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Equity Valuation: EDP Renováveis

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Master (MSc) in Finance

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

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BUSINESS
SCHOOL

Department of Finance

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Resumo

A escolha da EDP Renováveis (EDPR), subsidiária do Grupo Energias de Portugal e cotada no PSI-20, deve-se ao facto de ter como objetivos: a criação de valor, inovação e sustentabilidade ambiental. Esta opção também foi tomada por a EDPR registar um ótimo desenvolvimento nos últimos anos, especialmente na vertente financeira, contando com uma forte capacidade operacional, ativos excecionais e um sólido portfólio de projetos. Ainda para mais no setor das energias renováveis onde têm existido compromissos mundiais rigorosos, com o intuito de reduzir as emissões de gases, o que leva a perspetivas futuras bastante ambiciosas.

O valor da avaliação aponta para um enterprise value de € 30803, com um preço por ação de 23,79€. Foi elaborada a análise de sensibilidade para ter em conta o ambiente macroeconómico e a indústria onde a empresa se insere, vendo assim a evolução face a diferentes taxas de crescimento. A avaliação por múltiplos sustentou ainda mais os cálculos obtidos pelo modelo DCF, permitindo ver que a EDPR tem um crescimento superior à média das empresas das energias renováveis.

Esta equity valuation de grande utilidade prática, permite aos investidores terem grandes expectativas quanto ao crescimento da EDPR no mercado de energias renováveis, onde recomendamos a compra de ações.

Palavras-chave: EDP Renováveis; Energias Renováveis; Revisão de Literatura; Análise da Empresa; Análise do Setor; Valuation; Discounted Cash Flow; Múltiplos

Classificação JEL: G30, G32

Abstract

The choice of EDP Renováveis (EDPR), a subsidiary of the Energias de Portugal Group, listed in the PSI-20, is due to the fact that its goals are: value creation, innovation and environmental sustainability. This option was also taken because EDPR has recorded optimum development in the last few years, especially in the financial aspect, counting on a strong operational capacity, exceptional assets, and a solid project portfolio. All the more so in the renewable energies sector where strict world commitments have been made with the purpose of reducing gas emissions, leading to rather ambitious future perspectives.

The value of the evaluation points to an enterprise value of € 30803, with a price per share of 23,79€. A sensitivity analysis has been carried out to consider the macroeconomic environment and the industry in which the company is integrated, thus observing the evolution against different growth rates. The evaluation by multiples further substantiated the calculations obtained through the DCF model, showing that EDPR has had a growth above the average of the renewable energies' companies.

This equity valuation, with substantial practical usefulness, allows investors to hold great expectations as to the growth of EDPR in the renewable energies market, where the purchase of stock is recommended.

Keywords: EDP Renováveis; Renewable Energy; Literature Review; Company Analysis; Sector Analysis; Valuation; Discounted Cash Flow; Multiples

JEL classification: G30, G32

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Glossary

APV - Adjusted Present Value

CAGR - Compound Annual Growth Rate

CAPEX - Capital Expenditure

CAPM - Capital Asset Pricing Model

CEO - Chief Executive Officer

CF - Cash Flow

COVID-19 - Coronavirus Disease

CRP - Country Risk Premium

D&A - Depreciation and Amortization

DCF - Discounted Cash Flow

DDM - Dividend Discount Model

EBIT - Earnings Before Interest and Taxes

EBITDA - Earnings Before Interest, Taxes, Depreciation and Amortization

EDP- Energias de Portugal

EDPR - Energias de Portugal Renováveis

EPS - Earning Per Share

EU- European Union

EVA - Economic Value Added

EV/EBITDA - Enterprise Value-to-EBITDA

EV/Revenues - Enterprise Value-to-Revenues

FCFE - Free Cash Flow to Equity

FCFF - Free Cash Flow to the Firm

FTR - Financial Transmission Rights

GDP - Gross Domestic Product

GW - GigaWatt

GWEC - Global Wind Energy Council

IC - Invested Capital

IEA - International Energy Agency

MFS - Massachusetts Financial Services

MVA - Market Value Added

MW - MegaWatt

MWh - MegaWatt-hour

NER - New Entrants Reserve

NOPLAT - Net Operating Profit Less Adjusted Taxes

O&M - Operations and Maintenance

Opex/MWh - Operating expense-to-MegaWatt-hour

PER - Price to Earnings Ratio

PTCs - Production Tax Credits

PP&E - Property, Plant and Equipment

P/BV - Price to Book Value

P/E - Price-to-Earnings

ROA - Return on Assets

ROE - Return on Equity

ROIC - Return on Invested Capital

TSR - Total Shareholder Return

TWh - TeraWatt-hour

US – United States

WC - Working Capital

WACC - Weighted Average Cost of Capital

Introduction

EDP Renováveis (EDPR), founded in 2007, is world leader in the renewable energy sector and is considered to be the fourth greatest producer of wind power in the world. Through its history, EDPR has been concerned with sustainable development performance issues, namely with a solid development of its available assets, in creating value and innovation and also in the process of integration and recognition of its employees.

It is our purpose that the readers of this project may become acquainted and analyse somewhat further this subsidiary of EDP, EDP Renováveis, and also the sector where it operates. This project may also be rather useful for investors, since it shows the present financial behaviour of the organization, with several analyses of indicators and performances, as well as future projections with evaluation analyses. For that purpose, an in-depth analysis is required, considering several variables such as its position in the market, profitability and investment policy. Requiring a harmony, with an analysis of the external environment, namely the sector of activity, competition, the present political system and other macroeconomic variables (interest rates, for example). These external conjuncture variables are often out of the company's control. Logically, the time basis and the period of the company's report must be considered in order to evaluate more precisely, never disregarding its business model.

A mature institution such as EDP Renováveis, with a long financial history, will be much easier and suitable for evaluation than a young corporation or one in a troubled sector. The difficulty does not lie in the use of the models but on future estimates (cruise year).

The evaluation of a company such as EDP Renováveis is the central focus in fundamental analysis. Analysts use several models to evaluate companies. There are two models, to be explained further on in detail: discounted cash flow valuation and evaluation by multiples.

1.Literature Review

The literature review will be the starting point to analyse, synthesize and interpret, referring and explaining existing models. This review is indispensable in order to define equity valuation in a precise way, but also in order to gain a coherent knowledge of several concepts and definitions. Furthermore, it is also important to become aware of its omissions gaps and all this investigation will contribute to the development of one's knowledge which is in constant evolution.

"If you can`t describe what you are doing as a process, you don't know what you`re doing" (Deming,1993). Thus, some methods will subsequently be described, for identical purposes. One of the most important factor is the type of method that should be used to evaluate a company in an assertive way. As such, in order to make an economic evaluation of a company, one needs to identify all generated cash flows, by applying a set of valuation methods that will allow one to assess whether the company is or is not economically viable.

1.1. Discounted Cash Flow Methods (DCF)

The discounted cash flow model, or the present value of future monetary flows, determines the value of the company in a dynamic perspective rather than in a static perspective. This model is the foundation for construction of the evaluation of the other approaches.

The value of a company does not depend upon the current situation nor on its historical past, it depends fundamentally on its capacity to generate cash flows in the future. The first step to be met is how to calculate the cash flows. Thus, one will need to calculate the Free Cash Flow to the Firm (FCFF), which means the difference between the cash inflow, (Ebit(1-t) + Depreciation) and the cash outflow (Investment in fixed capital + Investment in WC), which are the consequence of the firm's operation activity. In short, FCFF is the resources created by the operational activity of the institution and it represents the resources that are available to remunerate the total capital invested in the company.

$$\text{FCFF} = \text{NOPLAT} + \text{Depreciation Expenses} - \text{CAPEX} - \Delta\text{WC} \qquad (1)$$

Evaluation of the company with the Free Cash Flow to Equity (FCFE) model is the way to measure the cash flow available to a company shareholder. This method is rather useful to evaluate the company. When positive, it shows the possibility of distributing dividends. If negative, however, it is possible to understand that there is a need for funding of equity capital.

"The differences between FCFF and FCFE arise primarily from cashflows associated with debt -- 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. As for the use of debt issues to finance principal repayments, the free cashflow to the firm will exceed the free cashflow to equity." (Damodaran, 2012, page 534).

1.2. Enterprise Value

It is known as business value. Future FCFFs need to be discounted at an adequate rate, namely the WACC (weighted average cost of capital) minus the expected growth rate if the FCFF is growing in perpetuity at a constant growth rate.

$$\text{EV} = \sum_{t=1}^{n} \frac{FCFFt}{WACC - g} \qquad (2)$$

1.3. Terminal Value

Terminal value, also known as going concern value, is the value of the period following the time horizon. It should be stressed that it is impossible to have a clear infinite period. In the evaluation process of a company this calculation assumes a decisive role since it represents the greatest percentage of the company's value. This value depends essentially on the sector of activity where the company is included, and the future strategy outlined by the company.
According to Damodaran (2012), there are three ways to estimate terminal value: multiples, a liquidation value, or a stable growth model.

Using multiples, the terminal value is calculated based on multiples of comparable companies, i.e., in the same sector/activity with the multiples of the firm. This calculation is inadequate, as DCF is being calculated in a certain explicit period, with a relative valuation of the terminal value.

In the liquidation approach, it is assumed that the company has a pre-established life and that there will be a liquidation in the end.

In the stable growth model part of the cash flows are used to the infinite in order to allow for reinvestment, thus enlarging its life cycle.

The most adequate way to calculate the Terminal Value is to use the liquidation approach or the stable growth model.

Normally the terminal value is calculated with a perpetuity for the FCFF, attributing a long-term constant growth rate (g). It should be noted that the FCFF, to be used in perpetuity, corresponds to a balance period attained by the company where net value of the fixed capital and the working capital grow at the g rate.

Calculation of the Terminal Value depends on whether one is valuing the firm or valuing the equity, (Damodoran,2012).

$$\text{Terminal Value t} = \frac{FCFF_{t+1}}{WACC_t - g_t} \quad (3)$$

$$\text{Terminal Value of the equity t} = \frac{FCFE_{t+1}}{Cost\ of\ Equity_{t+1} - g_{t*}} \quad (4)$$

1.4. Weighted Average Cost of Capital (WACC)

The weighted average cost of capital is the amount to be paid by the company to all its investors, whether shareholders or debt holders. When a certain institution is in debt, the WACC is the average debt of that company together with the cost of equity capital. In the WACC the interest expense is tax deductible, therefore the WACC is lower than the expected return on company assets. In case the company has no debt, the WACC is equal to the cost of equity capital (WACC=r_0). The WACC can also be analysed, by the investors, as corresponding to the company's average risk.

The WACC, before taxes, is the return expected on the part of the investors, retaining the company's assets. This can be used to evaluate a project with the same risk as the company and be fully funded with equity capital.

The WACC formula is shown below, where E is equity capital and D is debt, with the corresponding charges. r_E is the cost of equity capital and r_D is the cost of debt before taxes. t represents the tax rate on profits.

The formula is the following:

$$\text{WACC} = \frac{E}{E+D} * \text{rE} + \frac{D}{E+D} * \text{rD} * (1 - \text{t}) \quad (5)$$

1.5. Adjusted Present Value (APV)

The Adjusted Present Value (APV) determines the levered value (V^L) of a particular investment. It calculates its value without any leverage, that is, its unlevered value (V^U), subsequently adding its expected tax benefit and also the present value of expected bankruptcy cost.

APV shows less serious failures than WACC. It should be noted that the APV method includes the interest tax shield directly, as opposed to the WACC which adjusts the discounting rate. (DeMarzo and Berk, 2017).

According to Damodaran (2012), in order to calculate the unlevered value, the $FCFF_0$ (which is the present operational cash flow after taxes are added) must be deducted from the unlevered cost of the capital (r_u). g is the growth rate expected by the company.

The formula is as follows:

$$\text{VU} = \frac{FCFF_0 * (1 + g)}{ru - g} \quad (6)$$

To calculate the unlevered cost of the capital (r_u), also called Pre-tax WACC, the following formula is used:

$$\text{ru} = \frac{RL}{E} \quad (7)$$

Subsequently the value of the expected tax benefit is calculated. The tax rate (t_c) will be the marginal tax rate of the company and it is assumed to remain constant. This tax is deducted from the cost of debt (D) to represent the risk of that cash flow, (Damodoran,2012).

It is obtained through:

$$Tax\ Benefit = tc * D \quad (8)$$

The last step is taken by calculating the present value of expected bankruptcy cost, where π_a is the probability of bankruptcy after debt and BC is the present value of expected bankruptcy cost. In this project the BC will be calculated based on EDP Renováveis Bond Rate (Damodaran, 2012).

The formula for the PV of expected bankruptcy cost is:

$$PV\ of\ expected\ bankruptcy\ cost = \pi a * BC \quad (9)$$

Thus, it can be concluded that the formula for this method is the following:

$$APV = VL = VU + Tax\ Benefit - PV\ of\ expected\ bankruptcy\ cost \quad (20)$$

APV shows some serious flaws, such as, for example, the investors ignoring the expected cost of bankruptcy. This may lead them to conclude that the value of the company increases as more money is being borrowed.

It is often easier to apply the APV method when, for example, the company has no relation between debt and fixed capital. It also provides, as mentioned before, a specific evaluation of the expected tax benefit and the expected bankruptcy cost (De Marzo and Berk, 2017).

1.6. Capital Asset Pricing Model (CAPM)

The CAPM is a form of risk and return which allows to find the evaluation risk premium, based on its economic risk level given by unlevered beta (β_U). This model is used by most of the large companies to calculate capital cost.

The CAPM model takes into consideration the non-diversifiable risk, where the investor holds neither certainties nor control over macroeconomic aspects, political uncertainties and other factors. The CAPM considers a set of assumptions: there are no transaction costs, all the investors have the same access to a specific asset; the aim of the rational investor is to maximize his investment; the investor may sell short any asset and the time horizon is the same for all investors (Damodoran,2012).

In the calculation of the CAPM in order to estimate the levered beta (β_L), in accordance with Damodaran (2012), a regression needs to be made between the rate of return of company shares and the market rate of return, i.e.:

$$\beta j = \frac{Cov(r_j, r_m)}{Var(r_m)} \quad (31)$$

After calculating the levered beta, the unlevered beta must be determined, using the following equation (assuming β of Debt is zero):

$$\beta L = \beta U\ [1 + \frac{D}{E}(1 - t)] \quad (42)$$

In the calculation of the respective rate of CAPM, it is assumed that the project or company is fully funded by equity capital. The following formula is therefore used, where rf is the risk-free interest rate and $E(r_m)$ is the expected market return rate:

$$r = rf + \beta U\,[E(rm) - rf] \qquad (53)$$

1.7. Economic Value Added (EVA)

EVA was launched by Joel Stern and G. Bennett Stewart III (1990). It then started being used as a performance evaluator by Stewart Co, a consultancy company, and subsequently spread to many companies.

EVA compares the return of a certain investment with its real cost, thus allowing for the investor to have an idea of his choices.

Calculation of EVA is done through the difference between the return of the invested capital (ROIC) and the total cost of that same capital (WACC), multiplied by the invested capital (IC). The investor, on calculating a positive EVA concludes that the ROIC is higher than the WACC, that is to say, there is a creation of economic value for the investor. The negative EVA is exactly the opposite, there being a destruction of economic value. EVA may increase with a decrease of the WACC, when the company makes extra investments, or when the return of invested capital is increased.

The equation for EVA is given by:

$$EVA = (ROIC - WACC) \times IC \qquad (64)$$

This model is a reformulation of the Discounted cash flow. These valuation models are only equal only when exactly the same assumptions exist, namely where the calculation of the terminal value is concerned.

It is important to refer that the DCF model has several weaknesses when one wishes to evaluate the performance of a certain company, since the model relates the investment made with discounted cash flows. Therefore, the EVA, which has the capacity of evaluating the company's performance, is used.

1.8. Market Value Added (MVA)

The MVA determines the value of the company in the past and the value expected to be created in the future. It is no less than the difference between the market value (implied enterprise value) and the book value of capital (invested capital), (Damodaran, 2012):

$$Implied\ MVA\ =\ Implied\ EV\ -\ IC \tag{75}$$

A discounted sum of the calculated EVA for each year, provides an estimate of MVA:

$$MVA\ = \sum_{t=1}^{\infty} \frac{EVA_t}{(1+WACC)^t} \tag{86}$$

All companies have as a main target the improvement of their market value added, with the aim of creating value for their shareholders. Thus, with a positive MVA, it means that the capital return will be higher than the cost of invested capital. If the MVA is negative, it is exactly the opposite.

1.9. Evaluation by multiples

The valuation by multiples allows to compare the value of the company with the companies in the same sector. Through this comparison by multiples, one can understand and detect errors on the pricing of individual stocks and correct them (Damodaran, 2012).

This evaluation is rather simple and allows an understanding of the great discrepancies between companies such as: growth rates, risk, and payment rates. Even so, this evaluation enables verification of the value of the company versus the respective market valuation.

The analysis through multiples should be carried out as a complementary method to DCF or even EVA and never as anything different. Its great added value is to understand the characteristics and performances of the company. Whichever is the variation in multiples, the attributes of the company also change (Damodoran,2012). The big problem in this valuation is understanding which multiple should be applied and the choice of the ideal company, in order to enable comparison.

The most used multiples, which will be subsequently analysed, are:

- Price to earnings ratio (PER) which measures the price of the shares of an institution in relation to the earning per share (EPS). This multiple is subject to several criticisms due to being affected by the various capital structures and to integrating non-operational gains and losses in its results.
- The value of the company in relation to EBITDA is a rather important multiple in the comparison of companies, namely in their analyses, as it concerns the real value of the company, as opposed to the PER, which focuses on the price of shares. However, it is not so affected by the company's capital structure, as it counts on the value of the company in relation to EBITDA.

1.10. Dividend Discount Model (DDM)

When companies return a profit, this may be reinvested in the company or distributed as dividends among the shareholders. If the decision is to distribute dividends it can be done in cash or through share repurchase.

This evaluation model can be used to evaluate all shares, since it provides the price of the shares of the company, where the share value is the present value of expected future dividends (Damodoran,2012).

When dividend growth remains constant, this model assumes that the desired rate of return remains constant, and that the cost of equity, that is, expected return on equity r such that r>g.

Thus, the stock price (P_0) is calculated through the following formula:

$$P0 = \frac{D1}{r - g} \qquad (97)$$

One of the great advantages of this model is that it uses the only relevant cash inflow, which is normally generated by the company, for its shareholders.

It should be mentioned that this model introduces some uncertainties such as the dividend policy and the fact that it fails to approach some issues, such as non-essential assets of the company.

2. Company overview

2.1. Brief description of the parent company

Energias de Portugal (EDP) is a multinational power company. It is a public services institution, vertically integrated, and one of the biggest power operators in Europe. Its history goes back 40 years, and it has been a significant presence in the world power scenario, operating in 4 continents, in 19 countries. The EDP group is the third largest power producer and one of the largest in gas trading in the Iberian Peninsula. It counts on over 11,600 employees to supply electric power to 10 million clients and 1.2 million gas connection points.

It is the fourth largest wind power producer in the world and circa 66% of its power is produced from renewable resources. It should be noted that it also operates in several specific areas besides those already mentioned, such as engineering, real estate management and laboratory tests.

EDP is the main stockholder of Energias de Portugal Renováveis (EDPR), which will be described subsequently.

2.2. Company description

EDP Renováveis (EDPR) was founded in 2007 and is world leader in the renewable energies sector, being considered the fourth largest producer of wind power in the world. The company has a work force of 1,566 and an installed capacity of 11.4 GW, serving over 3 million homes. The output of EDPR relating to 2019 was around 1.824 million euros. Operating platforms, namely for financial analysis study purposes, are located in the following regions: Europe, North America and Brazil.

Throughout its history, EDPR has been concerned with sustainable development performance issues, namely with a solid development of its available assets, with value creation and innovation as well as with the process of integration and recognition of its employees. Due to this, the company has received several awards such as: TOP Employer 2019 in Europe, in the Bloomberg index for gender equality and also in the Jow Sustainability index. This has caused a strong positive impact for investors.

In the stock market, *EDP Renováveis* has had an important role, providing safety for investors, namely in this period of pandemic, aiming at a prosperous future for the company in the renewable energies sector.

2.3. Business description

EDPR business is described in three phases:

- Development Phase: where EDPR employers look for locations with good conditions for use of natural resources, namely wind and sunlight. Together with local landowners they aim to establish contracts and agreements. The acquisition of meteorological apparatus by employees is also important for the study and analysis of wind and solar quality conditions. Subsequently, it is necessary to perform an appropriate evaluation and find adequate funding Finally, required consent from local public authorities must be obtained in order to ensure appropriate construction and environmental licenses.

- Construction Phase: EDPR teams aim at selecting the best equipment (solar panels, wind turbine.) but the characteristics of the surrounding environment must be considered. After this process, the construction phase follows, where it will be necessary to build foundations, roads, assemble all the required equipment such as turbines and solar panels. Demonstration of technical know-how in this phase is rather important as this phase may take several months.

- Operation Phase: After the project is complete it is necessary to be able to keep the creation of value, aiming at producing and delivering a clean power. Besides, in this phase, renewable power generation is started. Subsequently, performance and live data are analysed, with the purpose of identifying opportunities and threats to be improved. It is necessary to minimize failure rates and to have ongoing maintenance services, through programmes and initiatives for required improvement.

The core business of this company will be further detailed, comprising the following areas: onshore, offshore and solar power, where EDPR always aims at innovation, creation of value and sustainability.

2.3.1. Onshore

Onshore wind stations are land infrastructures that are capable of turning wind into electrical power. Wind power complexes that transform kinetic power of the wind into electrical

power through a generator are built on land areas, so as to convert it into electrical power ready for consumption.

EDP Renováveis is a world benchmark on onshore, being the fourth largest producer. It is present in 14 international markets and has been in this sector for over 12 years.

This power has several advantages, such as:

- Clean, inexhaustible, and safe resource.
- Among renewable energies, it is one of the cheapest.
- Non-emission of greenhouse gases or residues thus contributing to environmental quality.
- The service life of a wind power turbine is 25 years, and it can be almost entirely recycled, except for the blades which require a more complex recycling process.
- The area where the turbines are located can be recovered after dismantling, i.e., they are mobile installations.
- It does not interrupt animal farming or agricultural activities in those areas.
- No water consumption is required.
- Jobs are created. This power will provide 569.000 jobs up to 2030, according to Wind Europe.

Even so, EDPR faces some disadvantages of onshore power, such as:

- Visual pollution.
- Local wind intensity variations.
- Sound pollution.
- Impact caused on animals, namely birds.

The onshore business is clearly where EDPR stands out and where the greatest revenues come from.

2.3.2 Offshore

The offshore wind park is similar to onshore energy, except that it uses the wind in high sea, where it blows at a higher speed and more abundantly. It can be installed in not too deep waters far from sea routes, protected ecologic spaces and distant from the coastal zone.

EDPR is world leader in offshore technology and operates a structure located in the east coast of the USA, with an installed capacity of 1600 MW, due for start-up in 2022. Several projects are also being developed in Poland, South Korea, United Kingdom and France. It

should be noted that the first Wind float in Europe was in Portugal, thus strengthening EDPR's position in this sector. EDPR is developing an operation estimated at 25 MW in Portugal, through a consortium of Wind plus.

The advantages in using these energies are:

- Non-pollutant and inexhaustible energy.
- Easy shipping with few limitations as to cargo.
- No water is required.
- The offshore resource is more abundant than the onshore since the wind is more consistent in high seas.
- No damage caused to sea life and sea habitats.
- Many jobs are created.

Some of the disadvantages faced by EDPR in offshore wind power are:

- Sound and visual pollution.
- Impact on fauna.
- Dependency on wind variation.
- Sea turbulence affects the utilisation rate of the wind.

This business has a substantial impact on EDPR accounts.

2.3.3. Solar power

Solar power is essentially divided in two types: photovoltaic solar energy and thermal solar energy. The thermal solar energy is the transformation of direct solar irradiation, through thermal solar panels, into thermal energy and subsequently into electrical power. It is mainly directed to domestic use and small industrial companies. Photovoltaic solar energy is the conversion of the solar energy captured by photovoltaic panels into electrical power, through the photovoltaic cell containing semiconductor material.

EDPR has been using this renewable energy and developing resources and means for growth of this energy, namely in photovoltaic energy. Investments have been made in the USA market, where technology benefits from the existence of the Investment Tax Credit, which encourages investing on this energy in this market. EDPR has invested in other markets such as, for example, the Brazilian market, where photovoltaic panels have been built.

Some of the advantages for EDPR in using solar power are:

- Sustainable renewable energy producing no toxic emissions.

- Service life of the photovoltaic panel is usually 25 years and requires almost no maintenance.
- Produces no sound pollution.
- It is the most accessible energy resource on the planet.
- Installation is easy.
- Adds value to immovable property.
- Creates jobs.
- Saves up to 95% in electricity bills.

The disadvantages faced by EDPR in solar power are:

- No power is generated at night, thus affecting operation in some countries with longer nocturnal periods.
- Climate conditions impair power production.
- High cost of acquisition.
- Lack of tax incentives from the governments of some countries such as Brazil.
- Storage capacity is less efficient when compared to other energies.

2.4. Company performance

This section will approach company performance both at operational and financial levels. The actual situation of EDPR will be assessed. Analysis will be carried out based on the last 4 years so as to understand the evolution of respective parameters. A general analysis will be performed allowing for the understanding of the company's position in a financial perspective. A more detailed and objective analysis with all the necessary parameters will be carried out in the chapter concerning projections and calculations.

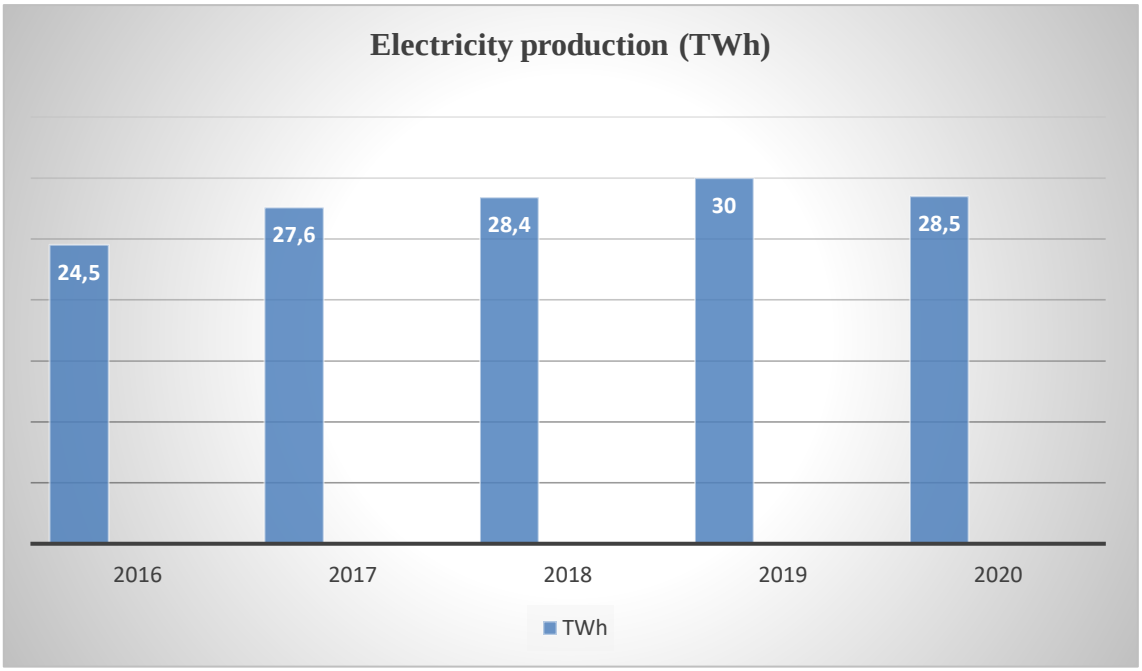

Figure 1: Electricty production (TWh)
Source: EDP Renováveis annual reports, Own Estimates

Renewable electricity production in 2016 was 24.5 TWh, in 2017 27.6 TWh, in 2018 28.4 TWh and in 2019 30 TWh. This continuous growth is due namely to the impact of capacity increases, with utilisation factors above average, avoiding $C0_2$ emissions from year to year. This increase in electricity production mainly reflects added capacity of wind resources. In 2020 electricity production was down 5% due to asset sales compared to 2019.

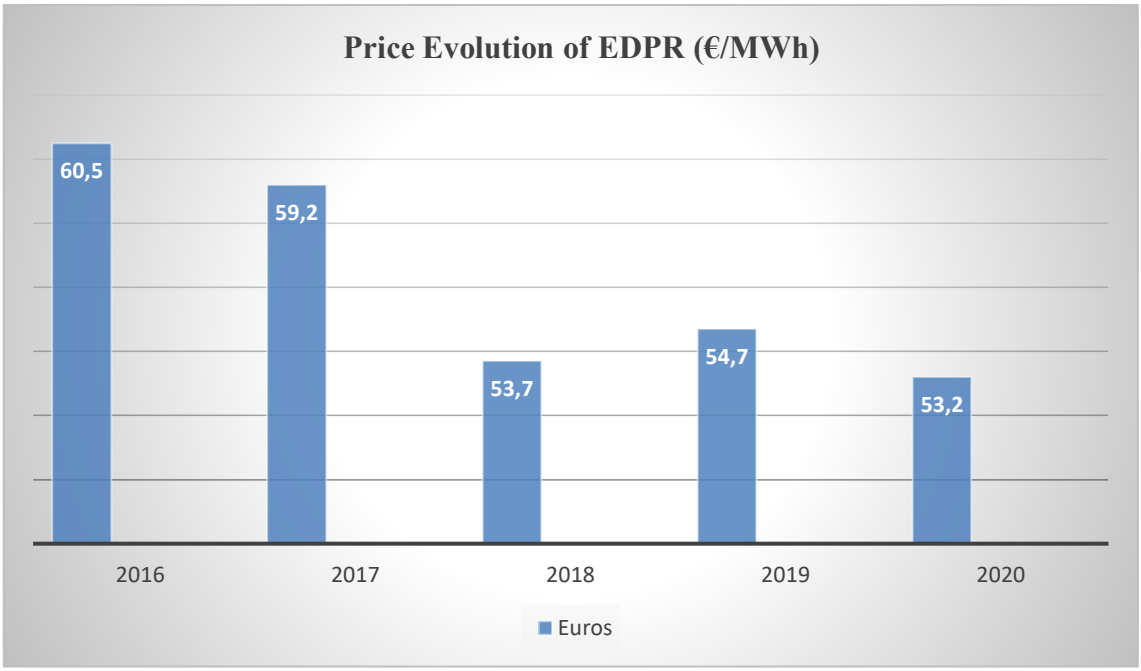

Figure 2: Price Evolution of EDPR (€/MWh)
Source: EDP Renováveis annual reports, Own Estimates

The average selling price of EDPR decreased 2% from 2016 to 2017 due to production increase (mix: production vs price). From 2017 to 2018 there was a price decrease mainly due to the price decrease in Europe (-4% compared to 2017) and a price decrease in North America (-2% compared to 2017). This period also saw the mix effect: production vs price. In 2018 and 2019 the price increased by 2% due to price recovery in Eastern Europe and currency exchange effect. There was a decrease in the price due to a strong financial hedging on prices, in the period 2019 to 2020.

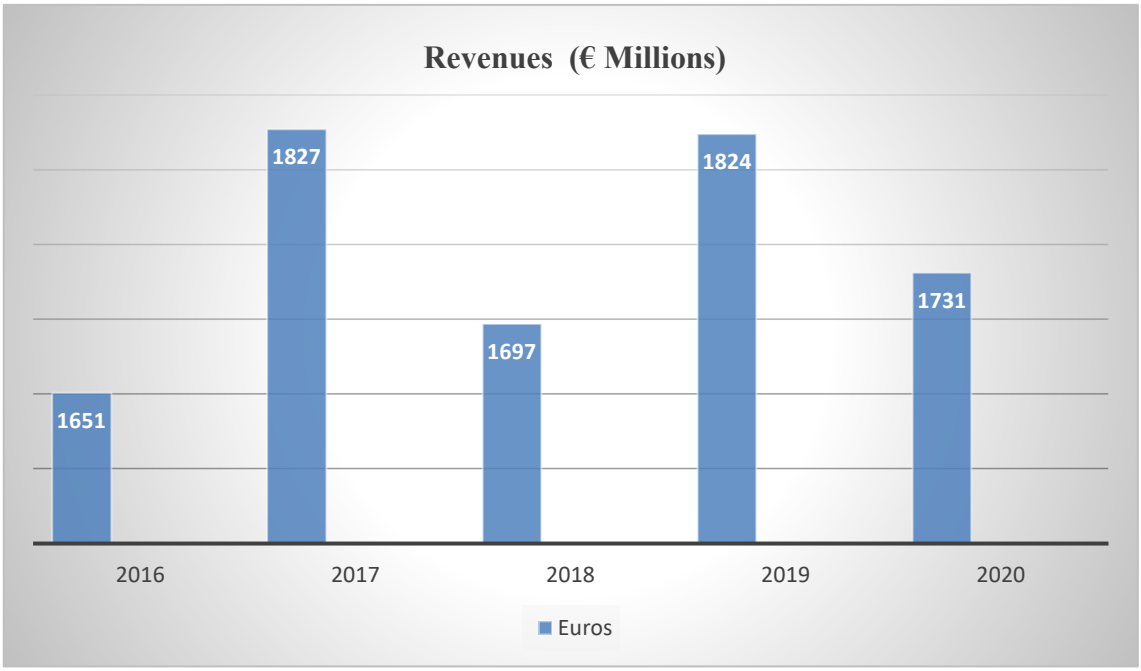

Figure 3: Revenues (€ Millions)
Source: EDP Renováveis annual reports, Own Estimates

Earnings grew 11% from 2016 to 2017 due to the higher electricity production of 13% compared to 2016. This was mostly due to the new capacity mainly of stronger wind resources and also to a lower average selling price of minus 2% against 2016. From 2017 to 2018 revenues fell by 7% essentially because of the unfavourable evolution of the average selling price by 9% and a greater electricity production by 3%. In the period from 2018 to 2019, revenues rose by 7%, due to greater wind resources, i.e., a 6% higher production in that same period and a 2% higher average selling price when compared to 2018 as well as to the positive impact of f/x effect of a further 39 million. From 2019 to 2020 there was a decrease in revenues mainly due to lower electricity production compared to 2019 which decreased by 5%

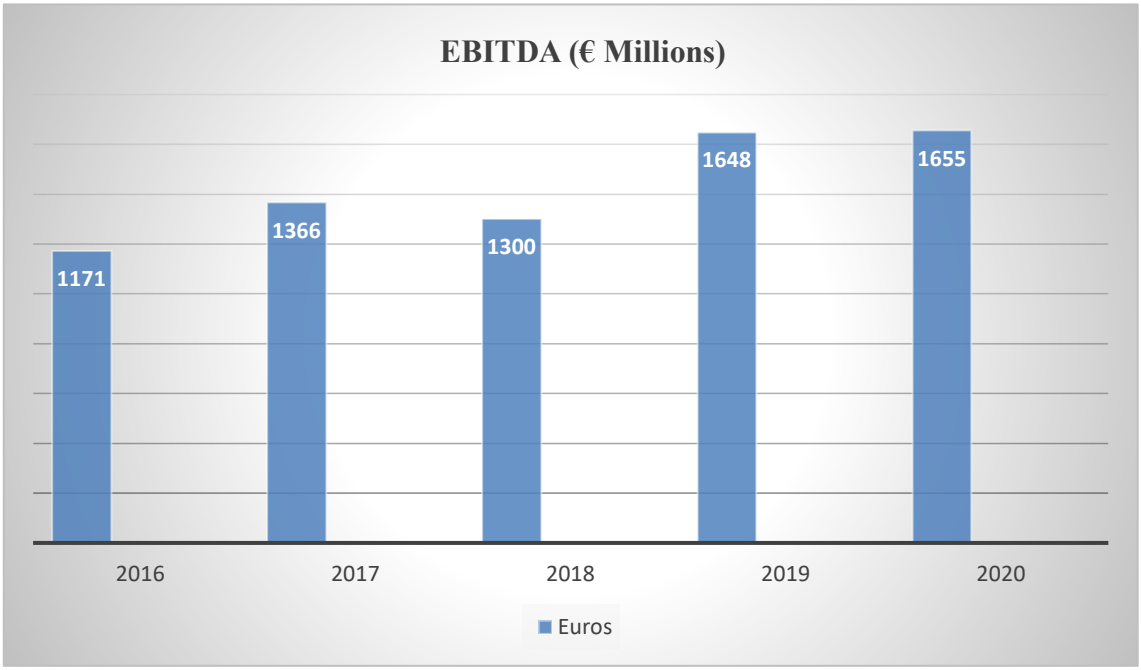

Figure 4: EBITDA (€ Millions)
Source: EDP Renováveis annual reports, Own Estimates

Earnings before interest, taxes, depreciation, and amortization (EBITDA) are crucial for a company to ascertain the evolution of productivity and efficiency throughout the years. From 2016 to 2017 there was an increase of 17% caused by an 11% increase in Revenues e and by the increase of other operational revenues by 77%. In the period of 2017 to 2018 there was a decrease of de 5% mostly to a heavy fall in revenues by 7%. From 2018 to 2019 the EBITDA grew 27% due to the large increase in Revenues by 7% and to the implementation of the Sell-Down strategy (whereby EDPR sells majority participations in projects in operation or under development, allowing for value creation by reinvesting the profits in additional growth. This will improve operational costs, i.e., the corporation can recycle capital). In the period from 2019 to 2020 there was an increase of 0.4%, mainly caused by the deconsolidation of assets and higher capital gains.

2.5. Return on investment ratios

Some of the more relevant ratios will be analysed as follows, in order to understand the company's situation in greater detail.

	2016	2017	2018	2019	2020
ROE	0,93	4,43	4,88	7,05	7,16
ROA	0,35	1,67	1,86	2,70	3,10
ROIC	4,13	6,38	5,65	7,51	7,14

Table 1: EDP Renováveis return on investment ratios (2016-2020)
Source: Bloomberg, Own Estimates

- The *Return on Equity* (ROE) aims at studying the capacity and effectiveness of the return on capitals invested in the company, whether by partners or shareholders, (Damodaran,2012). It can be seen that the ROE grows from 2016 up to 2020 which means that it creates value for the shareholders through the years and also offers the expected return, i.e., it means that there is growth along this period.

- The Return on Assets (ROA) is the profitability of all the company assets or the investment portfolio. Its purpose is to understand the assets available to the company and the capacity to generate profits (Damodaran, 2012). The ROA also grew between 2016 and 2020, which means that the greater its value, the greater the effectiveness of assets, i.e., the company is earning more money with less investment.

- The Return on Invested Capital (ROIC) evaluates the capital investment on the part of the company, i.e., whether the company is using well the invested capital, the sum of equity capital and third-party capital, in order to generate return. From 2016 to 2017 ROIC increased, meaning that the capital investment was correctly used, thus leading to higher returns. In the period between 2017 and 2018, the ROIC decreased due to the reduction of the EBITDA and the lower depreciation and amortisation in the same period. This decrease is essentially due to the low wind resource and first line discontinuation. From 2018 to 2019, growth occurred showing that the invested capital originated return for the company. ROIC decreased in the period from 2019 to 2020 essentially due to the increase in invested capital.

2.6. Management and Governance

In this table the Governance members of EDP Renováveis are presented, including their names, position, and date of entry:

Name	Position	Since
António Mexia	Non-executive chairman of the board	2008
João Manso Neto	Executive vice chairman of the Board, chief executive officer	2008
Spyridon Martinis	Chief operating officer of EDP Renováveis, S.A. for offshore, executive director	2019
Duarte Bello	Chief operating officer of Europe and Brazil and Executive Director	2017
Miguel Angel Prado	Chief operating officer - North America and executive director	2017
Manuel Menéndez Menéndez	Non-executive director	2008
António Nogueira Leite	Leading non-executive independent director	2013
Acácio Mota Piloto	Non-executive independent director	2013
Francisca Guedes de Oliveira	Non-executive independent director	2015
Allan J. Katz	Non-executive independent director	2015
Francisco Seixas da Costa	Non-executive independent director	2016
Conceição Lucas	Non-executive independent director	2018
Alejandro Fernández de Araoz Gómez-Acebo	Non-executive director	2018
Vera Pinto Pereira	Non-executive director	2019
Rui Teixeira	Non-executive director	2019
Miguel Stilwell de Andrade	Vice-Chairman & CEO	2021
Antonio Sarmento Gomes Mota	Chairman (independent)	2021

Table 2: Governance members of EDP Renováveis
Source: EDP Renováveis Website and Reuters

2.7. Institutional Ownership

EDP Renováveis ownership structure is composed by: Grupo EDP, main shareholder with 82,6% of the share capital; MFS Investment Management whose activity is the management of global assets, with head offices in the United States of America, owning 3% of the share capital; The remainder are institutional and private investors in 21 countries, namely in the USA. It

should be noted that institutional investors hold 94% of the ownership structure, while 6% are private investors, the large majority in Portugal.

3.Macroeconomic Framework

The macroeconomic framework is rather useful since it affects the renewable energies sector directly. It will have a direct impact on investors, on consumers, on environmental policies, on price evolution, among others, which may be either a positive or negative impact, depending on the economic situation.

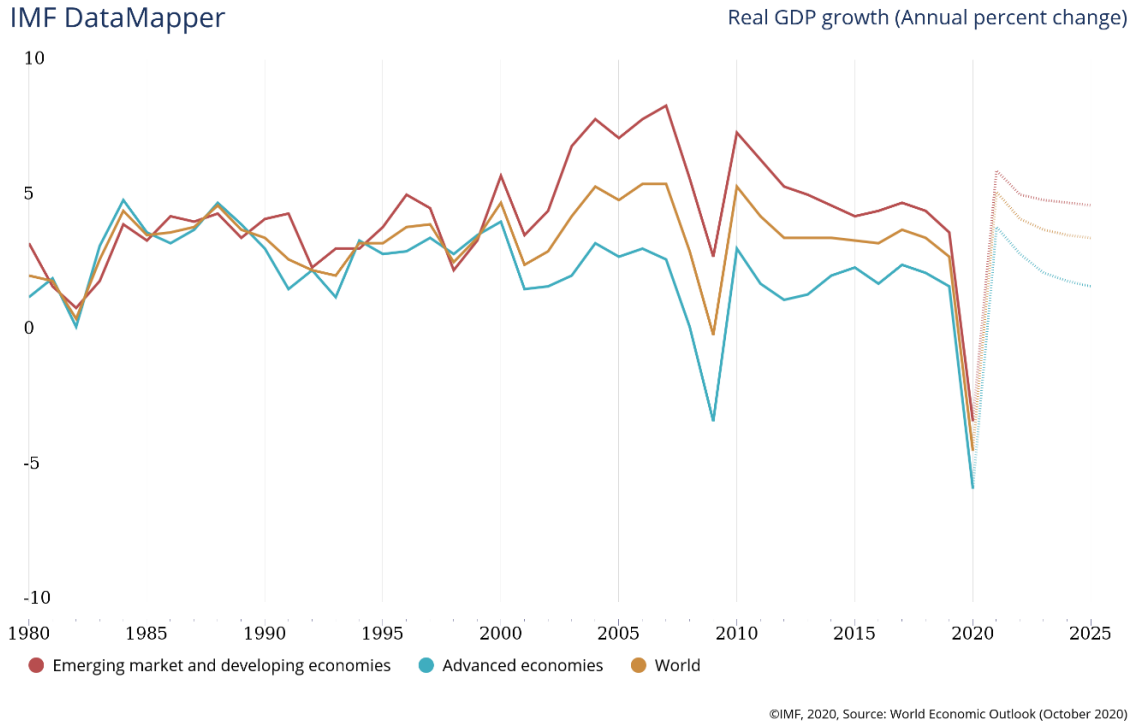

Figure 5: Real GDP Growth (Annual percent change)
Source: International Monetary Fund

This chart shows the Real GDP Growth, of Emerging markets, Advanced Economies and of the rest of the world, from 1980 to 2025. Subsequently, special emphasis will be given to the years from 2016 to 2024, as this is the relevant period for our valuation.

The great reduction in Real GDP growth caused by the world financial crisis in 2008 shown in the chart must be underlined. Damages were lower for the Emerging markets due to their better fiscal position, with better bank supervision and taxes and more flexible exchange rates. Between 2016 and 2017, there was an increase of the gross domestic product in most markets, marked by a positive development in the economy.

In 2020 and up to the present the economy has faced one of the greatest challenges, the corona virus disease, (COVID-19). While essential services are still operating, many other activities have ceased or considerably reduced operation, threatening companies at all levels, which face still unmeasurable losses (financial and human capital) and raise the spectrum of

recession. Thus, there has been a substantial drop in Real GDP growth, both in the emerging markets, in advanced economies or in the remaining countries in the world, which will bring about an increase in public debt. Structural measures will be required in order to re-allocate resources through time in the more viable sectors and to minimize permanent damages to the economy. Several countries are already implementing budget measures, measures to support liquidity and political measures to strengthen the capacity of their health services and providing aid for citizens, namely in fighting unemployment, and to particularly affected sectors.

Economic recovery is considerably dependent on the possibility of a greater increase in the number of virus cases, on the delays in the acquisition and distribution of vaccines and the financial stress caused by high debt and poor economic growth.

Thus, the World Bank, in an adverse scenario, estimates a global growth limited to1.6% in 2021 and 2.5% in 2022, and in a severely adverse scenario another recession is estimated in 2021 and 2% growth in 2022, while in a more optimistic scenario growth rises to almost 5% in 2021. Whereas Advanced Markets show a forecast of economic growth of 3.5% in the United States, 3.6% in the European Union and 2.5% in Japan, subsequent to recessions 3.6%, 7.4% and 5.3% in 2020, respectively. China, however, should grow 7.9% in 2021, thanks to the control of the pandemic and stimuli led by public investment.

The forecast of Real GDP Growth can be seen on the chart, from mid-2021, showing a foreseeable impact due to the vaccination, which is expected to mitigate the COVID-19 pandemic.

To avoid the collapse of some countries, some world leaders such as Joe Biden claim that in order to support the economy it is necessary to increase the money supply (quantitative easing), to control inflation and reduce interest rates, mainly to reduce deficits. An interesting measure in these times of pandemic.

For EDPR business, attention must be paid to exchange rates as in 2020 the euro has appreciated 9.63% against the American dollar (USD). Although through the first few months of the year the Euro has slightly depreciated against the American currency – reaching its lowest quotation on 20th March (1 EUR = 1.0707 USD). As of the end of March, the euro has appreciated continuously compared to USD and reached its highest quotation on 30th December (1 EUR= 1.2281 USD). Comparing to other currencies, the euro has appreciated, during 2020, 42.04% against the Brazilian Real , 5.98% against the Sterling Pound, 3.89% against the Japanese Yen and 2,.2% against the Chinese Yuan Renminbi . It should be mentioned that the volatility of exchange rates leads to possible negative impacts on their

overall results and EDPR follows a risk management strategy based on debt in the same currency and financial derivatives to reduce that same risk.

3.1. Green Finance

Green finance may be described as a decision-making process about how to finance investments with financial instruments that take into account environmental, social and governance concerns. It can be called green forms of financing. However, one must also be aware that such investments must be sustainable and that they will benefit the environment, society and the economic system in the long term.

Environmental, social and governance concerns to be taken into account in investment decisions are:

- Environmental concerns refer to mitigation and adjustment to climate change, natural disasters, renewable energy, waste management and so forth.
- Social concerns refer to issues of inequality, inclusion, work relationships, investment on human capital and communities, etc.
- Governance concerns refer to the governance of public and/or private institutions, including management structures, work relationships and executive salary policy, corporate ethics, etc.

Those three components are essential for a sustainable economic and financial development. It can be said that it was the growing awareness of those issues throughout the world that rendered Green Finance remarkable in the financial community. At the same time, the regulatory scenario, not only on world sustainability but also on Green Finance itself, has evolved. It should be noted that, in 2015, 195 countries committed themselves to the Paris Climate Agreement. All things combined have led to the development and refinement of Green Finance in the last few years. In order to achieve the targets established in the Paris Climate Agreement, a change in power systems is crucial. Renewable sources have a significant impact in order to reduce carbon emissions and help mitigate climate change and, according to the International Agency for Renewable Energy, they may supply four fifths of the world power up to 2050. Therefore, investments (private and public) in this sector must be significant.

EDPR has had environment related concerns, to develop and valuate Green Finance which represents a challenge to the company, financial advisors and investors who need to adjust to this new reality. However, one thing is certain, a sustainable action is necessary, and more companies and investors are increasingly aware of it.

To combat global climate issues, high investment is required. Although public funding plays an essential role, a substantial part of the financial flows must come from the private sector, as only thus will it be possible to meet.

As can be seen on the chart, private investment has been growing through the years, reaching the amount of US $ 326 billion as annual average in 2017/2018. Out of this amount, 85% were directed to renewable energies, 14% to low carbon transport and less than 1% to all the other subsectors.

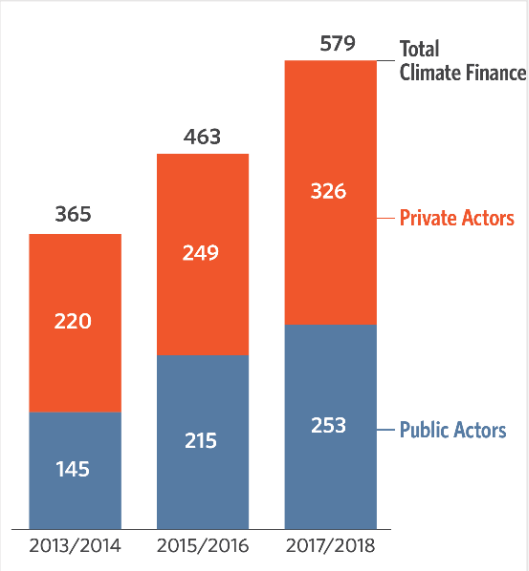

Figure 6: Total Climate Finance
Source: Climate Policy Initiative

3.2. Green Bonds

Green bonds have been in the market since 2007 and their demand more than quadruplicated in the last few years. According to Bloomberg, in 2018 green bonds issued in the whole world amounted to 167 billion euros and today the demand from investors is still higher than the offer.

In order to become an issuer of green bonds it is necessary to prove that the money is being used in an environmentally conscious manner, i.e., that the bond is being used to fight climate change. The range of options is wide, from renewable energies or energetic efficiency to reduced consumption.

Presently there are no compulsory patterns for green bonds, although there are directives as to how reports should be prepared, and the method may be used. The distinction between green, social and sustainability bonds is the following:

- If the bond is to be invested on a project that has a positive impact on the environment, it is green.
- If it is to be invested in projects that will positively affect social issues, it is social.
- Should the project benefit the environment as well as social issues, then it is called a sustainability bond.

The figure below is meant to show how the annual emission of green bonds and loans has grown throughout the years, amounting to US $ 254.9 billion by end 2019. This is a new global record and is greatly due to the investment by the European Union which had invested, in 2019, USD 106.7 billion in the green bond market.

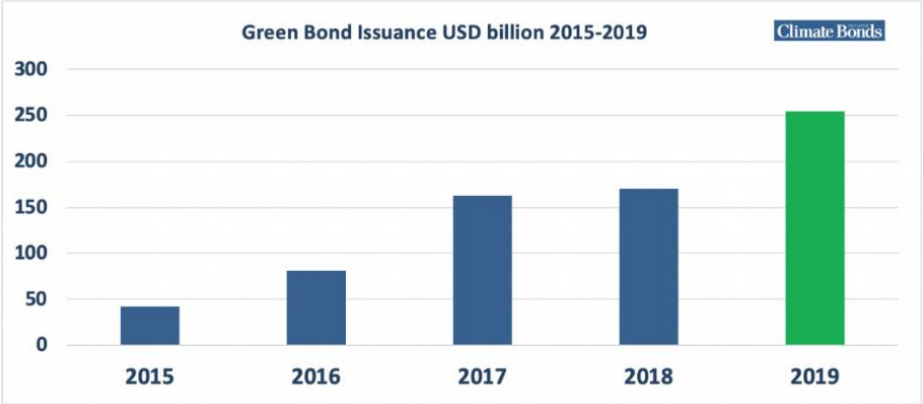

Figure 7: Green Bond Issuance USD billion (2015-2019)
Source: Climate Bonds Initiative

EDPR believes that sustainable funding and "Green Bonds", in particular, are an important tool to stimulate the transition to a low carbon economy, providing financial support to existing or new projects.

4.Industry Overview

Environmental sustainability has become a great differential in the economic market. Thus, companies that use renewable energies in their production processes are increasingly more valued in the market.

Renewable energy sources represent alternatives to fossil fuels which contribute for the reduction in greenhouse gases emissions. With the aim of avoiding climate change and keeping global warming 2°C. Renewable energy provides a strong contribution to the gross domestic product, apart from taxes and incentives for renewable energies bringing several benefits to industries, markets, investors, and countries.

In 2018, the EU reached the agreement on the target of 32% of the power consumption to be made from renewable sources up to 2030. This agreement will help the EU to comply with emission reduction commitments within the scope of the Paris Agreement. The European Union is already preparing the period post-2020, in order to supply several policies and measures for renewable energies to countries and investors.

In 2019, renewable power in Portugal represented 52.9 % of national consumption, led by wind power technology with 23%, followed by water technology with 21 %, solar photovoltaic with 2.3 %, bioenergy at 6% and geothermal at 0.4 %.

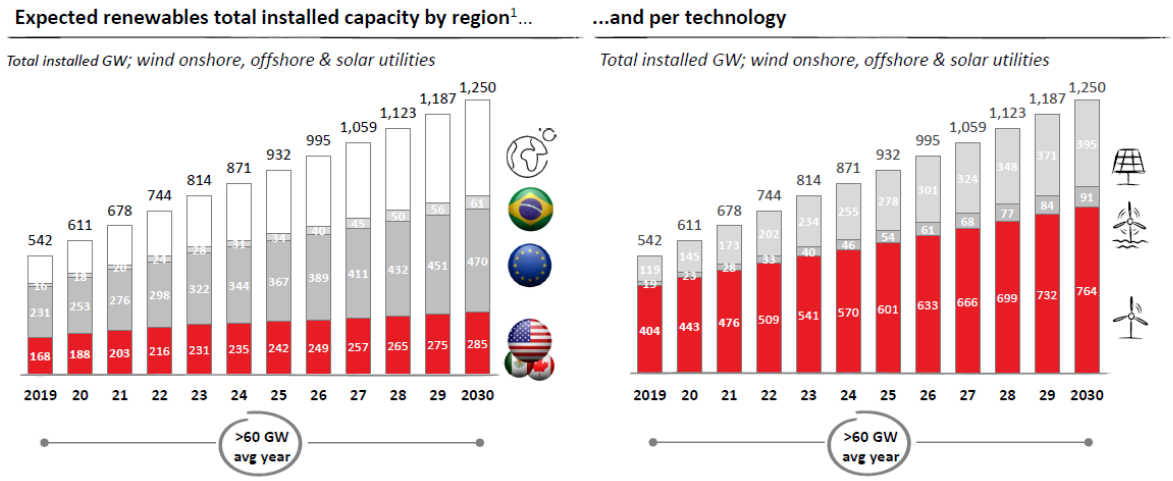

Figure 8: Expected Renewables total installed capacity by region and per technology (2019-2030)
Source: EDP Renováveis annual reports

The chart on the left shows total renewable energy capacity anticipated per region, with > 60 GW average per year until 2030. Meanwhile the chart on the right shows expected total renewable energy capacity (per wind onshore, offshore, and solar utilities), with > 60 GW average per year until 2030.

The COVID-19 pandemic has forced countries to lockdown, causing countries to be concerned about maintaining jobs and safeguarding economic activity. According to the Global Wind Energy Council (GWEC), the impacts of COVID-19 on the environment have led to a reduction of 8% in $C0_2$ emissions during the first half of 2020, when compared to the same period in 2019. However, it has been verified that emissions have returned to the levels before the pandemic in many markets and that a dangerous trajectory is being pursued to circa 3 °C in global warming, above pre-industrial levels.

Governments throughout the world are putting in place economic measures to support industries, namely those that trigger economic growth. The renewable energy sector may boost, through investment, job creation and a reduction of energy dependence, considering the effect of replacing fuel imports.

This crisis offers a window of opportunity to comply with sustainable targets, to achieve international climate measures and to build a stronger economy.

4.1. By segment Framework

4.1.1. Onshore wind power

The European Union wishes to increase onshore wind power facilities increasing the present 174 GW to 750 GW in 2050, within the next 30 years. According to Wind Europe, Europe will have greater onshore wind power capacity than offshore. Onshore wind is the cheapest means of power production in Europe, thus reducing fossil fuel imports by 10 million euros per year. This energy also benefits local communities and estimates show that, in Europe, circa 80% of the people living close to wind farms will approve their development.

Of the 300,000 wind farm jobs in Europe most are in onshore wind power.

4.1.2. Offshore wind power

According to WindEurope, in 2020, new investments in offshore wind power amounted to 26 billion euros. This energy is cheap and resilient, generates several jobs and economic growth. Estimates show that, in Europe, 77,000 people work in this field and that there will be 200,000 up to 2030.

It should be noted that in 2020 six Agreements for Power Purchase (PPAs) of offshore wind power have been signed. These agreements came from different sectors in industry and included major corporations off-takers such as Nestlé, Amazon, Deutsche Bank , Borealis and INEOS.

The European Union holds presently 25 GW of offshore wind power capacity but wishes to reach 300 GW by 2050. There are 116 offshore wind parks in Europe, in 12 countries and 40% of their capacity is in the United Kingdom. New offshore wind farms are under substantial investment and construction, namely in the United Kingdom, the Netherlands, Belgium, Germany and Portugal, where a floating wind park financed by the NER 300 program of the European Union is under completion.

It is considerably useful that the industry and politicians foster the environmental, economic and industrial benefits that offshore wind power provides for everyone concerned.

4.1.3. Solar Energy

The European Union, through the Clean Energy for all Europeans package, has taken measures to foster solar power and to render it more accessible for consumers. The EU market has grown 8 GW in 2018 and circa 15 to 17 GW in 2019. It is expected that the solar market will continue to have a sustainable growth.

Growth of the solar power market is due to the offer of governmental incentives, tax reduction for the installation of solar panels and pollution reduction.

Emerging economies such as China and Japan have significantly increased the production of solar technologies due to governmental taxes and mergers and acquisitions by local manufacturers.

4.2. Legislation

The European Union has targets for the use of renewable energy sources, aimed at meeting the requirements for energy consumption to fight climate change and for economic reasons.

The European Union had several targets for 2020 such as: to reduce greenhouse gas emissions by 20%, to increase the quota of renewable energies to 20% and to improve power efficiency by 20%, all of these targets have been achieved.

The European Council of the EU has approved a target known as “European Green Deal”, aiming at a reduction by at least 55% of greenhouse gas emission up to 2030, in comparison to 1990 data. The Green Deal is a comprehensive plan covering different sectors, including transport, energy, power, agriculture, and construction. It should be noted that the “clean energy” package is crucial in order to achieve the targets concerning renewable energies and climate for 2030 and it defines the forms of supervision and legislation for member states, holding a decisive role.

The Renewable Energy Directive (Directive (EU) 2018/2001), created in 2018, is aimed at maintaining the world leadership position of the EU concerning renewable energies and to help the EU to comply with its commitments regarding climate change within the scope of the Paris Agreement.

It should be stressed that the European Union follows a strategy of creating power infrastructures based on renewable energies on a large scale, where the promotion and development of renewable technologies are essential in order to pursue this strategy.

Some measures and legal proceedings of some countries are mentioned subsequently, such as:

- Portugal: launched its first auction of renewable energy on a utilitarian scale in 2019.
- Spain: In 2019 the Royal Decree 17/2019 was approved, introducing a set of measures so as to guarantee a regulatory stability and economic framework to stimulate the development of renewable energy generation in Spain.
- France: The French parliament approved in 2019 the "Law for Energy and Climate" committing the country to carbon neutrality before 2050 and anticipating the reduction in fossil fuel consumption by 40% before 2030.
- Poland: Poland's National Energy and Climate Plan has committed to a portion of 23% of renewable energies by 2030 subject to obtaining European funding and power through renewable energies will increase to 32% by 2030.
- Italy: The Italian ministry for economic development has signed, in 2019, a decree implementing a new set of auctions to be held between 2019 and 2021 aiming at allocating circa 5,5 GW of wind and solar power.
- United Kingdom: In 2019, a new legal target for zero liquid emissions before 2050 was converted to law. Such target will demand from the United Kingdom to transform all greenhouse gas emissions to zero liquid by 2050, in comparison to the previous target of at least 80% reduction against 1990 levels.
- USA: Production tax credits (PTCs) are available, which are the incentives for wind power prevailing in the USA and represent an extra source of revenue, per generated power unit ($ 25/MWh in 2019), in the first 10 years of asset life.

4.3. Competitors

The following table will refer the main companies in Europe in the energies sector and the last stock price on 25th February 2021. These companies will be used in Valuation, namely in the multiple's method.

Company	Country	Last Price (EUR)
EDP RENOVAVEIS SA	Portugal	18,50
E.ON SE	Germany	8,49
REDES ENERGETICAS NACIONAIS	Portugal	2,28
FEDERAL GRID CO UNIFIED ENER	Russia	0,00
NATIONAL GRID PLC	United Kingdom	9,55
ROSSETI PJSC	Russia	0,02
RED ELECTRICA CORPORACION SA	Spain	13,60
TERNA SPA	Italy	5,78
ELIA GROUP SA/NV	Belgium	91,70
VEOLIA ENVIRONNEMENT	France	23,48
SUEZ	France	17,21
FLUXYS BELGIUM	Belgium	33,80
SNAM SPA	Italy	4,36
ENAGAS SA	Spain	17,38
UNITED UTILITIES GROUP PLC	United Kingdom	10,24
SEVERN TRENT PLC	United Kingdom	25,83
PENNON GROUP PLC	United Kingdom	10,29
ITALGAS SPA	Italy	5,00

Table 3: Competitors, Country, and Last Stock Price
Source: Bloomberg and Own elaboration

4.4. Share Performance

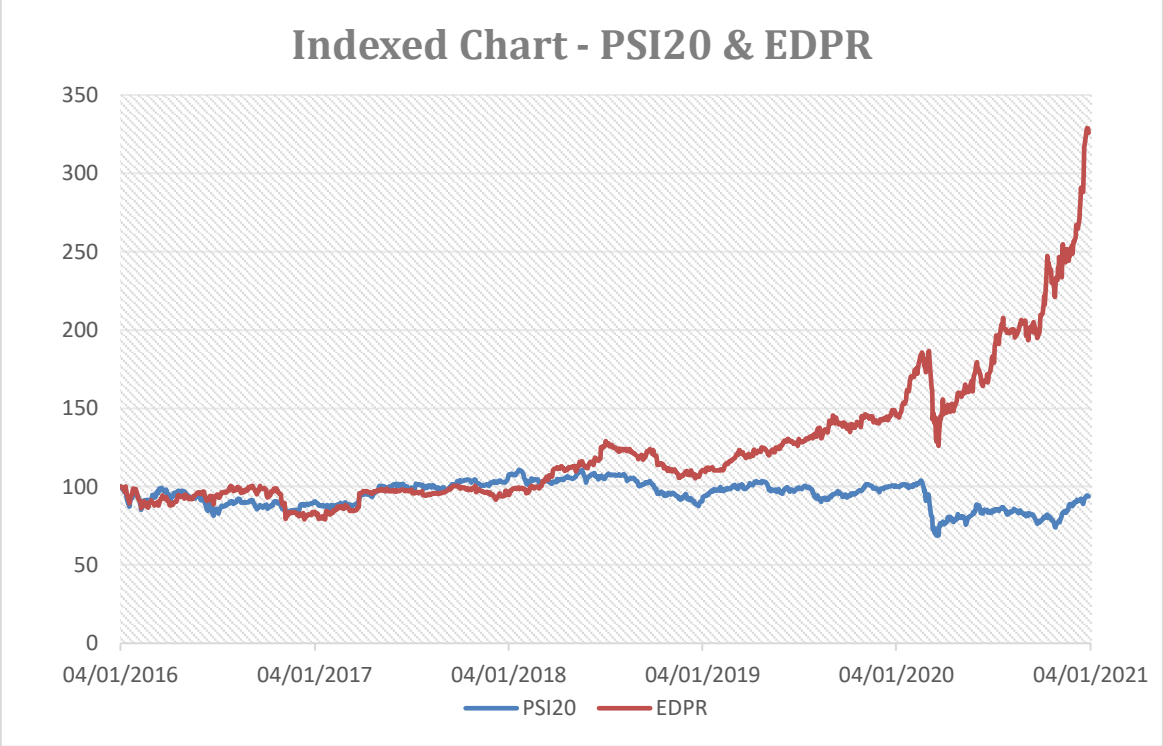

Figure 9: EDP Renováveis share price and market index PSI-20
Source: Bloomberg and Own elaboration

This chart shows the evolution occurred between EDP Renováveis and the market index (PSI-20). It shows how the development occurred along this period, allowing to verify that EDPR had a relative progress substantially higher than PSI-20.

EDPR share price details	2016	2017	2018	2019	2020
Opening Price (€)	7,25	6,04	6,97	7,78	10,42
Closing Price (€)	6,04	6,97	7,78	10,42	22,80
Average Price(€)	6,70	6,57	7,85	9,04	13,57
Market Cap. (€M)	5265	6080	6787	9089	19889
Volume (€M)	291,1	421,9	209,6	162,7	446,8
Dividend per share (€)	0,05	0,05	0,06	0,07	0,08
Total Shareholder Return (%):					
EDPR	-16%	16%	12%	35%	36%
PSI-20	-11%	14%	-13%	10%	-7%

Table 4: EDP Renováveis share price details (€) and Total Shareholder Return (%), (2016-2020)
Source: EDP Renováveis annual reports and own elaboration

The table above shows the share Price details of EDP Renováveis. It can be seen that the total shareholder return (TSR) of EDPR increased considerably in 2019 and 2020, indicating that there is creation of value for company shareholders. The TSR of the PSI-20 index suffered variations from year to year.

5.Valuation

The present valuation will be carried out bearing in mind the financial and operational data of EDPR, based on the approach contained in the chapter on literature review.

It is crucial to point out the models to be used, in accordance with the literature review. Initially, the DCF method will be used, where WACC will also be estimated. Relative valuation will also be used to determine the firm value. As explained in the literature review, the DCF method is largely accepted by investors in the evaluation of companies and businesses.

Forecasts to obtain revenues, EBITDA, depreciations and amortisations and operational provisions are based on historical data, by the renewable energies sector and macroeconomic data but also company data, which will subsequently presented in detail.

It should be noted that 2016 to 2020 will be the base years, 2020 to 2023 will be forecast horizon and 2024 is the basis for the continuing value. Forecasting will consider macroeconomic as well as microeconomic factors.

5.1. Revenues

Sales have been estimated based on electricity generation (GWh) and average sale price (€/GWh), adding profits with institutional partnerships.

It should be referred that sales include other concepts that are not described in EDPR statements of accounts. Such as: other concepts of turnover, non-related to electricity generation, namely rates charged for the management of the portfolio of assets alienated in 2019 and 2020, or O&M service rates rendered to companies; non-qualified derivatives, such as some FTR hedges that charge the price difference between interconnection points in the US market are another indicator. For this reason, there is a difference in the total of sales, but the estimate will be carried out as mentioned previously.

Revenues from 2016 to 2020 were very volatile, as can be seen in the appendix I.

For power generation an average growth rate was considered between 2016 and 2020 of the 3 main markets: Europe, North America, and Brazil. The calculated rate is 4.12%. According to the International Energy Agency (IEA), in the Stated Policies Scenario, global electricity demand grows at 2.1% per year to 2040. Thus, 2.1% have been used as perpetual rate. Subsequently, a CAGR has been carried out, obtaining an annual decrease of 0.5%.

	2020	2021	2022	2023	2024
Electricity Generated (GWh)	28 537	29568	30486	31279	31934

Table 5: EDPR Electricity Generated (GWh) Assumptions (2020-2024)

Source: Own Estimates

In the average sale price (€/GWh), consideration was given to the three main markets, the conversion of MWh to GWh and exchange rates. Price development was studied, and it was found that the average sale price does not grow at the relative inflation for each market; therefore, an average growth from 2016 to 2020 was considered using that rate up to 2023 and in the respective residual year, which is -3,07%.

	2020	2021	2022	2023	2024
Average Selling Price (€/GWh)	0,053	0,052	0,050	0,048	0,047
Europe (€/GWh)	0,081	0,078	0,076	0,073	0,071
North America ($/GWh)	0,044	0,043	0,041	0,040	0,039
Brazil (R$/GWh)	0,218	0,211	0,204	0,198	0,192

Table 6: EDPR Average Selling Price (€/GWh) Assumptions (2020-2024)
Source: Own Estimates

As electricity sales and others are the average selling price multiplied by electricity generated. It has been understood that electricity sales and others do not amount to the same figures shown in the statements of accounts of EDPR, due to the previously explained factors.

	2020	2021	2022	2023	2024
Electricity Sales and Others (€)	1529,2	1525,2	1524,2	1515,8	1500,0

Table 7: EDPR Electricity Sales and Others (€) Assumptions (2020-2024)
Source: Own Estimates

In the income from institutional partnerships, the performance in the last few years, where several variations exist, was analysed and an average growth rate from 2016 to 2020 was established, having obtained a rate of 1.4%.

	2020	2021	2022	2023	2024
Income from institutional partnerships	201,8	204,5	207,3	210,2	213,0

Table 8: EDPR Income from institutional partnerships (€) Assumptions (2020-2024)
Source: Own Estimates

Consequently, the total of Revenues has been achieved.

	2020	2021	2022	2023	2024
Total Revenues	1731,0	1729,8	1731,6	1726,0	1713,0

Table 9: EDPR Total Revenues (€) (2020-2024)
Source: Own Estimates

5.2. EBITDA

The historical evolution of the EBITDA from 2016 to 2020 is explained, in the internal analysis, in company performance.

The margin for the EBITDA in 2020 was used as assumption. EDPR has a very satisfactory margin, increasing between 2016 and 2020. This increase is essentially due to the growth of the EBITDA, showing that EDPR has increased its operational efficiency during that period. It should be noted that relevant operational costs are shown in each annual report of EDPR that is linked to installed capacity, i.e., an operational cost per MW is determined, named Opex/MWh.

Thus, the EBITDA margin for 2020 of 96% has been used as assumption for the remaining estimate years.

	2019	2020	2021	2022	2023	2024
EBITDA Margin (%)	90%	96%	96%	96%	96%	96%

Table 10: EDPR EBITDA Margin (%) Assumptions (2020-2024)
Source: Own Estimates

5.3. Provisions

Provisions are uncertain with regard to timeliness or amount and can only be recognized by an entity when such entity has a present obligation resulting from a past event. In the case of EDPR, it is considered a cost.

Establishing the residual value in the different markets, namely, Europe, Brazil and North America, and since it is not possible to make an exact estimate of provisions, we assumed zero in the estimate years.

5.4. Depreciations, Amortizations and Government grants

Firstly, the fixed assets business was calculated which, in the case of EDPR are Property, plant and equipment, net (PP&E), Right-of-use asset, intangible assets and goodwill, net and Deferred tax asset. A ratio was established for each year, the fixed assets related to revenues between 2016 and 2020. Subsequently, an average margin was established, arriving at a rate of

88,25%. Thus, in order to find the estimate years of the business fixed assets, that same rate was applied to the revenues.

	2020	2021	2022	2023	2024
Fixed Asset Business	15825	15266	15282	15233	15118

Table 11: EDPR Fixed Asset Business (€) Assumptions (2020-2024)
Source: Own Estimates

Later, the lifespan of EDPR fixed assets was checked by dividing fixed assets by revenues, for each year, from 2016 to 2020. Thus, a lifespan of 25 years was used. For depreciations and amortizations, the business fixed asset relating to the lifespan of 25 years were established as assumption.

	2020	2021	2022	2023	2024
D&A	633	611	611	609	605

Table 12: EDPR Depreciations and Amortizations (€) Assumptions (2020-2024)
Source: Own Estimates

Government Grants were considered as depending on Revenues, with the relevant fixed rate for the estimate years of 1.05%.

5.5. Share of profit from associates

For this item, since its forecast is very complex, all the more so in an exact way, it was based on the year 2020, equalling 0 in future years.

5.6. Income Taxes

An effective tax rate is used in the evaluation and for the estimate years, therefore the estimated effective rate was based on the last 4 years, calculating an average of the rates. This will amount to 12,79% in effective tax rate, which will be used, with progressive growth, up to 2024. This calculated rate will show the tax benefits awarded to EDPR for standing in the renewable energies sector. As of the cruise year (2024), the effective rate is 25%.

The marginal tax rate is what should be paid in theory, i.e., according to where company headquarters are located. The marginal tax rate is used where company headquarters are located in Spain, amounting to 25%.

5.7. Capital Expenditures

Capital Expenditures (CAPEX) are costs incurred on fixed assets and all the costs associated to the project (such as installation costs). In the case of EDPR it is essentially associated to investment on wind power machines (turbines), equipment and related setup. Capex is extremely important to EDPR since it allows to expand the company to new projects and countries.

The following formula has been used as assumption to calculate the estimate years in Capex:

$$\text{Fixed Asset Business of the current year} - \text{Fixed Asset Business of the previous year} + \text{D\&A of the current year} \quad (107)$$

Since Capex is investment on fixed asset, mostly on production machinery, namely in wind power, it makes sense to use the following assumption.

	2020	2021	2022	2023	2024
CAPEX	962	52	627	560	491

Table 13: EDPR CAPEX (€) (2020-2024)
Source: Own Estimates

5.8. Working Capital

The working capital is the excess of operational financial requirements relating to operational financial resources. Thus, working capital is the difference between current assets and current liabilities of the company. Consequently, the main items for its calculation have been selected as follows, within the current assets: Accounts Receivable – Trade, Inventories, Other Current Assets, Taxes Receivables and Other Receivables Short-Term. Current liabilities include Other Current Liabilities, Taxation and Social Security, Short-Term Provisions, Trade Payable and Other Payables, Accounts Payable – Trade and Deferred Income Tax Liability (Short-Term).

The assumption for the working capital was based on the Net working capital as per revenues, from 2016 to 2020. Subsequently an average was established as well as a pro rata in order to find the estimate years. As shown in the table below:

	2020	2021	2022	2023	2024
Net Working Capital	-584	-614	-615	-613	-608

Change Working Capital	-34	-30	-1	2	5

Table 14: EDPR Net Working Capital and Change Working Capital (€) (2020-2024)
Source: Own Estimates

5.9. CAPM

The Capital Asset Pricing Model is a method that analyses the ratio between risk and the expected return of a certain investment. CAPM also allows to identify the value of a project.

For the calculation of CAPM, the daily prices and the returns of EDP Renováveis and of Euronext 100, from 2016 to 2020, were used. Subsequently, a regression was carried out, where the value of beta is shown in the coefficients (N>100)

Regression Statistics	
Multiple R	0,50724427
R Square	0,257296749
Adjusted R Square	0,256714693
Standard Error	0,012366368
Observations	1278

Table 15: Regression Statistics
Source: Yahoo Finance, Own Estimates

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	0,067601132	0,067601132	442,048223	1,67076E-84
Residual	1276	0,195134919	0,000152927		
Total	1277	0,26273605			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	0,000816867	0,000345959	2,361168979	0,018367059	0,000138157	0,001495577
^N100	0,623009914	0,029631943	21,02494288	1,67076E-84	0,564877231	0,681142597

Table 16: ANOVA
Source: Own Estimates

For the risk-free interest rate, (r_f) a *yield-to-maturity* bond of the German market of -0.061% has been assumed.

In the calculation of the market rate of return [$E(r_m)$] the following formula has been created:

$$E(r_m)_{Total} = E(r_m)_{EUA} + (CRP_{EUA} \times p_{EUA}) + (CRP_{Europe} \times p_{Europe}) + (CRP_{Brazil} \times p_{Brazil}) \quad (118)$$

Where,

$E(r_m)$: market rate of return.

CRP: Country risk premium.

p: % of total market sales

It should be noted that for the calculation of the CRP_{Europe} the average of $CRP_{Portugal}$ and of CRP_{Spain} was established. The CRP and the $E(r_m)_{EUA}$ were obtained from the Damodaran platform. The accounts of EDPR were used for the calculation of total sales.

Thus, CAPM was subsequently calculated, where the expected return on investment should be 3.30% within the conditions laid down.

CAPM	3,30%
Risk-free ate (r_f)	-0,61%
Market Rate of Return (E[rm])	5,66%
Beta Unlevered (B_U)	0,62

Table 17: CAPM Calculation
Source: Own Estimates

5.10. WACC

To calculate WACC, some assumptions were made. Beta Levered was calculated based on the formula referred in the literature review and the corporate tax rate used was the Spanish rate of 25%. The cost of Equity (r_E) was performed according to the following formula: $r_E = r_f + B_L$ [E(rm) - r_f]. The debt and equity are those of 2020. The Cost of Debt (r_D) was calculated based on the interest expense as related to debt.

Thus, the weighted average cost of capital is 4,29%. An investor who uses this methodology as basis should expect a revenue above this figure to invest in EDP Renováveis. As r_E > WACC is causing return for investors.

Beta Levered (B_L)	1,14
Cost of Equity (r_E)	6,53%
E/(D+E) target ratio	47,48%
D/(D+E) target ratio	52,52%
Risk-free rate (r_f)	-0,61%
Market Rate of Return (E[rm])	5,66%
Rm-Rf	6,26%
Cost of Debt (r_D)	3,01%
WACC	**4,29%**

Table 18: WACC calculation steps
Source: Own Estimates

5.11. Sensitivity analysis

The sensitivity analysis is an important resource both for companies and for investors. Therefore, they should have a sound knowledge of this market and be able to elaborate different scenarios.

A sensitivity analysis has been prepared considering the enterprise value, considering WACC and the growth rate in perpetuity. A change in the WACC of 0.5% has been considered, assuming the variation of WACC of other organizations in this sector, which stand at around these figures. The growth rate varies between 0.2%, we considered a proportionality.

It can be seen that an increase in WACC generates a decrease in and the increase in the share value and growth rate the opposite.

		WACC			
	23,79	3,79%	4,29%	4,79%	5,29%
g	1,40%	28,90	22,70	18,31	15,05
	1,6%	30,78	**23,79**	18,97	15,46
	1,8%	33,03	25,06	19,71	15,91
	2,0%	35,79	26,54	20,57	16,42

Table 19: EDPR Sensitivity analysis
Source: Own Estimates

5.12. Terminal Value

The terminal value is the value of the period subsequent to the time horizon, in this case 2024. Therefore, in order to calculate the Perpetual CF, the following procedure was adopted: $NOPLAT_{2024}*(1+g)$ – Invested $Cpital_{2024}*g$. Our g presents an adjustment of 2,1% to 1,6%, considering that the price reduction in real terms continues to decrease, as far as its perpetuity is concerned. This has led to a Terminal Value amounting to 31,341 million.

	2021	2022	2023	2024
Fixed Asset Business	15266	15282	15233	15118
Net WC	-614	-615	-613	-608
Invested Capital	14652	14667	14620	14510
Perpetual CF	843			
Terminal Value	31341			

Table 20: EDPR Terminal Value steps
Source: Own Estimates

5.13. Discounted Cash Flow Method

Thus, after calculations considering the assumptions and following the established projections, the aim is to estimate the value of the investment based on expected future cash-flows.

DCF	2021	2022	2023	2024
NOPLAT	1068	1069	1066	1058
Depreciation Expenses	611	611	609	605
Taxes	-75	-65	-57	-43
CAPEX	52	627	560	491
Change WC	-30	-1	2	5
FCFF	1582	988	1056	1125

Table 21: EDPR Final DCF (2021-2024)
Source: Own Estimates

The Non-Operating Assets of EDPR are: deferred tax asset, collateral deposits, assets held for sale and cash and cash equivalents. Consequently, a Firm Value amounting to 31443 has been found. The Debt of EDPR are: non-controlling interests, financial debt, institutional partnership, provisions, deferred tax liability, deferred revenues from institutional partnerships

and rent due from lease contracts. The amount of Equity is found by establishing the difference between Firm Value and Debt.

According to this analysis, the intrinsic value of EDP Renováveis is € 23.79 per share and the market price on December 31, 2020, is € 22,8.

Enterprise Value	30803
Non-Operating Assets	639
Firm Value	31443
Debt	8588
Equity	22855
Number of Shares	960,56
Share Value	€ 23,79

Table 22: EDPR Share Value steps

Source: Own Estimates

5.14. Multiples

Besides the approach used in the DCF model, it has been decided to carry out the evaluation by multiples. With multiples, the enterprise value can be compared with the value of companies in the same sector of activity, allowing for the adjustment of values by correcting according to the fact that companies are of different dimensions. The evaluation by multiples is rather intuitive, allowing for control of the differences among companies such as growth potential and risk. Thus, evaluation by multiples should be a complementary method to DCF and not a substitute.

Since EDPR is a renewable energy company, some companies of the same sector were chosen from Bloomberg. As such, the following multiples have been used: EV/EBITDA, P/E, EV/REVENUES and P/Book Value.

Name	EV/EBITDA	P/E	EV/Rev	P/BV
EDP Renovaveis SA	15,58	36,93	12,79	2,51
REN - Redes Energeticas Nacion	8,82	13,01	5,34	1,08
Elia Group SA/NV	14,35	25,51	5,81	1,87
National Grid PLC	10,80	15,50	3,91	1,77
Terna SPA	12,10	16,88	8,65	2,86
Snam SpA	13,59	14,33	10,53	2,40
Italgas SpA	9,26	12,97	6,72	2,50
Severn Trent PLC	13,69	19,77	6,79	5,36
United Utilities Group PLC	14,29	20,84	8,14	2,32
Red Electrica Corp SA	10,20	13,30	8,02	2,51
Pennon Group PLC	14,03	35,34	7,52	1,64
Enagas SA	10,81	13,48	9,66	1,65
Fluxys Belgium SA	12,06	33,50	6,19	3,67
Arithmetic Mean	12,28	20,87	7,70	2,47
Harmonic Mean	11,91	18,06	7,04	2,13

Table 23: EDPR multiples comparisons with competitors

Source: Bloomberg, Own Estimates

It can be seen that EDPR shows a higher EV/EBITDA than the average comparable companies do, essentially due to the higher-than-average growth of EDPR. The higher P/E of EDPR is essentially due to the increase in net earnings on the part of this organization as against the number of shares. It should be noted that EDPR shows a high CAPEX/Sales ratio when compared to its competitors, according to Bloomberg, due to the investment EDPR is making for its future. The EV/Revenues indicator is essentially due to the net operating margin, without taxes, higher than average. The difference in the operating margin is caused by the fact that not all operate in the same sector as well as in different markets, but also because they operate in different business segments. The P/BV of EDPR is only exceeded by Fluxys Belgium SA, showing a value approximately similar to Rec Electrica Corp SA. This high ratio is essentially due to the high investment in assets, in order to sustain its growth. Another factor is the increase in the share price by EDPR.

These indicators lead to the increase in investors' expectations regarding the growth of EDPR in the renewable energies market, which in some way is related to the investment made.

6. Conclusion

EDPR has been chosen with the purpose of finding its share value, based on the assumptions and our forecasts.

Firstly, a presentation and a detailed and comprehensive analysis of the company were carried out, where the following subjects were approached: the various business segments, the operational and financial performance in the last 4 years and the corporate composition. This allowed for a solid and sustainable knowledge regarding the internal aspects, as well as its operation. In the sector analysis, macroeconomic factors were discussed, namely world economy, industry data, green finance, legislation in the main countries, main EDPR competitors and the share performance in more detail. Therefore, we became aware of the renewable energies market and of its directives, this allowed to set the relevant assumptions.

A detailed and exhaustive analysis was carried out regarding EDPR statements of accounts and presentations and contact was made with the chairman of EDPR, António Gomes da Mota, namely for clarification of revenues, load factors and production costs, allowing for a valuation to be carried out in a targeted manner. It was possible to combine the theoretical models (DCF model and evaluation by multiples) with the appropriately prepared and processed assumptions.

Forecasts for the renewable energies sector are rather positive, as proven throughout the present project. As EDPR is a reference in the wind power sector, with the investment made, human assets, know-how and a highly experienced board of directors, excellent results are envisaged for the future, where it will certainly be one of the main players.

Thus, the approach used to bear in mind the industry factor, the company, as well as the economic situation, the compliance with legal rules, the assumptions used and the information obtained allows investors, throughout this project, to understand better the future overview and that it is worth investing in this company.

The market price as of December 31, 2020, is €22.8 compared to €19.81 on 18th July 2021. EDPR has an estimated share value of €23.79 per share, showing an optimistic view on the company's prospects.

It is important to mention the limitations of this project and the clues for further investigation. The limitations are as follows: some growth rates such as share profit from associates are difficult to accurately predict; the fact that EDPR operates in several markets; a market-to-market analysis could be done with a specific WACC and an assessment by segment. The clues for future investigation are: analysis by segment in a detailed and structured way and

how renewable energy companies use real options - a study could be done with those assumptions

Our valuation in combination with the sector allows for the conclusion that EDPR is an excellent investment opportunity in the long term. It is suggested that EDPR should investigate other markets, namely the Asian market, for implementation of new wind power structures.

References

Books and academic material

Berk, J., DeMarzo, P. (2016). ***Corporate finance*** (4th ed.). Upper Saddle River: Pearson.

Damodaran, A. (2002). ***Investment Valuation: Tools and Techniques for Determining the Value of Any Asset*** (2nd ed.). New York: John Wiley & Sons, Inc.

Damodaran, A. (2012). ***Investment valuation: Tools and techniques for determining the Value of Any Asset*** (3rd ed.). New York: John Wiley & Sons, Inc.

Fama, E., & French, K. (2004). ***The capital asset pricing model: Theory and evidence***. *Journal of economic perspectives*, 18(3): 25-46.

Koller, T., Goedhart, M., & Wessels, D. 2010. ***Valuation: Measuring and Managing the Value of Companies***. Chichester: Wiley.

Luehrman, T. (1997a). ***What's it Worth? A General Manager's Guide to Valuation.*** *Boston: Harvard Business Review*.

Fernández, P. (2007), ***Company valuation methods, the most common mistakes in valuation.*** IESE Business School.

Reports

EDP Renováveis. (2016). ***Annual Results Report.***
EDP Renováveis. (2017). ***Annual Results Report.***
EDP Renováveis. (2018). ***Annual Results Report.***
EDP Renováveis. (2019). ***Annual Results Report.***
EDP Renováveis. (2020). ***Annual Results Report.***

Internet References

Aswath Damodaran (2020). ***Damodaran Online*** Retrieved from http://people.stern.nyu.edu/adamodar/ (20-11-2020).

Bloomberg (2020). Retrieved from https://www.bloomberg.com/europe (27-11-2020)

Reuters (2020). ***EDP Renováveis SA*** Retrieved from https://www.reuters.com/companies/EDPR.LS (10-12-2020).

Simply Wall (2020). ***Company Overview.*** Retrieved from https://simplywall.st/stocks/pt/utilities/eli-edpr/edp-renovaveis-shares (05-12-2020).

Guru Focus (2020). ***EDP Renováveis SA***. Retrieved from https://www.gurufocus.com/stock/EDRVF/summary (04-12-2020).

EDP Renováveis (2020). ***Quem somos.*** Retrieved from https://www.edpr.com/pt-pt/quem-somos (20-10-2020).

EDP Renováveis (2020). ***Offshore.*** Retrieved from https://www.edpr.com/pt-pt/offshore#descricao (05-11-2020).

EDP Renováveis (2020). ***Onshore.*** Retrieved from https://www.edpr.com/pt-pt/onshore#descricao (08-11-2020).

EDP Renováveis (2020). ***Solar.*** Retrieved from https://www.edpr.com/pt-pt/solar#descricao (08-11-2020).

EDP Renováveis (2021). ***Relatório e resultados.*** Retrieved from https://www.edpr.com/pt-pt/investidores/informacao-para-investidores/relatorios-e-resultados (10-01-2021).

EDP Renováveis (2021). ***Board Directors*** Retrieved from https://www.edpr.com/en/board-directors (14-01-2021).

International Monetary Fund (2021). ***Real GDP Growth.*** Retrieved from: https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/OEMDC/ADVEC/WEOWORLD (27-01-2021).

International Monetary Fund (2021). ***Inflation rate, average consumer prices.*** Retrieved from https://www.imf.org/external/datamapper/PCPIPCH@WEO/OEMDC/ADVEC/WEOWORLD (19-06-2021).

International Energy Agency (2021). ***Report extract Electricity.*** Retrieved from https://www.iea.org/reports/world-energy-outlook-2019/electricity (12-07-2021).

Yahoo Finance (2020). ***EDP Renováveis SA***. Retrieved from https://finance.yahoo.com/quote/EDPR.LS (14-08-2020).

Appendixes

Financial Data (€m)	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Revenues	**581,4**	**724,7**	**947,7**	**1 068,8**	**1 285,2**	**1 316,4**	**1 276,7**	**1 547,1**	**1 650,8**	**1 827,2**	**1 696,7**	**1 823,7**	**1 730,8**
Operating costs, Other operating income & Share of profit	(143,6)	(182,1)	(234,9)	(268,1)	(347,6)	(395,8)	(373,5)	(404,8)	(479,8)	(460,9)	(396,8)	(175,7)	(76,0)
EBITDA	**437,9**	**542,6**	**712,8**	**800,7**	**937,6**	**920,5**	**903,2**	**1 142,3**	**1 171,0**	**1 366,3**	**1 299,9**	**1 648,0**	**1 654,7**
EBITDA / Revenues	75%	75%	75%	75%	73%	70%	71%	74%	71%	75%	77%	90%	96%
EBIT	231,6	230,8	289,9	347,5	450,1	473,0	422,4	577,8	564,0	803,1	753,7	1 055,2	1 054,0
Net Financial Expenses	(74,9)	(72,2)	(174,2)	(233,6)	(274,9)	(261,7)	(249,9)	(285,5)	(350,1)	(301,6)	(219,7)	(349,5)	(285,1)
Net Profit (Equity holders of EDPR)	**104,4**	**114,4**	**80,2**	**88,6**	**126,3**	**135,1**	**126,0**	**166,6**	**56,3**	**275,9**	**313,4**	**475,1**	**555,7**
Operating Cash-Flow	294	392	567	643	666	677	707	701	869	981	985	1 089	908
Retained Cash Flow[i]	0	0	0	0	0	0	0	0	698	1 114	972	1 266	1 402
Capex	2 091	1 846	1 401	829	612	627	732	903	1 029	1 051	1 275	1 109	2 098
PP&E (net)	7 142	8 635	9 982	10 455	10 537	10 095	11 013	12 612	13 437	13 185	13 922	13 264	13 492
Equity	5 199	5 328	5 394	5 454	5 749	6 089	6 331	6 834	7 573	7 895	8 122	8 335	8 624
Net Debt	1 069	2 134	2 848	3 387	3 305	3 268	3 283	3 707	2 755	2 806	3 060	2 803	3 443
Institutional Partnership Liability	852	835	934	1 024	942	836	1 067	1 165	1 520	1 249	1 269	1 287	1 143
Rents due from lease contracts												618	689

Appendix A: EDPR Financial Data
Source: EDP Renováveis

Operating Data	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Installed Capacity (EBITDA MW + Eq. Consolidated)	**4 400**	**5 576**	**6 676**	**7 483**	**7 987**	**8 565**	**9 036**	**9 637**	**10 408**	**11 007**	**11 672**	**11 362**	**12 168**
Europe	2 477	2 938	3 439	3 977	4 266	4 796	4 938	5 141	5 163	5 213	5 424	4 553	4 956
North America	1 923	2 624	3 224	3 422	3 637	3 685	4 014	4 412	5 041	5 464	5 781	6 342	6 766
Brazil	0	14	14	84	84	84	84	84	204	331	467	467	436
Electricity Generated (GWh)	**7 807**	**10 907**	**14 352**	**16 800**	**18 445**	**19 187**	**19 763**	**21 388**	**24 473**	**27 621**	**28 359**	**30 041**	**28 537**
Europe	3 900	4 975	6 632	7 301	8 277	9 187	9 323	10 062	11 230	11 669	11 480	11 791	10 024
North America	3 907	5 905	7 689	9 330	9 937	9 769	10 204	11 103	12 576	15 091	15 644	16 492	17 421
Brazil	0	26	31	170	231	230	236	222	666	861	1 235	1 757	1 093
Load Factor (%)	**30%**	**29%**	**29%**	**29%**	**29%**	**30%**	**30%**	**29%**	**30%**	**31%**	**30%**	**32%**	**30%**
Europe	26%	26%	27%	25%	26%	28%	27%	26%	26%	27%	26%	28%	26%
North America	34%	32%	32%	33%	33%	32%	33%	32%	33%	35%	34%	34%	33%
Brazil	0%	22%	26%	35%	31%	31%	32%	30%	35%	43%	40%	43%	38%
Average Selling Price (€/MWh)	**65,9**	**58,8**	**58,4**	**57,7**	**63,5**	**62,6**	**58,9**	**64,0**	**60,5**	**59,2**	**53,7**	**54,7**	**53,2**
Europe (€/MWh)	98,0	87,2	84,2	88,0	94,2	89,3	80,3	83,0	81,5	81,0	77,4	77,3	80,6
North America ($/MWh)	33,2	34,7	34,3	32,8	47,1	48,4	50,8	51,0	46,4	46,4	45,3	45,3	44,0
Brazil (R$/MWh)	0,0	0,0	109,4	119,7	286,4	309,2	346,4	370,4	216,1	288,8	195,4	205,3	217,6

Appendix B: EDPR Operating Data

Source: EDP Renováveis

Consolidated Income Statement (€m)	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Electricity sales and other	520,2	642,0	840,6	957,2	1 157,8	1 191,2	1 153,1	1 349,6	1 453,2	1 601,6	1 511,5	1 642,1	1 529,0
Income from institutional partnerships	61,2	82,7	107,0	111,6	127,4	125,1	123,6	197,4	197,5	225,6	185,2	181,6	201,8
Revenues	**581,4**	**724,7**	**947,6**	**1 068,8**	**1 285,1**	**1 316,3**	**1 276,7**	**1 547,0**	**1 650,8**	**1 827,2**	**1 696,7**	**1 823,7**	**1 730,8**
Other operating income	28,3	42,6	73,0	84,5	63,1	41,4	45,7	161,6	53,8	94,9	192,0	399,7	498,4
Operating costs	(171,8)	(224,7)	(307,9)	(352,6)	(410,7)	(437,2)	(419,2)	(566,3)	(533,6)	(555,8)	(588,7)	(575,3)	(568,3)
Supplies and services	(106,9)	(148,3)	(196,2)	(225,1)	(261,8)	(255,2)	(256,6)	(292,7)	(304,7)	(326,9)	(345,3)	(309,0)	(304,4)
Personnel costs	(38,1)	(42,5)	(54,8)	(60,8)	(62,7)	(66,5)	(66,1)	(84,3)	(93,9)	(100,8)	(115,0)	(130,7)	(141,2)
Other operating costs	(26,8)	(33,8)	(56,9)	(66,7)	(86,2)	(115,6)	(96,4)	(189,3)	(134,9)	(128,2)	(128,4)	(135,6)	(122,7)
Share of profit from associates	-	-	-	-	-	-	-	-	-	-	-	-	(6,1)
EBITDA	**437,9**	**542,5**	**712,7**	**800,7**	**937,6**	**920,5**	**903,2**	**1 142,3**	**1 171,0**	**1 366,3**	**1 299,9**	**1 648,0**	**1 654,7**
EBITDA/Revenues	75,3%	74,9%	75,2%	74,9%	73,0%	69,9%	70,7%	73,8%	70,9%	74,8%	76,6%	90,4%	95,6%
Provisions	0,8	0,2	0,2	0,3	0,0	(1,3)	(0,0)	0,2	(4,7)	0,2	(0,3)	(1,2)	(0,7)
Depreciation and amortisation	(207,8)	(314,3)	(434,4)	(468,5)	(502,7)	(464,7)	(499,8)	(587,5)	(624,5)	(582,9)	(562,0)	(609,0)	(616,6)
Amortisation of deferred income (government grants)	0,7	2,4	11,4	15,0	15,2	18,5	19,0	22,8	22,2	19,5	16,2	17,3	16,6
EBIT	**231,6**	**230,8**	**289,9**	**347,5**	**450,1**	**473,0**	**422,4**	**577,8**	**564,0**	**803,1**	**753,7**	**1 055,2**	**1 054,0**
Financial income/(expense)	(74,9)	(72,2)	(174,1)	(233,6)	(274,8)	(261,7)	(249,9)	(285,5)	(350,1)	(301,6)	(219,7)	(349,5)	(285,1)
Share of profit from associates	4,4	3,9	5,0	4,8	6,8	14,7	21,8	(1,5)	(0,2)	2,7	1,6	3,4	-
Pre-tax profit	**161,2**	**162,5**	**120,8**	**118,7**	**182,1**	**226,0**	**194,3**	**290,8**	**213,7**	**504,3**	**535,6**	**709,1**	**768,9**
Income taxes	(49,0)	(44,8)	(37,8)	(28,0)	(46,0)	(56,9)	(16,4)	(45,3)	(37,6)	(48,1)	(63,4)	(86,4)	(86,1)
Profit of the period	112,2	117,8	83,0	90,6	136,0	169,1	177,9	245,5	176,1	456,2	472,2	622,7	682,9
Equity holders of EDPR	**104,4**	**114,3**	**80,2**	**88,6**	**126,3**	**135,1**	**126,0**	**166,6**	**56,3**	**275,9**	**313,4**	**475,1**	**555,7**
Non-controlling interests	7,9	3,4	2,8	2,0	9,8	34,0	51,9	78,9	119,8	180,3	158,8	147,5	127,2

Appendix C: EDPR Consolidated Income Statement

Source: EDP Renováveis

Consolidated Balance Sheet (€m)													
Assets (€m)	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
Property, plant and equipment, net	7 053	8 635	9 982	10 455	10 537	10 095	11 013	12 612	13 437	13 185	13 922	13 264	13 492
Right-of-use asset	-	-	-	-	-	-	-	-	-	-	-	616	674
Intangible assets and goodwill, net	1 395	1 336	1 367	1 334	1 327	1 301	1 405	1 534	1 596	1 546	1 577	1 490	1 537
Financial Investments, net	53	60	64	61	57	346	376	340	348	312	357	476	488
Deferred tax asset	22	28	39	56	89	109	46	47	76	64	174	126	122
Inventories	12	11	24	24	16	15	21	23	24	29	36	34	55
Accounts receivable - trade, net	83	106	144	146	180	202	146	222	266	364	334	303	279
Accounts receivable - other, net	512	637	757	750	800	655	859	338	338	235	540	556	999
Financial assets at fair value through profit and loss	36	37	36	0	0	0	-	-	-	-	-	-	-
Collateral deposits	-	-	-	-	49	78	81	73	46	43	39	32	31
Assets held for sale	1	-	-	-	-	-	-	110	-	58	8	214	12
Cash and cash equivalents	230	444	424	220	246	255	369	437	603	388	552	582	474
Total Assets	**9 397**	**11 294**	**12 835**	**13 045**	**13 302**	**13 058**	**14 316**	**15 736**	**16 734**	**16 224**	**17 539**	**17 693**	**18 163**
Equity (€m)	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
Share capital + share premium	4 914	4 914	4 914	4 914	4 914	4 914	4 914	4 914	4 914	4 914	4 914	4 914	4 914
Reserves and retained earnings	89	192	274	325	384	623	742	891	1 155	1 146	1 282	1 584	1 878
Consolidated net profit attrib. to equity holders of the parent	104	114	80	89	126	135	126	167	56	276	313	475	556
Non-controlling interests	83	107	126	127	325	418	549	863	1 448	1 560	1 613	1 362	1 276
Total Equity	**5 190**	**5 328**	**5 394**	**5 454**	**5 749**	**6 089**	**6 331**	**6 834**	**7 573**	**7 895**	**8 122**	**8 335**	**8 624**
Liabilities (€m)	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
Financial Debt	1 462	2 673	3 534	3 826	3 874	3 666	3 902	4 220	3 406	3 237	3 650	3 417	3 947
Institutional Partnership	895	920	1 009	1 011	942	836	1 067	1 165	1 520	1 249	1 269	1 287	1 143
Provisions	51	67	54	58	64	65	99	121	275	276	295	278	315
Deferred Tax liability	303	343	372	381	381	367	270	316	365	356	463	355	427
Deferred revenues from institutional partnerships	202	434	635	773	738	672	735	791	819	915	962	1 003	790
Rents due from lease contracts												618	689
Other liabilities	1 293	1 529	1 839	1 542	1 555	1 363	1 912	2 288	2 776	2 297	2 777	2 400	2 227
Total Liabilities	**4 206**	**5 966**	**7 442**	**7 591**	**7 553**	**6 969**	**7 986**	**8 902**	**9 161**	**8 329**	**9 416**	**9 358**	**9 539**
Total Equity and Liabilities	**9 397**	**11 294**	**12 835**	**13 045**	**13 302**	**13 058**	**14 316**	**15 736**	**16 734**	**16 224**	**17 539**	**17 693**	**18 163**

Appendix D: EDPR Consolidated Balance Sheet

Source: EDP Renováveis

	2016	2017	2018	2019	2020	2021	2022	2023	2024
Electricity Generated (GWh)	**24 473**	**27 621**	**28 359**	**30 041**	**28 537**	**29568**	**30486**	**31279**	**31934**
Europe	11 230	11 669	11 480	11 791	10 024	10437	10866	11313	12 710
North America	12 576	15 091	15 644	16 492	17 421	18138	18884	19661	22 089
Brazil	666	861	1 235	1 757	1 093	1138	1184	1233	1 385

Appendix E: Forecasted EDPR Electricity Generated (GWh)

Source: Own Estimates

	2016	2017	2018	2019	2020	2021	2022	2023	2024
Average Selling Price (€/GWh)	**0,061**	**0,059**	**0,054**	**0,055**	**0,053**	**0,052**	**0,050**	**0,048**	**0,047**
Europe (€/GWh)	0,081	0,081	0,077	0,077	0,081	0,078	0,076	0,073	0,071
North America ($/GWh)	0,046	0,046	0,045	0,045	0,044	0,043	0,041	0,040	0,039
Brazil (R$/GWh)	0,216	0,289	0,195	0,205	0,218	0,211	0,204	0,198	0,192

Appendix F:Forecasted EDPR Average Selling Price (€/GWh)

Source: Own Estimates

	2016	2017	2018	2019	2020	2021	2022	2023	2024
Electricity Sales and Others (€ M)	1 455,0	1 604,2	1 498,6	1 649,8	1 529,2	1 525,2	1 524,2	1515,8	1500,0

Appendix G: Forecasted EDPR Electricity Sales and Others (€)
Source: Own Estimates

	2016	2017	2018	2019	2020	2021	2022	2023	2024
Income from institutional partnerships	197,5	225,6	185,2	181,6	201,8	204,5	207,3	210,2	213,0

Appendix H: Forecasted EDPR Income from institutional partnerships (€)
Source: Own Estimates

YEARS		2016A	2017A	2018A	2019A	2020A	2021E	2022E	2023E	2024E
Revenues		**1 650,8**	**1 827,2**	**1 696,7**	**1 823,7**	**1 730,8**	**1 729,8**	**1 731,6**	**1 726,0**	**1 713,0**
Other Operating income		53,8	94,9	192,0	399,7	498,4				
Suplies and Services		-304,7	-326,9	-345,3	-309,0	-304,4				
Personnel Costs		-93,9	-100,8	-115,0	-130,7	-141,2				
Other Operating Costs		-134,9	-128,2	-128,4	-135,6	-122,7				
Share of profit from associates		0,0	0,0	0,0	0,0	-6,1				
Operating Costs		**-533,6**	**-555,8**	**-588,7**	**-575,3**	**-574,4**				
EBITDA		**1 171,0**	**1 366,3**	**1 299,9**	**1 648,0**	**1 654,8**	**1 661**	**1 662**	**1 657**	**1 645**
EBITDA Margin		71%	75%	77%	90%	96%	96%	96%	96%	96%
Provisions		-4,7	0,2	-0,3	-1,2	-0,7	**0**	**0**	**0**	**0**
D&A		-624,5	-582,9	-562,0	-609,0	-616,6	-611	-611	-609	-605
D&A/Revennues		**-38%**	**-32%**	**-33%**	**-33%**	**-36%**	**-34%**	**-34%**	**-34%**	**-34%**
Amortisation of deferred income (government grants)		22,2	19,5	16,2	17,3	16,6	**18,2**	**18,3**	**18,2**	**18,1**
Government Grants/Revennues		**1,35%**	**1,07%**	**0,95%**	**0,95%**	**0,96%**	**1,05%**	**1,05%**	**1,05%**	**1,05%**
EBIT		**564,0**	**803,1**	**753,7**	**1 055,2**	**1 054,0**	**1 068,2**	**1 069,3**	**1 065,8**	**1 057,8**
Financial income/expense		(350,1)	(301,6)	(219,7)	(349,5)	(285,1)	-297	-309	-321	-334
Share of profit from associates		(0,2)	2,7	1,6	3,4		0	0	0	0
Pre-tax profit		**213,7**	**504,3**	**535,6**	**709,1**	**769,0**	**771,5**	**760,6**	**744,6**	**723,6**
Income taxes		(37,6)	(48,1)	(63,4)	(86,4)	(86,1)	-75	-65	-57	-43
Profit of the period		176,1	456,2	472,2	622,7	682,9	696,5	695,1	687,5	680,8

Appendix I: Forecasted EDPR Consolidated Income Statement (Million €)

Source: Own Estimates

YEARS	2016	2017	2018	2019	2020	2021	2022	2023	2024
Fixed Assets business	15109	14795	15673	15496	15825	15266	15282	15233	15118
New D&A					633	611	611	609	605
Capex					962	52	627	560	491

Appendix J: Forecasted from Fixed Assets, New D&A and Capex
Source: Own Estimates

YEARS	2016	2017	2018	2019	2020
Accounts Receivable - Trade	280,5	323,1	313,8	284,1	279,0
Inventories	23,9	28,6	35,6	34,1	55,0
Other Current Assets	17,1	10,0	13,2	11,4	—
Acounts receivables	280,5	323,1	313,8	284,1	279,0
Taxes Receivables	77,6	72,1	59,5	55,5	140,8
Other Receivables Short-Term	102,5	114,2	370,8	393,4	999,0
Current Assets	782,2	871,2	1 106,7	1 062,6	1 752,8
Other Current Liabilities	—	—	—	—	2 227,0
Taxation And Social Security	88,4	90,3	86,8	92,8	109,8
Short-Term Provisions	5,5	5,4	5,2	5,7	—
Trade Payable And Other Payables	1 618,3	1 066,4	1 716,3	1 514,6	—
Accounts Payable - Trade	—	—	—	—	—
Deferred Income Tax Liability (Short-Term)	—	—	—	—	—
Current Liabilities	1 712,3	1 162,0	1 808,4	1 613,1	2 336,8
Net Working Capital	-930,1	-290,8	-701,6	-550,5	-584

Appendix K: Net Working Capital steps
Source: Bloomberg, Own Estimates