	2019
Inauguration of the Mortágua powerplant	Creation of Bioeléctrica da Foz	Iniciation of Greenvolt	Opening of the Ródão Biomass Plant	Launch of both Constância and Figueira da Foz I	Acquisition the totality of the capital of Bioeléctrica da Foz from Altri	Initiation of the biomass Plant of Figueira da Foz II
2021						
March	June	July	July	August	October	
Rebranding of GreenVolt	Acquisition of 51% of TGP capital	Acquisition of V-ridium Power Group	GreenVolt joined the Euronext market in Lisbon	Acquisition of 70% of Profit Energy	Acquisition of 42,19% of Perfecta Enegía	

Figure 4.1. Greenvolt relevant events, Source: Greenvolt Reports, adapted by author

4.2. Shareholder Structure

On the 31st of December 2021 there were 122 376 470 shares of Greenvolt. The capital structure of the company suffered changes during 2021. However, Altri holds a majority position with 58,72%. The second biggest shareholder is V-Ridium Europe, with a participation of 9,23%. The remaining capital, 32,05%, is detained by smaller shareholders and other shareholders.

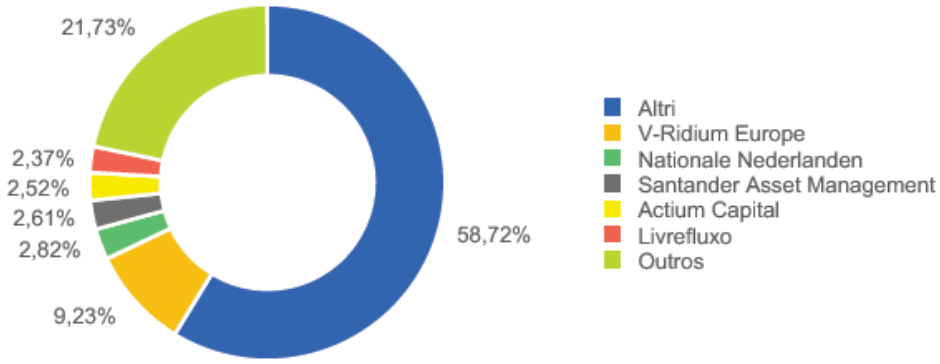

Figure 4.2. Shareholder Structure, as of 31st December 2020, Source: Company Financial Reports

4.3. Sustainable Biomass Sector

Greenvolt is the leader in the forestry Biomass production in Portugal. It has 5 plants in Portugal with a combined installed capacity of 98 MW. In 2020 it produced 733 GWh of the 1529 GWh produced in Portugal, which represents around 48% of the total electricity produced and 45% installed capacity.There are three small-size players which control 44% of the capacity (Navigator, TSM, and Trasfradelos), with the remaining 11% belonging to smaller players.

According to the Portuguese NECP (National Energy and Climate Plan) 2020-2030 the $CAGR_{2020\text{-}2030}$ for Biomass is around 2%. This market will grow at a slower pace than other renewables sources in Portugal.

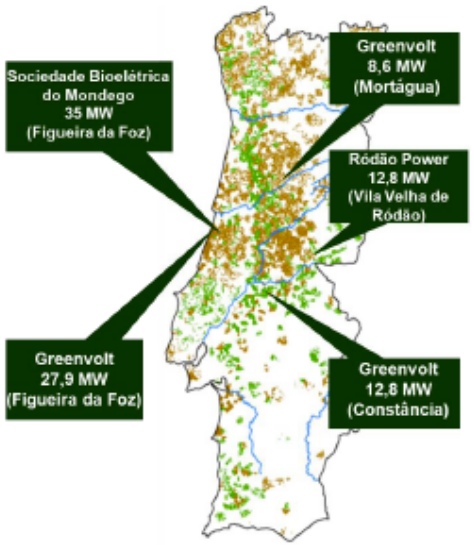

Figure 4.3. Biomass plants in Portugal, source: Company Reports;

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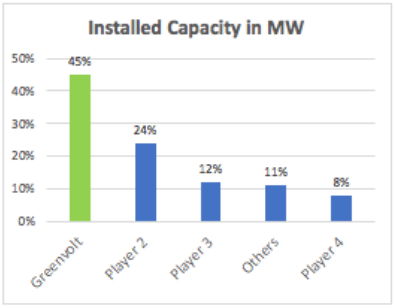

Figure 4.4. Portuguese biomass installed capacity

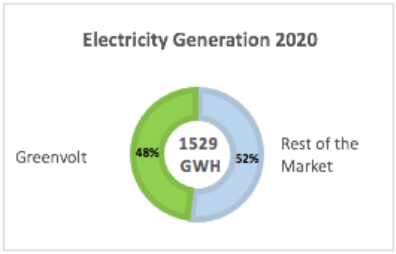

Figure 4.5. Biomass electricity generation in Portugal, source: Company Reports.

The National Energy Strategy provides the set of rules related to renewable energy calculating the amount of remuneration for energy supply produced in renewable plants. It also defines the procedures for allocation of available power in the same network and the deadlines for obtaining the establishing procedures for allocation of available power in the same network and the deadlines for obtaining the established license for renewable plants.

For plants whose fuel is forest biomass a FiT (Feed-In Tariff) guarantees a remuneration for a period of 25 years from the beginning of the supply of electricity to the grid. The FiT covers fully the generated energy and it is indexed to CPI (consumer price index). This provides a long-term secured revenue stream for Greenvolt. Although these contracts are not expected to be extended beyond the 25 years, Mortágua was granted an additional 15 years, extending its useful life to 2034. Including the Mortágua extension the average FiT visibility is 17 years and the average remuneration in Portugal was 122 €/MWh, in 2021.

Plant	Installed Capacity	COD	FiT Expire date	Avg. FiT FY21 (€/MWh)	Load Factor	Production 2021
Mortágua	10 MW	1999	2039 [1]	131	80%	70 GWh
Ródão	13 MW	2006	2031	120	40% [2]	46 GWh
Constância	13 MW	2009	2034	117	70%	79 GWh
Figueira da Foz I	30 MW	2009	2034	119	86%	226 GWh
Figueira da Foz II	35 MW	2019	2044	115	96%	294 GWh
Total Portugal	**101 MW**		**17y of avg. remaining life**	**122**	**81% [3]**	**873 GWh**

Table 4.1. Portuguese biomass plants characteristics, source: company reports

Tilbury Green Power (TGP)

TGP is a biomass plant strategically located 25 miles from London, to economically process waste wood. The plant started operations in 2019 and has a generation capacity of 42 MW. In June 30th Greenvolt achieved its first step in the internalization strategy by acquiring 51% of TGP's factory. The remaining 49% are owned by a local investor, Equitix Investment Management.

The TGP plant provides a stable remuneration with upside growth. TGP is expected to generate 330 GWh at a more than 90% availability in the first 15 years. Its operations are mostly covered by the system of Renewables Obligation Certificates (ROCs). TGP gets paid the UK's wholesale electricity price (GBP45/MWh in 2021) plus 1.4 ROCs per MWh produced. TGP sells electricity to a supplier under a PPA (Purchase Price Allocation) format. The ROC price

1 The extention of the FiT for 15 years in Mortágua plant in 2024.

2 Disregarding the outage, it would be 71% (there was a turbine replacement in Ródão and it went into operation in September 6th. It stayed idle for 5 months).

3 Disregarding the Ródão outage the load factor would be 87%.

is set at a fixed price of GBP50/MWh for the regulatory period (2037), hence in 2021 it is receiving GBP 115/MWh (GBP 45+ 50 x 1.4 /MWh). The ROC price is indexed annually to the RPI (Retail Price Index), 3.4532% per annum until 2037. In summary, TGP has a high degree of cash flow visibility, including 58% of the revenue underpinned by RPI-indexed ROCs through 2037, while the rest is variable and based on the wholesale prices.

Plant	Injection Capacity	COD	ROC Expire date	Wholesale avg. FY21 (GBP/MWh)	Availability 2021	Expected Generation
TGP	41.6 MW [4]	2019	2037	166.87	91% [5]	330 GWh

Table 4.2. UK biomass plants characteristics, source: company reports

In terms of costs, the proximity to London makes the availability of wood waste high. It is expected that the wood waste start to decline by 2027, when a large number of ROCs will come to an end in the UK. The ROC remuneration ends in 2037. After this date either the plant will receive only the UK's wholesale electricity price, or the plant will renegotiate a payment remuneration scheme.

4.4. Utility Scale Wind and Solar and Project Development

In 2020 the European Commission proposed a binding target of net zero gas emissions by 2050 as a part of the European Climate Law. This proposal is now passing through the ordinary legislative procedure of the European Parliament and the EU Council.

Achieving this goal will generate a three-decade long investment cycle of investments, along with the policies to support it, with utilities and renewable developers right at the heart of the transformation.

The European scenario for renewable installations in the coming decades is therefore promising. Given the enormous investment needed is expected both regulatory frameworks and the financing for this type of project to remain supportive.

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4 Represents the injection capacity which is covered by the ROC contract, although the unconstraint capacity is 43.6 MW;

5 Availability during the ROC contract, even though the company might continue to operate beyond 2037.

Wind and solar PV installations will be the main renewable drivers to achieve the energy transition in Europe. Currently, solar and wind represent around 45% of the electricity generation and is expected to achieve 600 GW in 2030. The level of installation and penetration of the different technologies will depend on the quality of the wind resource, the solar irradiation, orography, installation cost and the Operating expenses evolution.

Greenvolt strategy is to focus in key geographies with a common project scarcity feature, while exhibiting different regulatory frameworks, and also having high growth targets for wind and solar. These geographies should have government auctions to support renewable growth and reliable and stable regulations. The strategy includes markets such as Portugal, Poland, Greece, Italy, Serbia, France, and Bulgaria.

Greenvolt at the IPO (initial public offering) acquired 100% of V-Ridium, a Polish company which focusses in the development of Wind and Solar PV projects in different stages of development. The aim of the acquisition is to provide complementary technologies in the different stages of development, whilst providing a large pipeline of projects across Europe. V-Ridium has a highly experienced management team, is well-positioned on the main renewable drivers, it is positioned in what are considered high-value regions by focussing on the most profitable part of the value chain and has expertise in O&M (operations and maintenance) and AM (asset management).

During 2022 there were other significant events in this segment. Greenvolt acquired 51% of KSME and has expanded through an early-mover strategy in Serbia and bought a 35% share in an innovative solutions firm in Germany, MaxSolar.

The different stages of development and GV strategy

Greenvolt hopes to build a vertically integrated renewable energy business model focused on development to create value via sales, while selectively retaining some projects. The firm identifies 4 main phases in these projects: Project development, Construction Management, Operation, and Energy management.

Project development includes all the progress until the site is at a ready-to-build stage (RTB). This contains the access to the grid, connection permits and administrative authorizations as well as the landowner's negotiation and occupation titles. To add to this there is an energy yield assessment and an environment and technical optimization analysis.

Construction Management encompasses the progress from an RTB phase to the operation phase. This contains the Structure/Management engineering, purchase and construction

contracts, as well as, project management. This stage is dominated by utilities and local EPCM providers (engineering, procurement and construction management) and requires a high CAPEX.

Operation stage where O&M (Operation and Maintenance) and energy production forecasts should improve cost-efficiency, maximizing availability and extending assets useful life.

Finally, the Energy Management where a sales management and the portfolio management should provide a flexible approach to the market while achieving the adequate risk/return balance. Greenvolt identifies the development phase has the one where it delivers the highest return in the value chain. Therefore, Greenvolt has a flexible ´Sell or Hold` strategy with a preferential market segment of selling at RTB stage where 70 to 80% of the pipeline is expected to be sold and an opportunistic presence in the construction stage. Greenvolt expects to keep 20 to 30% in its balance sheet.

Greenvolt's pipeline

At the IPO date Greenvolt projected a 3,6 GW pipeline of Solar Photovoltaics and On-shore Wind in project-scarce markets and high potential geographies, of which 1,2 GW of RtB until 2023. As of the end of 2021 there has been a further reinforcement of the wind and solar pipeline through partnerships and new co-development agreements.

Currently the pipeline is around 5,8 GW of which 2,0 GW are expected to be at RtB or COD (commission on date) until 2023. This represents a 60% increase in the projected pipeline and a 100% rise in the delivery of projects until 2023.

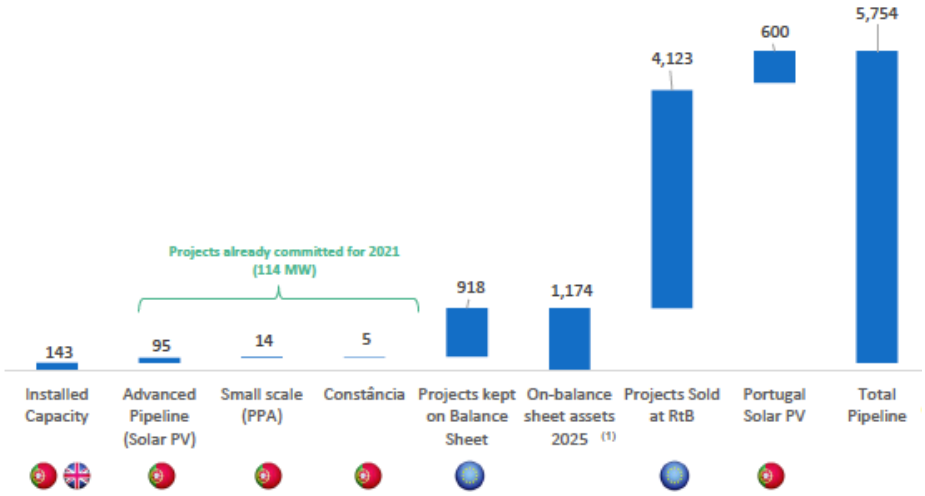

Figure 4.6. Greenvolt Injection Capacity and Pipeline, source: Company Reports

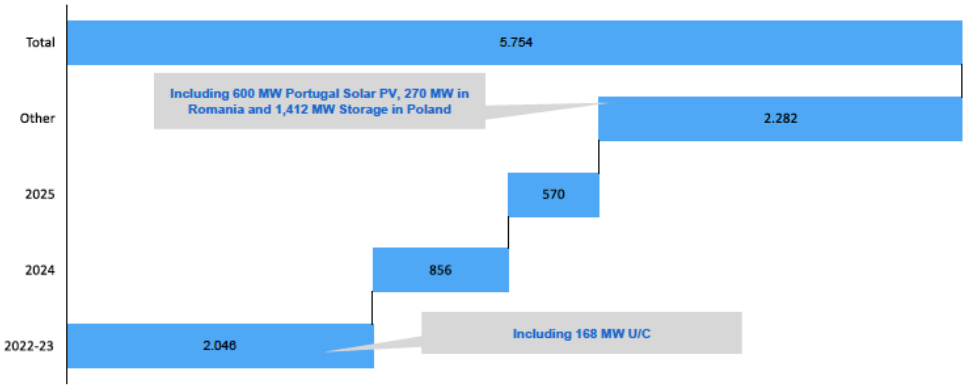

Figure 4.7. Greenvolt pipeline schedule, source: Company Reports

Development to Own: Vertical Integrated Model

Greenvolt strategy is to select which projects it keeps on the balance sheet based on the assets in which there can be an improvement on its performance or projects that have a significant strategic importance, such as the contract to place solar PV on Altri's power plants. The company is aiming to keep a 900 MW installed capacity of solar and wind, until the of 2026.

Development to Sell (Asset Rotation)

Greenvolt expects greater value creation in the earliest development phase, from project identification to ready-to-build. This phases also present its challenges as it depends on market conditions and project availability. Greenvolt believes that the track record and expertise of V-Ridium will contribute to the success of this project. From the total pipeline, around 80% will be used for the construction of the Development to Sell strategy at the ready to build phase.

4.5. Decentralization Generation

A decentralized system is characterized by locating energy facilities closer to the site of energy consumption. A decentralized energy system allows for more optimal use of renewable energy as well as combined heat and power. Decentralized systems seek to put sources closer to the end user, avoiding distribution inefficiencies. Decentralized generation (DG) is the generation of energy that comes from the use of these systems and can either include micro-renewables or heating and cooling solutions.

Decentralized generation represents the third strategic lever present in the company long term growth strategy. The decentralized generation market is expected to experience significant growth in the near future, and partly displacing conventional generation sources. From 2015 to 2020 the industry of DG had a CAGR of 20%, reaching a capacity of 283 GW in 2020. The

industry growth in the coming years is predicted to remain strong, has CAGR is expected to average 12% between 2020 and 2025 worldwide.

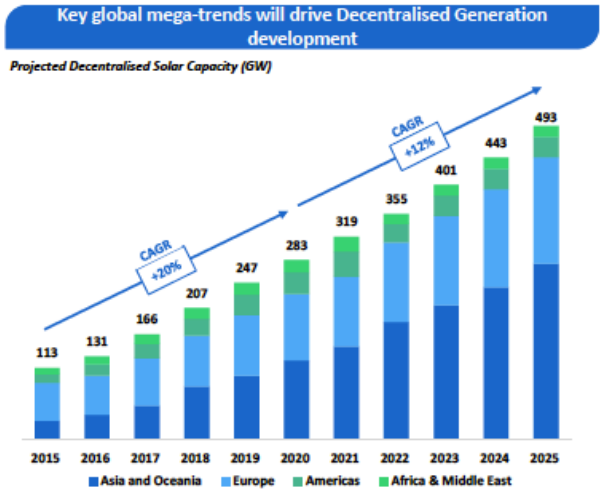

Figure 4.8. Projected decentralized solar capacity, source: Greenvolt Financial Reports;

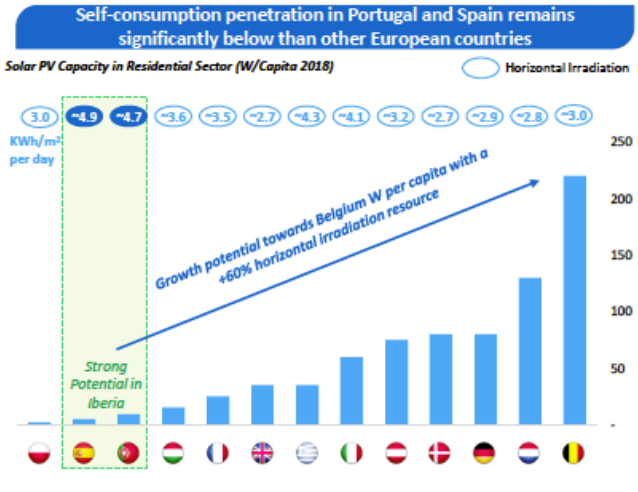

Figure 4.9. Solar PV capacity in residential sector, source: Greenvolt Financial Reports

The self-consumption solutions penetration in the Iberia remains significantly below other European countries with lower horizontal irradiation. It is expected for both Portugal and Spain to close the gap of DG segment when compared to other European countries. This is due to higher horizontal irradiation in southern Europe and thus a stronger potential for the development of the segment. Thus, it is expected a higher growth than the 12% projected worldwide. In addition, with historical high prices in MIBEL (Mercado Ibérico de Energia), it is expected that self-consumption solutions will soar.

There are several groups of clients that operators focus on: Family houses - Seek simple solutions with significant cost savings (1,5-15 kWp); Dwelling buildings, SME and others (10-100 kWp); High street and hotels - Sophisticated customers seeking strong savings (100 kWp); and Industrial - large projects with sophisticated customers looking for short paybacks (>120kWp).

Greenvolt strategy on Decentralized generation

The strategy on this market is to take advantage of market's under-penetration markets with higher irradiation, such as Portugal and Spain, and capture significant growth opportunities available in the market through inorganic growth. Target full integration within Greenvolt and

activate synergies while enhancing access to consumer increasingly in the new energy transition.

In August 2021 Greenvolt acquired 70% stake in Profit Energy. Profit Energy specializes in the development and design of energy projects using renewable sources and energy efficiency, with a particular focus on photovoltaic solar systems and LED lighting. It offers engineering, procurement, construction services, and operation and maintenance services. Profit Energy is essentially dedicated to the industrial and commercial segment (B2B). In 2020 it installed 9MWp, in 2021 it installed 18,5MWp, and in 2022 it has already secured 31,5MWp.

On October 2021 Greenvolt acquired a 42,19% stake in Perfecta Energía, a solar PV platform that offers financed solutions for residential customers (B2C). It also provides engineering, procurement and construction services as well as operation and maintenance services. The company offers a broad range of renewable energy products including electric vehicle chargers and batteries and solutions based on savings. Perfecta Energía presents a financed solution unique in the market with no up-front, with savings and hassle free. It tripled the installed capacity for 2021 for more than 4,5 MWp, when compared with 2020. For 2022 it has already a 2,5 MWp of secured orders.

5. Financial Analysis

5.1. Profitability

Greenvolt revenues grew from 2018 to 2021, on average, 38% yearly rate, as we can observe in Figure 5.1. The bigger portion of revenues are from the biomass sector of Portugal, which were responsible for the entire revenues until the end of 2020. The revenues expansion in 2019 and 2020, of 21% and 38% respectively, was mainly due to the beginning of operations of the power plant Figueira da Foz II. In 2021 revenues rose 58%. This can be explained through the expansion of the company to different segments or geographic areas, more specifically through the biomass addition in the UK, the decentralized generation segments and utility scale wind & solar and project development.

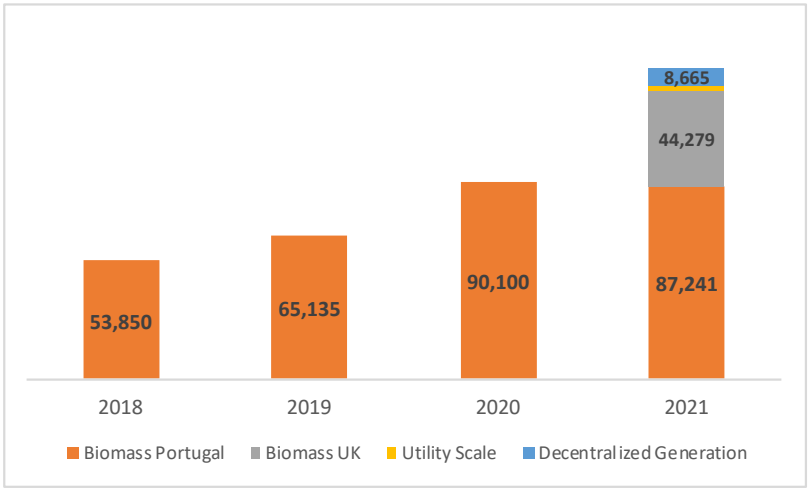

Figure 5.1. Revenues 2018-2021 Source: company reports

Through the observed period EBITDA grew over the years and EBITDA margins were between 34,84% and 39,96%, in 2019 and 2021 respectively. These stable margins occur since the nature of the long-term contracts, that provide a secure revenue stream. Operating profit margins grew every year until 2020, from 12,69% in 2018 to 30,20% in 2020. However, in 2021 Operating Profit margin decrease to 21,60%, which would be larger if we excluded the amount of costs related with transactions.

For the Net Profit, 2020 was the year with the highest performance with a value around 18 M€. In 2021 Net Profit went down to 11 M€, which is explain by an increase of financial expenses.

	2018	2019	2020	2021
Total Revenues (values in thousands €)	53 850	65 135	90 100	141 507
YoY Growth (%)		21%	38%	57%
EBITDA (values in thousands €)	20 098	22 701	33 021	56 541
EBITDA (%)	37,32%	34,85%	36,65%	39,96%
Operating Profit (values in thousands €)	6 833	12 078	27 208	30 561
Operating Profit (%)	12,69%	18,54%	30,20%	21,60%
Net Profit (values in thousands €)	5 203	6 792	17 936	11 392
Net Profit (%)	9,66%	10,43%	19,91%	8,05%

Table 5.1. Operating activity indicators 2018-2021 Source: company reports

Looking now at the profitability ratios, Return on Assets (ROA) went up from 3,09% to 9,13% from 2018 to 2020. In 2021 it dropped to 1,13%, due to the rapid increase in assets and to a reduction of the EBIT.

Return on Equity (ROE) had a similar behavior as the ROA. Between 2018 to 2020 it rose from 15,56% to 26,65%, respectively. In 2021, it dropped to 3,68%, due to a sharp increase in the Equity value, and a reduction on the value of Net Income.

Return on Invested Capital (ROIC) increased from 2018 to 2020, from 4,29% to 13,55%. In 2021 it plumbed to 3,30%, as Invested Capital increased sharply, and NOPLAT decreased from 19,1 M€ to around 16,7 M€.

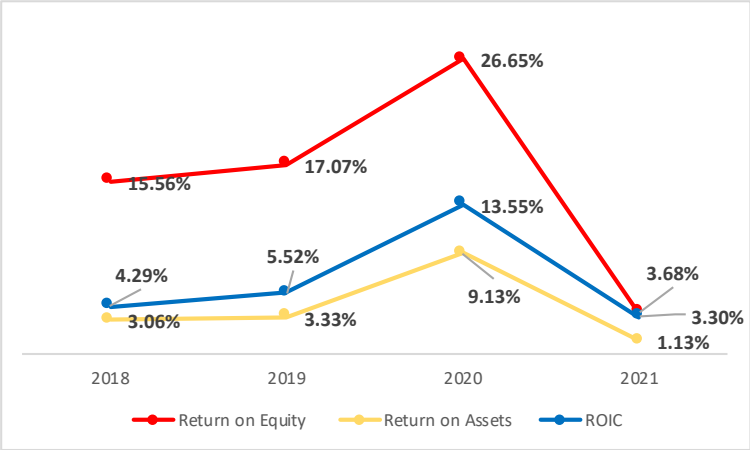

Figure 5.2. Greenvolt profitability ratios 2018-2021 Source: company reports

5.2. Liquidity Ratios, Cash Conversion Cycle and Cash Flows

In regard to the Liquidity Ratios, the Quick Ratio was below 1 between 2018 and 2020, as can be observed in Table 5.2. However, in 2021 the quick ratio sharply increased to 4,43, due mainly to a large increase in cash and cash equivalents.

The Current Ratio between 2018 and 2020 was also below 1, this means current liabilities were larger than current assets in the end of the year in this period. It is noticeable a rapid increase in 2021, this was due to not only the rise in cash and cash equivalents, but also with Assets associated with costumers' contracts and Other Receivables. Cash Ratio increased

throughout the years, in 2021, cash and cash equivalents were more than triple the amount of short-term liabilities.

	2018	2019	2020	2021
Current Ratio	0,17	0,30	0,38	4,44
Quick Ratio	0,16	0,26	0,38	4,43
Cash Ratio	0,05	0,17	0,24	3,50

Table 5.2. Liquidity ratios 2018-2021 Source: company reports

Looking at the cash conversion components, Days of Inventory Outstanding (DIO) has been relatively low and decreasing across the years. The DIO of 2018 and 2019 lowered from 10 and 17 to 0 and 2 in 2020 and 2021, respectively. Days of Sale Outstanding (DSO) have not remained stable across 2018 to 2021 and have increased from 2019 to 2021. Days Payable Outstanding (DPO), have been high, however they have been decreasing since 2019. Lastly, the cash conversion cycle was negative between 2018 and 2021, which means that investing and financing activities are financing Greenvolt's operations.

	2018	2019	2020	2021
Days of payable Outstanding	127	917	471	410
Days of sales Outstanding	54	41	30	108
Days of Inventory Outstanding	10	17	0	2
Cash Conversion Cycle	-63	-859	-441	-300

Table 5.3. Cash conversion cycle components 2018-2021 Source: company reports

Net operational cash flows (NOCF) evolved positively between 2018 and 2021, from 9,180 M€ to 28,204 M€. In 2019 Receipts from costumers increased more than the other items, and from 2019 to 2021 NOCF remained stable.

Cash Flows from investment were negative throughout the years. Cash flows from operating activities were not able to fully finance investment activities (except in 2020). However, cash flows from financing activities were positive (except in 2020) and were able to cover most of the cash flows from Investments. Thus, Net Cash Flow between 2018 and 2020 averaged 0,3 M€. In 2021, due to a large amount of inflows from finance activity, the Net Cash Flow was 243, 562 M€.

(values in thousands €)	2018	2019	2020	2021
Net Opererating Cash Flow	9 180	30 338	28 644	28 204
Cash Flow from Investment	-43 395	-31 847	-3 777	-235 361
Cash Flow from Financing	27 777	10 909	-26 873	450 720
Net Cash Flow	-6 438	9 400	-2 007	243 562

Table 5.4. Cash flow components 2018-2021 Source: company reports

5.3. Capital Structure

Greenvolt capital structure has suffered some changes across the observed period. Equity has increased both in absolute value and in relative weight in the capital structure. In 2018 was 33,4 M€ and doubled to 67,3 M€ and, as a result of a capital increased, in 2021, total Equity increased to 350,4 M€.

The total amount of assets increased about 6 times between 2018 and 2021. This has to do with the significant growth of Goodwill, Intangible Assets, Property Plants & Equipments, and cash and cash equivalents.

The Solvency Ratio[6] in 2021 was the lowest from the observed period and it might be concerning, as the ratio measures the financial capability of a company to meet its obligations in the long term. The Net Leverage[7] increased when compared with the previous periods.

(values in thousands €)	2018	2019	2020	2021
Book Value of Equity	33 427	39 792	67 311	350 366
Book Value of Debt	136 383	164 392	129 110	654 591
Assets	169 810	204 184	196 421	1 004 957
Debt to Equity Ratio	408,0%	413,1%	191,8%	186,8%
Solvency Ratio	0,10	0,11	0,23	0,06
Net Leverage	6,45	6,53	3,48	7,00

Table 5.5. Capital structure, solvency and net leverage ratio 2018-2021 Source: company reports

There were no dividends paid in the 4 years analyzed, as the firm believes they have attractive growth opportunities. Greenvolt also believes that, until 2025, there will be no dividends distributed to shareholders. As a result of the capital raise the number of shares increased from 75 M to 122,376 M. Total Earnings more than doubled from 5,2 M€ in 2019, to 11,4 million € in 2021. Earnings per share also rose when comparing 2021 to 2019 or 2018.

	2018	2019	2020	2021
Number of shares outstanding (in thousands)	75 000	75 000	75 000	121 376
Dividends Paid (in thousands of €)	0	0	0	0
Earnings (in thousands of €)	5 203	6 792	17 936	11 392
Earnings per share (in €)	0,069	0,091	0,239	0,094

Table 5.6. Earnings and shares values 2018-2021 Source: company report

All in all, it seems that Greenvolt seats on solid financial foundations, and is reliant on those to support further growth.

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6 Solvency Ratio = (Net Income + Depreciations) / Total Liabilities

7 Net Leverage = (Net Debt – Cash & Cash Equivalents) / EBITDA

6. Business Valuation

The valuation that is performed is based on the discounted cash flow model which needs the forecast of the future cash flows, more specifically the Free Cash Flow of the Firm (FCFF). In order to cross-check our results, a Relative Valuation will also be performed.

6.1 Valuation Method and Assumptions in the Forecasting Period

For this model, there was historical data from 2017-2021 used as the base of forecasts in the valuation. The Forecasted period of each segment of the company depended mostly on the information available and the firm specific projections for each division: biomass, utility scale wind and solar project development, and decentralized generation. The model forecasts cash flows between 2022-2027. For the remaining period, a terminal value was determined, as the model assumes perpetual cash flows.

6.1.1. Biomass

Revenues

Biomass is a much-needed renewable resource linked to the circular economy and to energetic transition. It is expected to grow at a 5% yearly rate across the EU, between 2020 and 2030 and 2% in Portugal.

Greenvolt has identified new business opportunities of 20 MW of additional installed capacity. Those will not be addressed in the model, however new opportunities that are already under development will be included (Mortágua II/extention).

Although the electricity market in at all-time highs, the biomass long-term contracts allow energy to be sold at stable and favorable price, making the sales of energy more predictable. In 2021 the average tariff was 121 €/MWh. The tariff values are adjusted to inflation (CPI-Consumer Price Inflation). The Table 6.1. summarizes the key variables considered for the forecasted period.

Plant	Injection Capacity	COD	FiT Expire date	Avg. FiT FY21 (€/MWh)	Load Factor (F)
Mortágua	10 MW	1999	2039	131	80%
Ródão	13 MW	2006	2031	120	71%
Constância	13 MW	2009	2034	117	70%
Figueira da Foz I	30 MW	2009	2034	119	86%
Figueira da Foz II	35 MW	2019	2044	115	96%
Total Portugal	**101 MW**		**17y of avg. remaining life**	**122**	**81%**
Tilbury	41,6 MW	2019	2037	1,4*ROC+50 GBP**	90%

Table 6.1. Biomass plants characteristics and performance, source: company reports, and authors estimates

Note that for simplicity model FiT contracts will be assumed to be renewed in the expire date and FiT tariff prices will be maintained in line with the same conditions as the current contracts. Although, so far only Mortágua is scheduled to extend its FiT in the next years. The following is our production plan for the biomass factories:

Production GWh:	2019	2020	2021	2022F	2023F	2024F	2025F	2026F	2027F	2028F
Mortágua	56,9	73,0	70,1	70,1	70,1	70,1	70,1	70,1	70,1	70,1
Ródão	65,2	66,0	45,6	80,9	80,9	80,9	80,9	80,9	80,9	80,9
Constância	78,3	79,1	79,1	79,1	110,4	110,4	110,4	110,4	110,4	110,4
Figueira da Foz I	223,4	228,6	226,0	226,0	226,0	226,0	226,0	226,0	226,0	226,0
Figueira da Foz II	116,0	286,0	294,3	294,3	294,3	294,3	294,3	294,3	294,3	294,3
Production Portugal	**539,8**	**732,7**	**715,1**	**750,4**	**781,7**	**781,7**	**781,7**	**781,7**	**781,7**	**781,7**
Tilbury	0,0	0,0	158,2	330,0	330,0	330,0	330,0	330,0	330,0	330,0
Production Total	**539,8**	**732,7**	**873,3**	**1080,4**	**1111,7**	**1111,7**	**1111,7**	**1111,7**	**1111,7**	**1111,7**

Table 6.2. Biomass plants forecasted production plan, source: company reports, and authors estimates

6.1.2. Utility Scale Wind and Solar Project Development

Greenvolt aims to build a pipeline in project-scarce European markets. It aims to develop a 5,800 MW of installed capacity. Both Solar and Wind are expected to have significant growth in EU, 6% and 5%, respectively, of yearly growth between 2020 and 2030.

The group is pursuing an optionality-based approach to development to own assets to maximize the retained value. These assets will represent 20% of the total amount of the portfolio. Our model assumes, from the total pipeline, around 900 MW will be kept on the balance sheet. The value of the projects to own was estimated by dividing the assets into technology, country and start of the operation year, as can be observe by Table 6.3.

Develop to Own							
Country	Technology	2022	2023	2024	2025	2026	Accumulated
Poland	Solar PV	51	51	51	16	16	185
Portugal	Solar PV	25	25	25	63	63	200
Romenia	Solar PV	0	0	0	15	15	30
Greece	Solar PV	36	36	36	1	1	111
Italy	Solar PV	21	21	21	3	3	70
Bulgaria	Solar PV	5	5	0	0	0	11
Poland	Wind	25	25	25	50	25	151
Greece	Wind	0	12	12	12	0	36
Serbia	Wind	0	0	33	33	33	98
Romenia	Wind	0	0	9	9	9	26
Total		164	176	212	202	165	**918**

Table 6.3. Assets to keep in the balance sheet, source: company reports, and authors estimates

The other 80% of the pipeline will be sold at the part of the value chain that Greenvolt believes it can deliver the most value, the ready to build stage (RTB). This will enable Greenvolt to crystalize the investment value while recycling value for future growth.

A production schedule was made, according to Greenvolt's predictions. Then a multiple for the exit values, according to observations and predictions V-Ridium prediction, was multiplied by the production for each country and technology. In our model the RTB portfolio represents around 4900 MW. The following is the schedule for the Development to Sell strategy.

Ready to Build (to sell)							
Country	**Technology**	**2022**	**2023**	**2024**	**2025**	**2026**	**Accumulated**
Poland	Solar PV	193	193	193	60	60	698
Portugal	Solar PV	93	93	93	237	237	752
Romenia	Solar PV	0	0	0	57	57	115
Greece	Solar PV	137	137	137	4	4	418
Italy	Solar PV	79	79	79	13	13	264
Bulgaria	Solar PV	20	20	0	0	0	40
Poland	Wind	95	95	95	189	94	567
Greece	Wind	0	45	45	45	0	135
Serbia	Wind	0	0	112	112	112	337
Romenia	Wind	0	0	33	33	33	99
Poland	Storage	0	471	471	471	0	1412
Total		616	1131	1257	1221	611	**4836**

Table 6.4. Asset for the RTB strategy, source: company reports, and authors estimates

The following is the revenue forecast for both asset rotation and assets to own:

(values in thousands of €)	2021	2022F	2023F	2024F	2025F	2026F	2027F	2028F
Sales	1 839	138 991	160 039	202 670	224 659	211 307	214 260	217 318
From Asset Rotation		119 984	127 879	150 652	153 725	124 568	124 568	124 568
From Assets to Own		19 007	32 160	52 017	70 934	86 740	89 693	92 750
YoY Growth		7457%	15%	27%	11%	-6%	1%	1%

Table 6.5. Revenue forecast for utility scale wind and solar, source: company reports, and authors estimates

6.1.3. Decentralized Generation

On a global scale the decentralized generation sector is expected to have significant growth in the coming years. Portugal and Spain are under-penetrated areas in the segment, despite the good irradiation levels in Iberia.

Decentralized Generation is a relatively new segment, and Greenvolt is still exploring the different business models depending on the segments targeted and different positions. Profit Energy specializes in the development of self-consumption projects to commercial and industrial businesses (B2B) in Portugal, and Perfecta Energía in the residential customers (B2C) in Spain.

To forecast revenues for the year 2022, it was considered that the secured portfolio would reflect revenues for 2022, and we compared it with the amount of revenues for 2021. With the

assumption that the average project remains the same, for 2022 the revenue forecast more than tripled, when compared with 2021. For the rest of the forecasting period the model predicts that sales will follow the growth trajectory of the market of 12%.

(values in thousands €)	2021	2022F	2023F	2024F	2025F	2026F	2027F	2028F
Total Revenues	8 665	32 121	35 976	40 293	45 128	50 544	56 609	63 402
YoY Growth		271%	12%	12%	12%	12%	12%	12%

Table 6.6. Revenue forecast decentralized generation, source: company reports, and authors estimates

6.1.4. Operational Expenses & Earnings Before Interest and Taxes (EBIT)

Greenvolt has unique advantages in every sector in which it operates. In the biomass sector has extensive experienced professionals, and high-quality assets which deliver more efficient results than competition. In the utility scale wind and solar the firm has access to a large pipeline of products and has expertise in the most valuable part of the value chain, the development phase. In decentralized generation Greenvolt aims to take advantage of under-penetrated markets with higher irradiation and benefit from attractive inorganic growth opportunities.

With declining LCOE's for solar and wind solutions in both grid and off-grid solutions and stable costs of biomass energy, it was assumed in general a continuation of the current cost structure. For each item of costs, a historical average between 2018 and 2021 was applied in 2022 and beyond.

(values in thousands €)	2022F	2023F	2024F	2025F	2026F	2027F	2028F
Revenues	339 752	351 312	400 881	430 798	426 030	438 296	451 476
Operational Costs:							
Costs of Revenue	(110690)	(121122)	(136887)	(146557)	(145280)	(149379)	(153766)
External supplies and Services	(68206)	(73669)	(82340)	(86809)	(85457)	(87472)	(89604)
Administrative Expenses	(11587)	(13322)	(14978)	(15479)	(16014)	(16587)	(17202)
Other Expenses	(7166)	(8229)	(10373)	(11479)	(10807)	(10956)	(11110)
EBITDA	**142 104**	**134 969**	**156 304**	**170 475**	**168 472**	**173 902**	**179 795**
Depretiation & Amortization	(32394)	(44058)	(59331)	(75454)	(87741)	(96298)	(104936)
Impairment and losses	0	0	0	0	0	0	0
EBIT	**109 710**	**90 911**	**96 973**	**95 021**	**80 730**	**77 605**	**74 860**

Table 6.7.Forecasted revenues and cost structure, source: company reports, and authors estimates

6.1.5. CAPEX & Depreciation

It is expected heavy investments in property, plants & equipment, namely with a strong investment phase in solar panels and wind turbines. For the biomass sector an extension on one of the plants was considered, Constância plant, and a maintenance CAPEX was added as well.

The depreciation rate used for the wind turbines and solar panels was 8% (in agreement with Portuguese depreciation tables). For the rest of the assets it was applied the historical depreciation average (for more information check annexes I and J).

6.1.6. Working Capital

Looking at the historical data of the firm, it reveals that current assets have been inferior to the current liabilities, although the differences between them reduced over time. In 2021 with the capital increase current assets increased significantly, causing the working capital to become positive.

The forecast for inventories, accounts receivable, and accounts payable were based on a 4-year average of the days of inventory outstanding, days of sale outstanding and days of payable outstanding. The components were achieved based on the historical average weight on revenues (see annex G).

6.1.7 Dividends

Although having always had positive earnings in the end of the year, Greenvolt has not paid any dividends. During the forecasted period no dividends are expected, due to the growth opportunities in the sector.

6.2. Weighted Average Cost of Capital (WACC)

6.2.1. Capital Structure

To estimate the target for the capital structure of Greenvolt, an estimate for the Market Value of Debt and for the Market Value of Equity was made. The Market Value of Equity was achieved by multiplying the number of shares outstanding by its stock price (the closing price on 31st of December 2021). It was considered that the book value of Debt was a good proxy for its Market Value.

Shares Outstanding (in Millions)	121,38
Share Price	6,35 €
Market Value of Equity (in Millions of €)	707,74
Market Value of Debt (in Millions of €)	654,59
Debt to Equity	92,49%

Table 6.8. Capital structure, source: company reports, and authors estimates

6.2.2. Risk-Free Rate and The Country Risk Premium

The 10-year German Government bond Rate was the security chosen as the risk-free asset. The yield of the German bond was 0,971%. The difference between 10-year Portuguese and the German Government bond rate was computed in order to find the Country Risk Premium. The yield of the Portuguese Bond was 2,056%. Thus, the country risk premium for Portugal is 1,085%.[8]

6.2.3. Beta Unlevered and Beta Levered

In order to estimate the Equity Beta, the bottom-up approach was followed. To perform this technique, we selected 11 different comparable firms that operate in the energy sector, this creates a group of firms with relatively similar cash flow potential and risk.

Company	Market Cap (values in Million €)	Adjusted Beta	Tax Rate	D/E	Unlevered Beta
Greenvolt	**770,7**	**1,031**	**26,85%**	**84,93%**	**0,636**
Acciona	9221,4	0,831	30,15%	31,80%	0,680
Albioma	1107,2	0,869	25,22%	201,40%	0,347
Drax	2873,8	0,66	54,65%	115,70%	0,433
EDP R	20778,1	1,128	15,58%	54,10%	0,774
Encavis	2501,7	0,862	-0,10%	215,80%	0,273
Ence	557,6	1,207	25,67%	104,60%	0,679
Grenergy	809,9	0,749	11,60%	195,80%	0,274
Orsted	47180,4	1,146	18%	215,80%	0,414
Solar Pack	879,5	0,813	10%	263%	0,241
Solaria	2139,2	0,711	14,56%	270%	0,215
Voltalia	1983,8	0,67	-0,20%	156,30%	0,261
Average Greenvolt Peers	**8184,8**	**1,056**	**18,87%**	**155,83%**	**0,511**
Median Greenvolt Peers	2320,4	0,822	13,08%	205,80%	0,274
Levered Beta Greenvolt	**0,828**				

Table 6.9. Bottom-up approach, source: Bloomberg

According to the sample of peer companies collected, the average Beta Unlevered is 0,511. By adjusting the Beta Unlevered to the Debt to Equity ratio and the Marginal Tax rate we estimate the levered beta for Greenvolt as 0,828.

6.2.4 Market Risk Premium

For the Equity Risk Premium, we opted to follow the Statista estimates for the Portuguese risk premium, which was 6,8%.

8 German and Portuguese bond rate as of 2nd of May.

6.2.5. Cost of Equity

Now that we have gathered all the components of the equity required rate of return - risk-free rate, country risk premium, beta levered and market risk premium - we are now able to compute it. Using the CAPM model the cost of equity is 7,69%.

6.2.6. Cost of Debt

Since there are no information regarding the yield of the debt, we decided to estimate a synthetic rating as Damodaran (2002) suggests. The author suggests that to find the cost of debt we need to add to the risk-free rate, a default spread based on the quality of debt, associated with the firm's coverage ratio. Greenvolt has a coverage ratio of 3,129, which corresponds to a default spread of 3,5%. To this we need to add the risk-free rate, 0.971%, and discount the marginal tax rate 26,85%. Using formula (9)[9], the after-tax cost of debt is 4,47%.

6.2.7. Weighted Average Cost of Capital (WACC) calculation

Now that we have all the component necessary to compute the WACC by applying formula (6)[10] we arrive at a 5,66% discount rate. The following is a summary of the steps necessary to arrive at the WACC.

Risk-Free Rate	0,97%
Country Risk Premium	1,09%
Market Risk Premium	6,80%
Default Risk	3,50%
Cost of Debt	4,47%
Tax Rate	26,85%
After Tax Cost of Debt	**3,27%**
D/(E+D)	45,93%
E/(E+D)	54,07%
Unlevered Beta	0,511
Levered Beta	**0,828**
Cost of Equity	**7,69%**
WACC	**5,66%**

Table 6.10. WACC calculation, source: author estimates

9 After-tax cost of Debt = Pre-tax cost of Debt (1 – Tax Rate)

10 WACC= $r_E \times \frac{E}{E+D} + r_D \times \frac{D}{E+D} \times (1 - t_m)$

6.3. Discounted Cash Flow (DCF) Valuation

The following forecast is based on the projections made on the previous section. By projecting Revenues, Operational expenses, CAPEX, Depreciations and Amortizations and working capital, we are able to compute the Free Cash Flow to the firm. To discount the cash flows the WACC rate was used.

6.3.1. Terminal Value and Growth rate estimate

In what concerns the perpetual growth rate of the company, we believe that the company will grow at a similar pace than the markets that the Greenvolt is in. The three main markets that the firm is in (biomass, solar and wind) are projected to grow significantly until 2030.

In Europe, the CAGR until 2030 of biomass, wind and solar are 5%, 5% and 6%, respectively. Although until 2030 the biomass, wind and solar are expected to grow at between 5% and 6% yearly rate, it is not expected to continue to grow at the same rate in the future.

We used an IRENA report to estimate the growth rate. This report shows that the installed capacity is expected to grow at an 1,77% rate between 2050 and 2030, for bioenergy, solar and wind. The prospects until 2050 seem reliable, and investment in these markets appear to continue thereafter. Thus, the 1,77% will be used as the growth rate for our cash flows.

The terminal value was determined by using equation (14) to the cash flow after the forecasted period, the cash flow of the year 2028. For the perpetuity, the discount rate used was the WACC subtracted to the perpetuity growth rate.

The terminal value is 2001,436 M€ and discounted at the WACC rate is 1361,472 M€. To this will added the present value of the cash flows on the forecasted period, to get to the enterprise value.

6.3.2. Fair Value

The sum of the present value (PV) of all future cash flows is the Enterprise value. The estimated enterprise value is 1250,614 M€.

To arrive at the equity value, there were some adjustments made to the Enterprise Value, which included:

- Adding Non-Operating Assets to the Enterprise Value. Non-Operating Assets contains the items “Cash & Cash Equivalents” and “Other tax assets”, which amounted to 262,448M€;

- Subtracting Non-Equity Claims, to the Enterprise Value. Non-Equity Claims which involves items such as "Bonds", "Loans", and other debt sorts. This amounted to 478,126M€.

We arrive at the implied equity value, the total value of all shares outstanding, of 1034,936 M€. Thus, our model predicts that the fair value of the share price is 8,53€, which means a downside potential of 34,28%.

(values in thousands €)	2022F	2023F	2024F	2025F	2026F	2027F	2028F
EBIT	108 908	90 151	96 260	94 360	114 010	116 112	117 566
Tax Rate (%)	26,85%	26,85%	26,85%	26,85%	26,85%	26,85%	26,85%
NOPLAT	**79 666**	**65 945**	**70 414**	**69 024**	**83 399**	**84 936**	**85 999**
D&A	36 788	48 560	63 943	80 179	92 581	101 256	110 015
Changes in NWC	13 895	-3 492	6 096	3 566	-761	1 365	1 479
CAPEX	131 109	157 331	198 144	209 100	161 509	115 267	116 708
FCFF	**-28 549**	**-39 333**	**-69 883**	**-63 463**	**15 232**	**69 560**	**77 827**
WACC	**5,66%**						
Growth Rate	**1,77%**						
Discounted FCFF	**-27 020**	**-35 233**	**-59 246**	**-50 922**	**11 568**	**49 996**	
Terminal Value							**2 001 436**
Dicounted TV	**1 361 472**						
Enterprise Value	1 250 614						
Non Operating Assets	262 448						
Non Equity Claims	478 126						
Equity Value	**1 034 936**						
Number of Shares Outstanding	121 376						
Target Price	**8,53**						
Actual Price as of 31 Dec 2021	6,35						
Upside/ Downside	34,28%						

Table 6.11. DCF Analysis source: company reports, and author estimates

6.3.3. Sensitivity Analysis

This section aims to understand the effects of variations in the main value drivers on the target price. For this purpose, we chose firstly to test the discount rate and the growth rate and then the EBIT. We created optimistic scenarios and pessimistic ones, where we assess the different variations in the variables.

The discount rate and growth rate are two variables, which impact greatly the value of the firm. If any of the components of the WACC changed significantly, for instance the risk-free rate or the cost of debt, this could change the value of the firm. Similarly, an acceleration or a break in the growth rate will have an impact on valuation.

For the growth rate, besides the base case, we included an increase and a decrease of 0,2pp and 0,4pp, whereas for the discount rate, apart from the base case, we included a rise/ decline of 0,5pp and 1pp.

	WACC					
Growth		4,66%	5,16%	5,66%	6,16%	6,66%
	1,37%	€11,47	€9,20	€7,48	€6,12	€5,04
	1,57%	€12,39	€9,86	€7,98	€6,51	€5,34
	1,77%	€13,43	€10,60	€8,53	€6,93	€5,67
	1,97%	€14,63	€11,44	€9,13	€7,39	€6,03
	2,17%	€16,02	€12,38	€9,81	€7,89	€6,41

Table 6.12. Sensitivity analysis WACC and growth source: company reports, and author estimates

In the Table 6.12. we can observe the different combination of share prices, according to different WACC and growth rates. In orange are the prices at which our model would deliver a lower valuation than the one observed in 31st of December 2021, while in white are the share prices above the observed price. These scenarios allow the price to fluctuate between 16,02€ and 5,04€. It is noticeable that the price is sensitive to changes in both the WACC and the growth rate.

Furthermore, we tested how the profitability of the company would change the target price, by changing the absolute value of EBIT every year. These variations aim to understand the impact of rising or lowering revenues or operational costs.

EBIT				
-20%	-10%	0%	10%	20%
€5,43	€6,98	€8,53	€10,07	€11,62

Table 6.13. Sensitivity analysis EBIT source: company reports, and author estimates

For EBIT besides the base case, we included as an optimistic scenario an increase of 10% and 20%. As a pessimistic scenario a decrease of 10% and 20% was added as well. As can be observed in Table 6.13., these scenarios allow the price to fluctuate between 11,62€ and 5,43€.

6.4. Relative Valuation

In order to assess and compare Greenvolt share price relative to other similar firms a Relative Valuation was performed. The companies chosen in Table 6.14. are from the energy market. They are distributed between traditional biomass market, Iberian renewable market, and pure renewable players focused on wind and solar PV. Eleven comparable companies were selected,

and they are all based in Europe. The multiples chosen to evaluate were the enterprise value to EBITDA (EV/EBITDA), price to earnings (P/E) and price to book ratio (P/BV).

Company	Country	Market Cap (values in Million €)	EV/EBITDA	P/E	Price/ Book Value
Greenvolt	**Portugal**	**770,7**	**17,95**	**63,5**	**2,49**
Acciona	Spain	9 221,4	11,8	29,55	2,16
Albioma	France	1 107,2	9,9	26,6	3,14
Drax	UK	2 873,8	9,11	43,53	1,88
EDP R	Spain	20 778,1	15,41	31,29	2,4
Encavis	Germany	2 501,7	14,5	29,92	3,05
Grenergy	Spain	809,9	26,37	49,66	5,08
Neoen	France	3 795,5	22,95	89,53	2,99
Orsted	Denmark	47 180,4	16,51	34,57	5,48
Solar Pack	Spain	879,5	20,39	92,9	5,78
Solaria	Spain	2 139,2	28,42	45,05	8,65
Voltalia	France	1 983,8	20,17	266,69	2,79
Average Greenvolt Peers		**8 479,1**	**16,17**	**41,49**	**4,18**
Median Greenvolt Peers		2 501,7	16,51	43,53	3,05
Greenvolt Multiple Equity Value			717 817	472 699	1 068 616
Number of shares Outstanding			121 376	121376	121 376
Greenvolt Multiple Share Price			**5,91**	**3,89**	**8,80**
Actual Price at 31st Dec 2021			6,35	6,35	6,35
Upside/ Downside			-6,87%	-38,67%	38,65%

Table 6.14. Relative valuation analysis, source: Bloomberg, and authors estimates [11]

To reach the implied share price of each multiple the following process was followed:

- A geometric average of the EV/EBITDA multiple was calculated. By multiplying the actual $EBITDA_{2021}$ to the average multiple, we achieve the enterprise value. Adjusting it to the non-operating assets and non-equity claims, we get the Equity Value of 717,817 M€. This shows an implied share price of 5,91€, representing a downside potential of 6,87% of the actual share price;
- A geometric average of the P/E multiple was calculated from the peer companies, delivering a 41,49X average multiple. By multiply the actual Net Income with the P/E ratio we get the Implied Equity Value. Adjusting it to the number of shares outstanding, it delivers a share price of 3,89 €, which provides a downside potential of 38,57%;
- The geometric average of the Price/ Book Value was computed, which resulted in a 4,18X average multiple. By multiplying the actual book value to the P/BV multiple we

[11] There were some adjustments made to reach the results, for more information check the annex section

get the implied Equity Value 1068,616 M€. By dividing the equity value with the number of shares outstanding, we get the implied share price of 8,80€, delivering an upside potential of 38,65%.

6.5. Valuation Results

The actual share price, when compared with the fair values delivered by the DCF and the relative valuation, have been slightly different.

Results from the relative valuation range between 3,89€ and 8,80€. Although EV/EBITDA is relatively close to the actual price, P/E and Price/ Book Value is 38% has a downward and upward potential, respectively. These differences are significant and may have to do with the peer group selected. The peer group is composed by different sized firms, located in different geographies and in slightly different markets.

The price of the DCF model is 34,28% above the actual price of the shares, as of 31st of December 2021. A significant proportion of the value comes from the terminal value (perpetuity), which is highly influenced by the growth rate and weighted average cost of capital chosen. Shareholders might believe that either the cost of capital should be lower, or future cash flows might be higher (or both). On one hand, if we believe that the cost of capital is correct, the required growth rate investors expect is 0,83%, at the end of the forecasted period. On the other hand, if the growth rate is accurate, investors would be expecting that the required rate of capital is 6,37%.

The sensitivity analysis in Tables 6.12 and 6.13, predicts different scenarios. The share price range for the different scenarios is between 5,04€ and 16,02€.

In Figure 6.1, we can observe the different models used during this analysis and the different results.

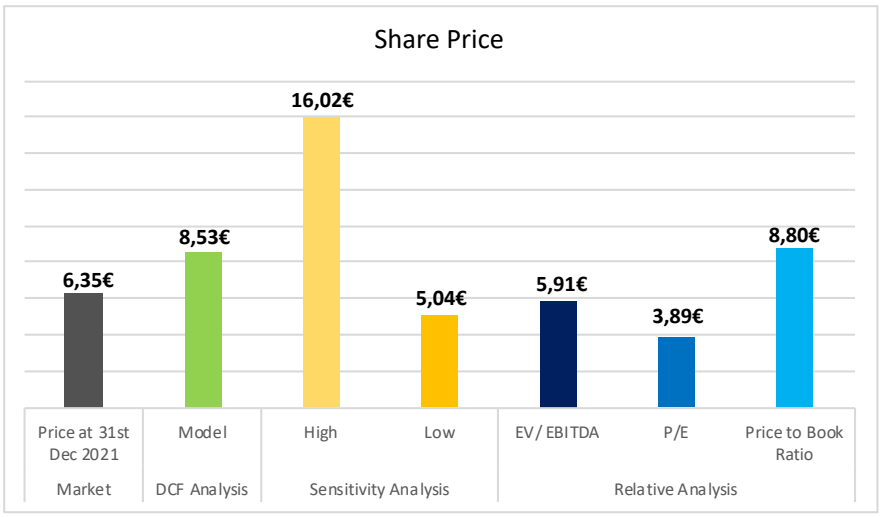

Figure 6.1. Comparing the different valuation models, source: authors estimates

Conclusion

The aim of this project was to find the fair value of Greenvolt Energias Renováveis S.A. and to compare it to the share price on the 31st of December 2021. A DCF analysis was performed, as well as a relative valuation and sensitivity analysis.

In the Literature Review was set an overview of the main methodologies used in the equity valuation process. This allowed us to further improve my understanding of the insights of equity valuation. The following step was an analysis on the external and internal environment was made. A wide variety of topics were discussed, from which we can highlight the price escalation on energy sources, the growth in energy markets and the different opportunities for Greenvolt's further expansion. This enabled me to make decisions regarding the valuation method and forecasting assumptions.

On the DCF valuation, we selected the free cash flow to the firm approach. We forecasted cash flows that were discounted at the WACC, which is the return that both equity and debt holders demand. In the relative valuation approach a group of firms with similar risks and cash flow potential were selected. Three multiples were selected: P/E ratio, EV/EBITDA and P/BV.

The DCF analysis result shows that the share price of Greenvolt, as of 31st December 2021 was underpriced by 34,28%. However, in the sensitivity analysis we explore different scenarios where the share price could be either underpriced or overpriced. The relative approach does not show clear results, has the EV/EBITDA and the P/E indicate that the share price is overvalued by 6,87% and 38,67% respectively, whereas the P/BV indicates that the share price is undervalued by 38,65%. According to our model investors were trading Greenvolt share price

below its true value at 31st of December 2021. This represents a gain in value of buyers and a loss in value for sellers of the Greenvolt's share.

The DCF model was built under the assumptions that the "Greenvolt February 2022 Presentation" would be fully followed. However if some setbacks take place the true value of the company might be lower.

More recently new information has been published by the company in "Greenvolt September 2022 Presentation", in which they believe that there may be some room for improvement in the value of the firm, for the following reasons. Firstly, because Greenvolt has positioned strategically in the energy market, in which the current trends favor energy independence, security supply and fight against the climate crisis. Secondly, the acquisition of TGPH, Profit Energy and Perfecta Energia might give additional value, as full integration is achieved and synergies within the company occur.

Other important aspects for this dissertation is the access to information inside and outside the company, which is limited. The information used is publicly available on the internet or on Bloomberg platform. This limitation had an impact on the quality of the assumptions of the model and the final result.

Lastly, future equity research on Greenvolt should consider both the impact of acquisitions and the current growth strategy. Greenvolt had a strong activity on the acquisition market and its growth strategy throughout Europe is on an early phase. Thus, its impact on the results of the company is still uncertain.

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Annexes

Annex A - Balance Sheet Assets: Historical

(in thousands €)	2017	2018	2019	2020	2021
Assets					
Non-Current Assets:					
Property, Plants and Equipment	117 250	144 916	166 810	160 466	370 016
Goodwill	0	0	0	0	123 900
Right-of-use assets	0	0	5 738	5 434	66 298
Intangible Assets	1 656	1 537	1 418	6 796	87 762
Other Investments	0	0	0	0	3 178
Other Receivables	0	0	0	0	3 338
Financial Derivatives	0	0	0	0	1 333
Deferred Tax Assets	644	2 337	2 503	1 494	20 474
Total Non-Current Assets	**119 551**	**148 790**	**176 469**	**174 190**	**676 299**
Current Assets:					
Inventories	538	1 501	3 042	1	875
Trade Receivables	0	0	0	19,58	13 106
Assets associated with contract	3 635	8 018	7 366	7 477	28 698
Other Receivables	27	2 478	988	12	20 566
Income tax receibable	0	0	0	0	680
Other tax assets	6	2 174	7	115	3 691
Other current assets	164	140	204	506	2 283
Cash and Cash Equivalents	13 145	6 707	16 107	14 101	258 757
Total Current Assets	**17 516**	**21 020**	**27 714**	**22 232**	**328 658**
Total Assets	**137 066**	**169 810**	**204 184**	**196 421**	**1 004 957**

Annex B - Balance Sheet Assets: Projections

(in thousands €)	2022F	2023F	2024F	2025F	2026F	2027F	2028F
Assets							
Non-Current Assets:							
Property, Plants and Equipment	464 442	573 320	707 630	836 665	905 707	919 837	926 651
Goodwill	123 900	123 900	123 900	123 900	123 900	123 900	123 900
Right-of-use assets	66 268	66 237	66 206	66 174	66 141	66 108	66 074
Intangible Assets	87 688	87 611	87 532	87 451	87 368	87 283	87 196
Other Investments	3 178	3 178	3 178	3 178	3 178	3 178	3 178
Other Receivables	3 338	3 338	3 338	3 338	3 338	3 338	3 338
Financial Derivatives	1 333	1 333	1 333	1 333	1 333	1 333	1 333
Deferred Tax Assets	20 474	20 474	20 474	20 474	20 474	20 474	20 474
Total Non-Current Assets	**770 620**	**879 391**	**1 013 592**	**1 142 513**	**1 211 440**	**1 225 451**	**1 232 144**
Current Assets:							
Inventories	3 887	4 020	4 587	4 929	4 875	5 015	5 166
Trade Receivables	16 340	16 896	19 280	20 719	20 490	21 080	21 714
Assets associated with contracts with	68 711	71 049	81 074	87 124	86 160	88 641	91 306
Other Receivables	37 998	39 291	44 835	48 181	47 647	49 019	50 493
Income tax receibable	445	923	954	1 089	1 170	1 157	1 190
Other tax assets	3 926	8 131	8 408	9 594	10 310	10 196	10 490
Other current assets	5 205	5 382	6 142	6 600	6 527	6 715	6 917
Cash and Cash Equivalents	359 736	379 286	370 430	357 108	354 932	361 160	364 891
Total Current Assets	**496 250**	**524 979**	**535 710**	**535 344**	**532 111**	**542 983**	**552 167**
Total Assets	**1 266 870**	**1 404 370**	**1 549 302**	**1 677 858**	**1 743 551**	**1 768 434**	**1 784 312**

Annex C - Balance Sheet Liabilities and Equity: Historical

(in thousands €)	2017	2018	2019	2020	2021
Equity and Liabilities					
Equity					
Share capital	50	50	50	50	267 100
Legal Reserve	10	10	10	10	10
Emission Bonuses	0		0	0	773
Supplementary capital	13 150	13 150	13 150	9 584	0
Other reserves and retined earnings	15 014	15 014	19 773	39 718	33 951
Consolidated Net Profit for the year to Equity holders of the parent company	0	5 203	6 795	17 934	8 016
Total equity attributable to Equity holders of the parent	**28 224**	**33 427**	**39 778**	**67 296**	**309 850**
Non-controlling interests	0	0	13	15	40 516
Total Equity	**28 224**	**33 427**	**39 792**	**67 311**	**350 366**
Liabilities					
Non-Current Liabilities:					
Interest Bearing Liabilities	43 266	0	49 674	48 464	448 029
Lease Liabilities	0	0	6 089	5 837	67 071
Other payables	0	0	0	820	16 289
Other non-current liabilities	1 339	1 106	834	612	389
Deferred tax liabilities	3 078	3 048	2 845	3 258	32 920
Provisions	9 194	9 238	11 388	11 538	15 867
Total non-current liabilities	**56 877**	**13 392**	**70 829**	**70 529**	**580 566**
Current Liabilities:					
Interest Bearing Liabilities	39 228	111 314	74 891	41 552	30 097
Lease Liabilities	0	0	274	284	877
Trade Payables	4 715	6 914	11 932	8 538	17 858
Other Payables	6 825	3 463	1 955	3 939	15 809
Income tax payable	183	945	151	3 412	1 214
Other tax liabilities	667	0	4 012	566	1 870
Other current liabilities	347	355	349	290	6 301
Total current liabilities	51 965	122 991	93 563	58 582	74 025
Total Liabities	**108 842**	**136 383**	**164 392**	**129 110**	**654 591**
Total Equity and Liabilities	**137 066**	**169 810**	**204 184**	**196 421**	**1 004 957**

Annex D - Balance Sheet Liabilities and Equity: Projections

(in thousands €)	2022F	2023F	2024F	2025F	2026F	2027F	2028F
Equity and Liabilities							
Equity							
Share capital	267 100	267 100	267 100	267 100	267 100	267 100	267 100
Legal Reserve	10	10	10	10	10	10	10
Emission Bonuses	773	773	773	773	773	773	773
Supplementary capital	0	0	0	0	0	0	0
Other reserves and retined earnings	41 967	102 485	147 471	194 631	238 060	270 188	300 610
Consolidated net profit for the year to	60 517	44 986	47 160	43 429	32 128	30 422	29 069
Total equity attributable to Equity hol	370 367	415 354	462 513	505 943	538 071	568 493	597 562
Non-controlling interests	40 516	40 516	40 516	40 516	40 516	40 516	40 516
Total Equity	**410 883**	**455 870**	**503 029**	**546 459**	**578 587**	**609 009**	**638 077**
Liabilities							
Non-Current Liabilities:							
Interest Bearing Liabilities	573 241	642 042	720 115	788 662	814 410	802 282	787 773
Lease Liabilities	67 071	67 071	67 071	67 071	67 071	67 071	67 071
Other payables	16 289	16 289	16 289	16 289	16 289	16 289	16 289
Other non-current liabilities	389	389	389	389	389	389	389
Deferred tax liabilities	32 920	32 920	32 920	32 920	32 920	32 920	32 920
Provisions	15 867	15 867	15 867	15 867	15 867	15 867	15 867
Total non-current liabilities	**705 777**	**774 579**	**852 652**	**921 199**	**946 946**	**934 819**	**920 309**
Current Liabilities:							
Interest Bearing Liabilities	60 297	76 101	82 962	91 680	100 559	103 826	101 589
Lease Liabilities	1 385	1 516	1 713	1 834	1 818	1 869	1 924
Trade Payables	48 236	52 783	59 653	63 867	63 310	65 097	67 008
Other Payables	30 889	33 800	38 199	40 898	40 541	41 685	42 909
Income tax payable	4 131	4 271	4 874	5 237	5 179	5 329	5 489
Other tax liabilities	4 978	5 147	5 874	6 312	6 242	6 422	6 615
Other current liabilities	294	304	347	372	368	379	390
Total current liabilities	150 210	173 921	193 621	210 200	218 019	224 607	225 925
Total Liabities	**855 987**	**948 500**	**1 046 273**	**1 131 399**	**1 164 965**	**1 159 425**	**1 146 234**
Total Equity and Liabilities	**1 266 870**	**1 404 370**	**1 549 302**	**1 677 858**	**1 743 551**	**1 768 434**	**1 784 312**

Annex E - Income Statement: Historical Data

(in thousands €)	2018	2019	2020	2021
Sales	50 537	64 283	89 878	130 710
Provision of services	0	0	0	9 935
Other Income	3 313	851	222	861
Costs of Sale	-19 870	-24 881	-39 029	-43 238
External supplies and Services	-13 518	-17 471	-17 920	-34 273
Administrative Expenses	0	0	0	-6 442
Provisions and impairment reversal/ (losses) in current assets	0	0	0	-147
Other Expenses	-365	-82	-130	-589
Income/Expenses relative to investments	0	0	0	-276
Operating profit before amortization and depreciation and Impairment reversals/ (losses) in non-current assets	**20 098**	**22 701**	**33 021**	**56 541**
Amortization and Depreciation	-7 765	-10 623	-12 148	-25 980
Impairment reversals/ (losses) in non-current assets	-5 500	0	6 336	0
Operating Profit	**6 833**	**12 078**	**27 208**	**30 561**
Financial Expenses	-621	-1 872	-1 781	-9 056
Financial Income	0	0	0	-709
Profit before income tax and CESE	**6 213**	**10 206**	**25 427**	**20 796**
Income Tax	-1 010	-2 616	-6 413	-8 389
Energy Sector Extraordinary Contribution (CESE)	0	-797	-1 079	-1 015
Net Profit	**5 203**	**6 792**	**17 936**	**11 392**
Attributable to:				
Equity holders of the parent	5 203	6 795	17 934	8 016
Non-controlling interests	0	-4	-9	4 794
	5 203	6 792	17 926	12 810
Earnings per Share				
Basic	0,52	0,68	1,79	0,10
Diluted	0,52	0,68	1,79	0,10

Annex F - Income Statement: Forecasts

(in thousands €)	2022F	2023F	2024F	2025F	2026F	2027F	2028F
Revenues	339 752	351 312	400 881	430 798	426 030	438 296	451 476
Operational Costs:							
Costs of Revenue	-110 690	-121 122	-136 887	-146 557	-145 280	-149 379	-153 766
External supplies and Services	-68 206	-73 669	-82 340	-86 809	-85 457	-87 472	-89 604
Administrative Expenses	-11 587	-13 322	-14 978	-15 479	-16 014	-16 587	-17 202
Other Expenses	-7 166	-8 229	-10 373	-11 479	-10 807	-10 956	-11 110
EBITDA	142 104	134 969	156 304	170 475	168 472	173 902	179 795
Depretiation & Amortization	-32 394	-44 058	-59 331	-75 454	-87 741	-96 298	-104 936
Impairment and losses	0	0	0	0	0	0	0
EBIT	109 710	90 911	96 973	95 021	80 730	77 605	74 860
Financial Expenses	-26 980	-29 412	-32 503	-35 651	-36 809	-36 016	-35 121
Financial Income	0	0	0	0	0	0	0
Profit before income tax and CESE	**82 730**	**61 499**	**64 470**	**59 370**	**43 921**	**41 589**	**39 738**
Income Tax	-21 510	-15 990	-16 762	-15 436	-11 419	-10 813	-10 332
Energy Sector Extraordinary Contribution (CESE)	-703	-523	-548	-505	-373	-354	-338
Net Profit	60 517	44 986	47 160	43 429	32 128	30 422	29 069

Annex G - Working Capital: Forecasts

(in thousands €)	2022F	2023F	2024F	2025F	2026F	2027F	2028F
Current Assets:							
Inventories	3 887	4 020	4 587	4 929	4 875	5 015	5 166
Accounts Receivable	85 052	87 945	100 354	107 843	106 650	109 720	113 020
Other Current Assets	43 203	44 673	50 977	54 781	54 175	55 734	57 410
State and Other Public Entities	9 054	9 362	10 683	11 480	11 353	11 680	12 032
Total	141 197	146 000	166 601	179 034	177 052	182 150	187 627
Current Liabilities:							
Accounts Payable	80 510	88 098	99 565	106 598	105 670	108 651	111 842
Other Payable Liabilities	11 711	12 109	13 818	14 849	14 685	15 107	15 562
State and Other Public Entities	9 109	9 418	10 747	11 549	11 422	11 750	12 104
Total	**101 329**	**109 626**	**124 130**	**132 996**	**131 776**	**135 509**	**139 507**
Net Working Capital	**39 867**	**36 375**	**42 471**	**46 037**	**45 277**	**46 641**	**48 120**
Changes in Net Working Capital	**13 895**	**-3 492**	**6 096**	**3 566**	**-761**	**1 365**	**1 479**
Assumptions:							
Days of Inventory Outstanding (in % of Revenues)	4,2	4,2	4,2	4,2	4,2	4,2	4,2
Days of Sale Outstanding (in % of Revenues)	91,4	91,4	91,4	91,4	91,4	91,4	91,4
Other Current Assets (in % of Revenues)	12,72%	12,72%	12,72%	12,72%	12,72%	12,72%	12,72%
State and Other Public Entities (in % of Revenues)	2,66%	2,66%	2,66%	2,66%	2,66%	2,66%	2,66%
Days Payable Outstanding	261,85	261,85	261,85	261,85	261,85	261,85	261,85
Other Payable Liabilities (in % of Revenues)	3,45%	3,45%	3,45%	3,45%	3,45%	3,45%	3,45%
State and Other Public Entities- Liabilities (in % of Revenu	2,68%	2,68%	2,68%	2,68%	2,68%	2,68%	2,68%

Annex H - Debt Map: Forecasts

(in thousands €)	2021	2022F	2023F	2024F	2025F	2026F	2027F	2028F
Interest-bearing Liabilities:								
Current interest-bearing liabilities:	30 097	60 297	76 101	82 962	91 680	100 559	103 826	101 589
Old non-current interest-bearing liabilities		478 126	527 340	574 884	635 296	696 822	719 462	703 960
New non-current interest-bearing liabilities		95 115	114 702	145 231	153 366	117 588	82 820	83 812
Total non-current interest-bearing liabilities	**448 029**	**573 241**	**642 042**	**720 115**	**788 662**	**814 410**	**802 282**	**787 773**
Total interest bearing liabilities	**478 126**	**633 538**	**718 143**	**803 077**	**880 343**	**914 969**	**906 109**	**889 362**
Debt payments		30 097	60 297	76 101	82 962	91 680	100 559	103 826
Net interest bearing liabilities	**478 126**	**603 441**	**657 846**	**726 977**	**797 381**	**823 288**	**805 550**	**785 536**

Annex I - CAPEX: Forecasts

(in thousands €)	2022F	2023F	2024F	2025F	2026F	2027F	2028F
Capex:							
Biomass	2 000	12 143	2 000	2 000	2 000	2 000	2 000
U.S. Solar PV	88 950	88 950	85 579	63 291	63 291	78 012	78 012
U.S. Wind	32 658	48 246	102 033	134 684	86 438	24 754	25 398
DG	3 212	3 598	4 029	4 513	5 054	5 661	6 340
Total Capex	**126 819**	**152 936**	**193 642**	**204 488**	**156 784**	**110 427**	**111 750**

Annex J – Depreciations & Amortizations: Forecasts

(in thousands €)	2022F	2023F	2024F	2025F	2026F	2027F	2028F
PP&E	32 394	44 058	59 331	75 454	87 741	96 298	104 936
Right-use	1 487	1 518	1 549	1 581	1 614	1 647	1 681
Intangible Assets	2 907	2 984	3 063	3 143	3 226	3 312	3 399
Depreciations & Amortizations	**36 788**	**48 560**	**63 943**	**80 179**	**92 581**	**101 256**	**110 015**

Annex K – Relative Valuation EV/EBITDA

Company	Country	Market Cap (in Millions €)	EV/EBITDA
Greenvolt	**Portugal**	**770,7**	**17,95**
Acciona	Spain	9 221,4	11,8
Albioma	France	1 107,2	9,9
Drax	UK	2 873,8	9,11
EDP R	Spain	20 778,1	15,41
Encavis	Germany	2 501,7	14,5
Grenergy	Spain	809,9	26,37
Neoen	France	3 795,5	22,95
Orsted	Denmark	47 180,4	16,51
Solar Pack	Spain	879,5	20,39
Solaria	Spain	2 139,2	28,42
Voltalia	France	1 983,8	20,17
Average Greenvolt Peers		**8 479,1**	**16,17**
Median Greenvolt Peers		2 501,7	16,51
Greenvolt EBITDA			56 541
Greenvolt Multiple EV			933 495
Non-Operating Assets			262 448
Non-Equity claims			478 126
Greenvolt Equity Value			717 817
Number of shares Outstanding			121 376
Greenvolt Multiple Share Price			**5,91**
Actual Price at 31st Dec 2021			6,35
Upside/ Downside			-6,87%

Annex L – Relative Valuation P/E

Company	Country	Market Cap (in Millions €)	P/E
Greenvolt	**Portugal**	**770,7**	**63,5**
Acciona	Spain	9 221,4	29,55
Albioma	France	1 107,2	26,6
Drax	UK	2 873,8	43,53
EDP R	Spain	20 778,1	31,29
Encavis	Germany	2 501,7	29,92
Grenergy	Spain	809,9	49,66
Neoen	France	3 795,5	89,53
Orsted	Denmark	47 180,4	34,57
Solar Pack	Spain	879,5	92,9
Solaria	Spain	2 139,2	45,05
Voltalia	France	1 983,8	266,69
Average Greenvolt Peers		**8 479,1**	**41,49**
Median Greenvolt Peers		2 501,7	43,53
Greenvolt Net Income			11 392
Greenvolt Equity Value			472 699
# of shares Outstanding			121 376
Greenvolt Multiple Share Price			**3,89**
Actual Price at 31st Dec 2021			6,35
Upside/ Downside			-38,67%

Annex M – Relative Valuation Price/ Book Value

Company	Country	Market Cap (in Millions €)	Price/ Book Value
Greenvolt	Portugal	770,7	2,49
Acciona	Spain	9 221,4	2,16
Albioma	France	1 107,2	3,14
Drax	UK	2 873,8	1,88
EDP R	Spain	20 778,1	2,4
Encavis	Germany	2 501,7	3,05
Grenergy	Spain	809,9	5,08
Neoen	France	3 795,5	2,99
Orsted	Denmark	47 180,4	5,48
Solar Pack	Spain	879,5	5,78
Solaria	Spain	2 139,2	8,65
Voltalia	France	1 983,8	2,79
Average Greenvolt Peers		**8 479,1**	**4,18**
Median Greenvolt Peers		2 501,7	3,05
Greenvolt Book Value			350 366
Greenvolt PBV Equity Value			1 068 616
# of shares Outstanding			121 376
Greenvolt Price / Book Value Share Price			**8,80**
Actual Price at 31st Dec 2021			6,35
Upside/ Downside			38,65%