LISBON
SCHOOL OF
ECONOMICS &
MANAGEMENT
UNIVERSIDADE DE LISBOA

Masters in Finance

Masters Final Work Project

Equity Research – EDP Renováveis, S.A.

André Daniel Alves Ramos

October – 2016

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Supervisor: Prof. Ana Isabel Ortega Venâncio

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Acknowledgements

The journey that now comes to a close began in late 2013. Almost three years later, and after many hardships endured, both personal and professional, it is time to present the final paper of the Master in Finance. A herculean task, and one that I would not have been able to successfully achieve without the help of the people around me. This dissertation is also theirs, in one way or another.

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Last but not least, to Marta. You are my rock and pillar. Your support pushes me forward. All in.

Abstract

EDP Renováveis, S.A. (EDPR) is a multinational Portuguese company operating in the field of renewable energy, with key positions in a number of important global markets. Benefiting from a well-devised growth and expansion strategy, EDPR has had a consistent performance and sustainable growth in revenues in recent years, despite the current macroeconomic scenario.

The goal of this study is to value EDPR stocks and determine the firm value. To this end, an equity report was developed. The company's performance was therefore evaluated, along with its growth perspectives and the factors which, directly and indirectly, have an impact on its operational outcome. The main drivers of the value are the company's growth in revenues and the implementation of its Asset Rotation Program. The valuation methods applied were the Adjusted Present Value (APV) method and the Relative Valuation (multiples) method.

We estimate that the EDPR's firm value is € 16.169 million, corresponding to a price target of € 9.20, thus representing a 27% depreciation when compared to its trading price of € 7.25 on the 31.12.2015. The Relative valuation computed also shows that EDPR's share price is undervalued when in comparison to the same date. Finally, a Monte Carlo simulation was performed to further complement the report. We therefore provide potential investors with a buy recommendation.

Keywords: Equity Research; EDP Renováveis; Firm Valuation; Equity Value; Discounted Cash-Flow (DCF); Multiples; Monte Carlo Simulation.

Resumo

A EDP Renováveis, S.A. (EDPR) é uma empresa portuguesa internacional que opera no campo das energias renováveis, com posições-chave num importante número de mercados globais. Beneficiando de uma sólida estratégia de crescimento e expansão, tem registado uma *performance* constante e uma evolução positiva nas receitas nos últimos anos, não obstante o actual contexto macroeconómico.

A dissertação em mãos tem como objectivo avaliar as acções da EDPR e determinar o valor de avaliação da empresa. Para o efeito foi realizado um *equity report* com vista a apurar a *performance* da companhia como um todo, bem como ao sector de indústria em que está inserida, as suas perspectivas de crescimento e os factores que, directa e indirectamente, têm impacto no *outcome* operacional. Os principais *drivers* para o bom desempenho da empresa são o crescimento das vendas e o sucesso do Programa de Rotação de Activos. Os métodos de avaliação escolhidos foram o Adjusted Present Value (APV) e a Avaliação por Múltiplos.

De acordo com a avaliação realizada o valor da empresa situa-se nos € 16.169 milhões, correspondendo a um preço-alvo de € 9.20, 27% abaixo do seu valor intrínseco de € 7.25 à data de 31.12.2015. A avaliação por múltiplos fundamentou o resultado obtido pelo APV, estimando o preço-alvo da empresa acima do seu valor na data em análise. Por último foi efectuada a simulação de Monte Carlo, tendo corroborando os resultados obtidos previamente. Apresentamos portanto aos potenciais investidores uma recomendação de compra.

Keywords: Equity Research; EDP Renováveis; Firm Valuation; Equity Value; Discounted Cash-Flow (DCF); Multiples; Monte Carlo Simulation.

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Abbreviations

APV – Adjusted Present Value

BR – Brazil

CAPEX – Capital Expenditures

CAPM – Capital Asset Pricing Model

CDS – Credit Default Swap

D – Net Debt

DCF – Discounted Cash Flow

DDM – Dividend Discount Model

E – Equity

EBIT – Earnings Before Interests and Taxes

EBITDA – Earnings Before Interests, Taxes, Depreciation and Amortization

EDP – Energias de Portugal

EDPR – Energias de Portugal Renováveis

EEA – European Energy Agency

EIA – Energy Information Administration

ENEOP – Energias Eólicas de Portugal

EPS – Earnings per Share

EV – Enterprise Value

EVA – Economic Value Added

EU – European Union

EWEA – European Wind Energy Association

FCFE – Free Cash Flow to Equity

FCFF – Free Cash Flow to Firm

G – Growth Perpetuity Rate

GDP – Gross Domestic Product

GWEC – Global Wind Energy Council

IEA – International Energy Association

IRENA – International Renewable Energy Agency

IMF – International Monetary Fund

NA – North America

NASDAQ – National Association of Securities Dealers Automated Quotations

NREL – National Renewable Energy Laboratory

NYSE – New York Exchange

PBV – Price to Book Value

PEG – Price/Earnings to Growth

PER – Price/Earnings ratio

PPA – Power Purchase Agreements

PSR – Price/Sales ratio

PTC – Production Tax Credits

PV – Present Value

REN21 – Renewable Energy policy Network for the 21st century

RES – Renewable Energy Source

Rf – Risk free rate

SWOT – Strenghts, Weaknesses, Opportunities and Threats

T – Marginal tax rate

WACC – Weighted Average Cost of Capital

1. Introduction

EDP Renováveis (EDPR) is a global leading renewable energy company, whose business focuses on the development, building, operating and subsequent management of wind farms and solar plants around the globe. The company focuses on the providing quality service and material, thus enabling and creating the ground for new projects indoors and overseas.

In this study we will assess EDPR's enterprise value, as well as the intrinsic value of its stocks, by performing an equity research. To do so, we analyze EDPR financial data, business units' performance, firm risks and opportunities.

According to EDPR's characteristics, we apply the discounted cash-flow (DCF) model, in order to study the firm as a whole. The company is currently implementing an Asset Rotation Program scheduled to end in 2017, and according to its Chief Financial Officer (CFO) the firm's capital structure will be variable throughout the next years. Therefore, the Adjusted Present Value (APV) is the most appropriate method. To validate the previous valuation, we also apply Relative Valuation, by comparing EDPR with its peer's performance. Finally, a Monte Carlo Simulation will be computed, in order to further complement the results obtained.

It is important to note, nevertheless, that given the specificity of the utility industry regulations, previous studies suggest that the valuation process should be performed with a cautionary eye. According to Fernandez (2007), utility companies' growth rate is stable and usually indexed to the Consumer Price Index (CPI), making it easier to discount the cash flows, albeit the need of constant awareness of uncertainties derived from regulatory changes. Blacconiere et al. (2000) examined the impact of

deregulation in the renewable energy market, and its relation between market value, book value and earnings. They predicted that the effect deregulation increases the importance of book value when explaining the price. On the other hand, Menegaki, (2008) suggested that when valuing renewable energy projects, the analyst should do an environmental cost-benefit analysis.

We estimate that the EDPR's firm value is € 16.169 millions, corresponding to a price target of € 9.20. Considering that in 31.12.2015 EDPR's stocks were trading at € 7.25, we provide potential investors with a buy recommendation. The main drivers of the value are the company's growth in revenues and the implementation of its Asset Rotation Program.

This study is structured as follows: in the next section, a literature review is presented, addressing the importance of valuation and overviewing the valuation methods; afterwards, an analysis of EDPR economic and financial performance is undertaken, covering its business areas, stock performance and market outlook; section four identifies the business risks and opportunities that the company faces, from the industry as a whole to the countries in which it operates, as well as the regulatory aspects of the market in which it is inserted; in section five we present the methodology and the main assumptions; next, a valuation of the company is conducted; the final section will contain the conclusions drawn from the study and the respective recommendation to be given to the investors.

2. Literature Review

2.1. The Importance of Firm Valuation

Valuation lies at the heart of finance (Damodaran, 2002). It provides a means for measuring the impact of a company's policies and strategies on value creation (Fernandez, 2007). As every asset has a value, the key to successfully invest and manage assets lies in understanding not only the value but also the drivers of its value (Damodaran, 2002).

The guideline principle of value creation is that companies must realistically assess market opportunities and the competitive industry environment (Goedhart et al, 2010). According to Damodaran (2004), one must first understand the factors that exert a degree of influence over a company's value, in order to formulate solid investment decisions. A valuation process is comprised not only of objective factors, but subjective and contingent phenomenon as well (Neves, 2002).

The main purpose of valuation is to compare between the value estimated and the price of the stock, thus allowing analysts to give investors recommendations on whether to buy, sell or hold shares (Fernandez, 2007). When in the process of assessing a value, the analyst must first determine the context, the purpose, the advantages to be held from the buy/sell operation and the time-frame in which the valuation is being made (Neves, 2002).

According to Luehrman (1997), asset valuation is no longer exclusive to financial analysts. Understanding how the value is created has become a prerequisite for managers to meaningful participate in firm's resource-allocation decisions. It provides

insights for the strategic planning of their businesses, thus endowing a broader perspective in the decision process.

2.2. Valuation Methods

Although valuation models range from simple to complex and include different assumptions, they share common characteristics (Damodaran, 2006). According to Damodaran (2002) and Fernandez (2007) there are four valuation methods, namely the Asset Based Valuation, the Contingent Claim Valuation, Relative Valuation and Discounted Cash Flow Valuation (DCF). An overview of models will be presented henceforth.

2.2.1. Asset Based Valuation

A business is valued by the book value of its individual assets (Damodaran, 2015). The method is applied by valuing each asset separately (Damodaran, 2006). There are four main models to the method – book value, adjusted book value, liquidation value, and substantial value. It is a method to be performed when a company does not intend to pursue its business activities, and thus it is a variant of the Reproduction Valuation method. In the latter method, the value depends on the replacement costs (Meitner, 2006). This method does not take into consideration company growth or other factors that may influence the firm, such as internal restructuring or changes in market conditions.

2.2.2. Contingent Claim Valuation

The method consists in using option pricing models to measure the value of assets (Damodaran, 2012). Unlike the traditional DCF methods, this method provides the analyst to adjust the guidelines of the project when facing changes in market

conditions (Copeland and Keenan, 1998; Damodaran, 2012). Option pricing can also be used as a complementary tool to the valuation methodology by helping rethink the decision process derived from traditional DCF (Luehrman, 1997). The most common models are the Black-Scholes Model and the Binomial Model. Both require numerous inputs and variables, making them less intuitive and more likely to generate errors in the estimation. Furthermore, they are of difficult applicability in certain cases, given their high dependency on the financial capacity of the firm (Luehrman, 1997).

2.2.3. Relative Valuation

The goal of relative valuation is to compare the prices of similar assets in the market. This method assumes that comparative assets or substitutes should have the same price (Baker and Ruback, 1999). This method is often viewed as complementary to the DCF analysis. It enables a broader understanding of the cash flow forecasts and, it provides insights into the key factors that create value in an industry (Goedhart et al., 2005). In some cases, this method is used to estimate the terminal value in the DCF (Lie et al., 2001). According to Fernandez (2002), after performing a valuation by a different method, the analyst should compare the multiples of comparable firms in order to identify the differences between comparable firms and the firm that is under analysis. Damodaran (2004) states that the multiples method requires fewer assumptions than the DCF valuation, and it's a simple approach which provides a more understandable conclusion for the stakeholders. Moreover, it provides a more accurate market conjecture, by market price comparison. However, it can sometimes lead to over or underestimating the results due to multiple manipulation by the analyst. Previous literature identifies four multiples that are commonly used in

relative valuation – Price-to-Earnings Ratio (PER), Price-to-Book Ratio (PBV), Enterprise Value-to-EBITDA (EV/EBITDA) and Price/Earnings-to-Growth Ratio (PEG).

2.2.4. Discounted Cash-Flow (DCF)

Discounted Cash Flow (DCF) valuation consists in valuing an asset by discounting the expected cash flows of an asset at a rate that reflects its risk. It estimates the intrinsic value of the asset (Damodaran, 2004). This method is the most accurate and flexible (Goedhart et. al, 2005 and Fernandez, 2007). It is used not only for valuing companies but to price other financial assets, as well as defining the initial price of the firm, in Initial Public Offerings (IPOs) (Luehrman, 1998). According to Damodaran (2002) there are three main DCF models: Equity Valuation models, Firm Valuation Model and the Adjusted Present Value (APV) model.

Equity valuation models estimate directly the company's equity (Goedhart et. al., 2005) and are comprised of the Dividend Discount Model (DDM) and the Free Cash-flow to Equity model (FCFE). The DDM was first introduced by Williams (1938) and revised by Gordon (1962) to what is currently known as the Gordon Model (Berk and DeMarzo, 2014). The model assumes a constant perpetual growth rate for the dividends of the firm and is efficient in estimating the value of stable companies (Farrel, 1985). This method applies to firms that are rapidly growing. However, it is sensible to inputs on the rate and can lead to erroneous valuation results (Damodaran, 2002). The FCFE model is very similar to the DDM, with the difference in both being the fact that here potential dividends are discounted (Damodaran, 2002). The main problem in using this method occurs if the debt levels of the firm are expected to

change over time, thus making it difficult to estimate debt repayments and issuing of new debt (Damodaran, 2006).

Firm valuation models comprise the sum of all the cash flows, its equity holders and debt holders (Damodaran, 2002). The two most common models are the free cash flow to firm (FCFF) and the economic value added (EVA). The FCFF is computed by discounting the cash flows of all claim holders in the company by the weighted average cost of capital (WACC) (Damodaran, 2006). According to Damodaran (2002) and Fernandez (2010), the FCFF is the most convenient method for firms with a fixed capital structure. Goedhart et al. (2005) state that the method can be used in valuing investment projects and in the valuation of multi-businesses companies. The EVA measures the performance and residual income used by companies to achieve the value for the shareholders (Brealy et al., 2008). Managers can take advantage of its simplicity and distort the valuation process by trading off future growth for higher economic value today.

The Adjusted Present Value Model (APV) was first introduced by Myers (1974). According to Luehrman (1997), this method is the most versatile, reliable, transparent and flexible. It gives managers the opportunity to analyze the firm from different perspectives. This method is considered the best approach when valuing high leverage transactions (Arzac, 1996). Sabal (2007) states that when computing the present value of the tax shields in the APV there is no need to choose a constant tax rate, as oppose to the WACC approach, given that the tax shields are obtained period-by-period and therefore seen as more realistic. According to Damodaran (2006) it presents certain limitations, such as not being the most accurate method for valuing projects.

3. Company Overview

3.1. Company History

Energias de Portugal (EDP) was created in 1976 via the merger of thirteen companies that had been previously acquired by the Portuguese government in 1975. As Portugal's main utilities company, EDP became responsible for the electrification of the whole country, the modernization and enlargement of the electricity distribution network. By the mid 1980s EDP's distribution network already covered 97 % of Portugal and secured 80% of the supply of electricity at low voltage.

In 2006, 35% of the energy produced by EDP was through renewable energy sources, and, as of the end of 2007, the company announced that 39% of its energy was already emissions-free.

In 2008, EDP established renewable energy subsidiary, EDP Renováveis (EDPR), headquartered in Madrid, Spain. EDP owns 77.5% of EDPR's share capital and voting rights. Since then, the newly created venture has grown to be the leading global player in the renewable energy market. EDPR operates in several markets around the world and is continuously expanding its business to new regions. The company was listed publicly in 2008, in the NYSE Euronext Lisbon with the ticker EDPR.LS.

In 2011, EDP and China Three Gorges ensued negotiations for the acquisition of Portugal's equity stake in the first by the latter, aiming to make the Chinese company the biggest shareholder in the nation's largest energy company. China Three Gorges acquired 21.35% of equity stake in EDP for 3.45€ per share, ascending up to 2.7 billion Euros. The joint-venture aimed at the combined efforts of both companies to become

a force to be reckoned in the field of renewable energies; to this end China Three Gorges committed itself to invest up to 2 billion Euros in the triennium 2012/2015 in operational and ready-to-built projects, as well as granting credit facility of up to 2 billion Euros to EDP at a corporate level for a maturity of up to 20 years. The entrance of CTG in EDP's capital was important for EDPR, due to two factors: on the one side, CTG's contacts for potential partnerships in the renewable sector, and on the other side the CTG's financial capital that allowed the development of EDPR's self-funding strategy.

3.2. Strategy and Operations

EDPR operates in the renewable energy sector and is the third largest wind energy producer in the world. The core business of the company is: *onshore wind energy*, which includes the development, construction and operation of wind farms and *solar power plants*, which generates and provides clean electric power. Wind farms exploration accounts for 99% of the company's revenues, whereas the remaining 1% is derived from solar plants operations. The company is also analyzing opportunities in solar photovoltaic systems.

EDPR's business portfolio consists of three phases: development, construction and operation phase. Figure 1 presents a summary of the three phases. In the development phase, EDPR engineers search for renewable sources locations with nearby electricity transmission lines and upon finding them proceed to evaluate the valuation and funding of the project. In the construction phase, the workers choose the best wind turbines and solar panel systems for each project and build the access roads and

foundations for the project. In the operation phase, renewable electricity starts to be generated through the grid connection. In this phase, EDPR manages the operation.

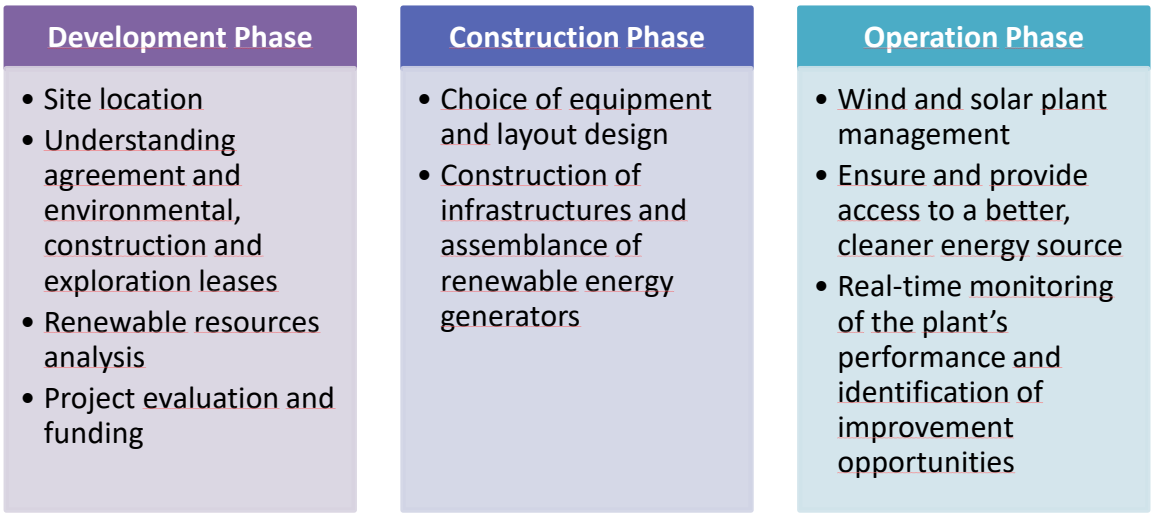

Figure 1 – Business Phases EDPR (Source: EDPR)

In terms of strategy, EDPR focuses on three pillars: selective growth, increased profitability and self-funding model. Figure 2 presents a brief summary of EDPR's strategy. Selective growth comprehends the investment and exploration of high quality and low risk projects over a long period of time, by entering into markets with predictable prices through long-term power purchase agreements (PPA). Increased profitability consists in optimizing the performance of the projects to ensure high levels of availability and low operational costs per MW. The self-funding model is one of the most important pillars of the company's strategy. It consists in selling minority stakes of the operational assets and in using those profits to reinvest in new projects. The asset rotation strategy consists in converting risky projects into lower risk ones, and therefore leveraging long life-span assets with stable cash flows. In light of the asset rotation program, EDPR is relocating part of its assets from well established energy markets across Europe to new and lesser explored ones, with solid growth opportunities.

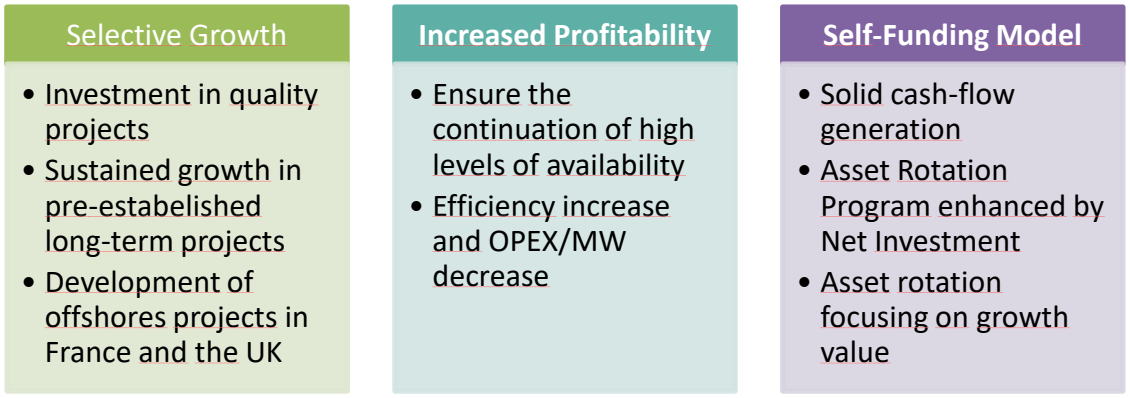

Figure 2 – EDPR's Strategy 2014-2017 (Source: EDPR)

3.3. Economic and Financial Performance

The main drivers of growth in 2015 were EDPR's ability to capture and explore wind resources, as well as the contribution of newly added partners.

Geographically, EDPR's operations are concentrated in Europe & Brazil and North America, as observed in Figure 3.

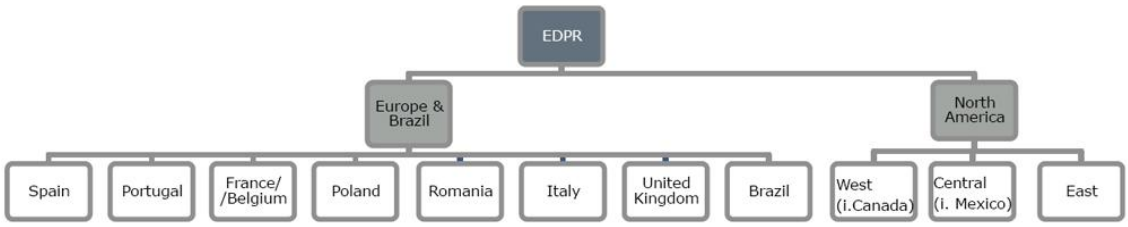

Figure 3 – EDPR Organizational Structure (Source: EDPR)

Figure 4 presents the total output (clean energy generated) between 2013 and 2015 by EDPR. In 2015, North America's operations registered 52% of the total output of the company, whereas in Europe the output represented 47%, in line with the previous two periods. In terms of installed capacity, North America recorded the largest growth in assets, followed by the European unit, also in line with the previous two years, as presented in Figure 5 below.

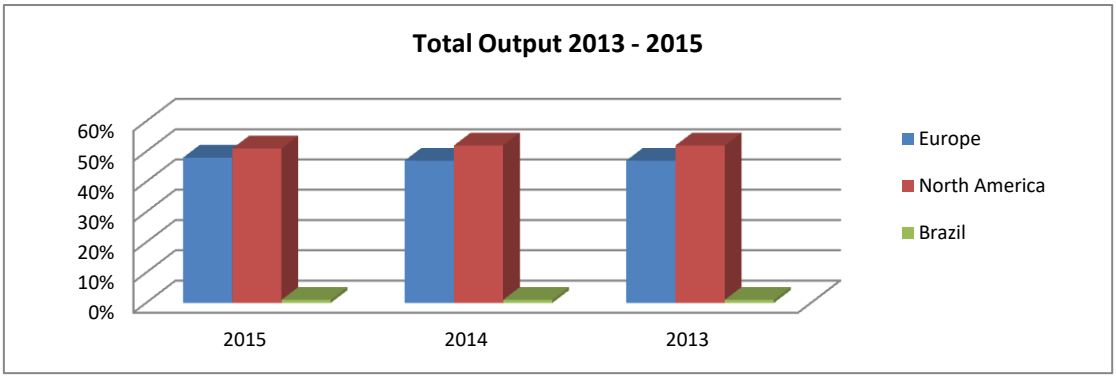

Figure 4 – Total Output 2013 – 2015 (Source: EDPR)

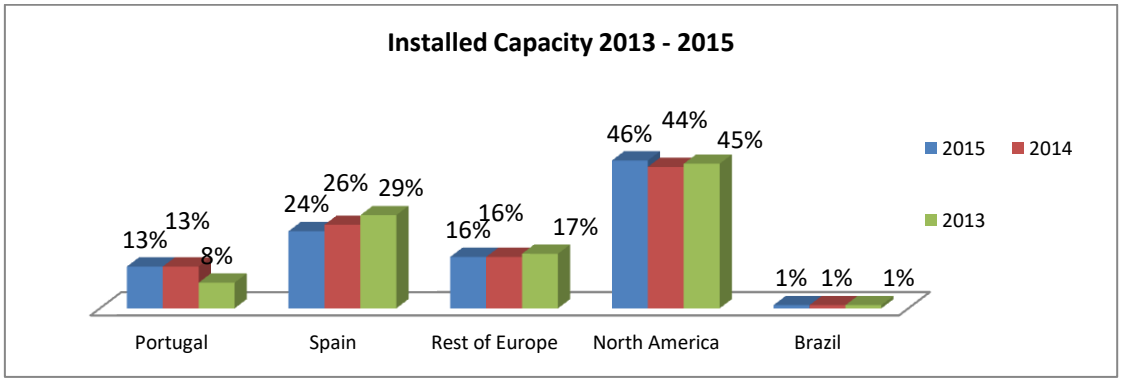

Figure 5 – Installed Capacity 2013 - 2015 (Source: EDPR)

Table I shows the consolidated income statement of EDPR between 2013 and 2015.

Total revenues increased by 21% following a growth in production in all of the business units, overshadowing a contraction of 3% in 2014, due to an increase in the overall selling price. EBITDA decreased by 2% in 2014 when compared to 2013, mainly due to regulatory changes in Spain and exceptionally low pool prices in the first semester. In 2015 EBITDA registered an increase of 26% driven by the acquisition control of key-ENEOP (Eólicas de Portugal) assets and by an increase in the generated cash flow of the company's assets in operation. Net Profit contracted by 7% in 2014 in comparison to 2013 mainly due to the impact on deferred assets and liabilities. In 2015 EDPR

registered an increase in Net profit of 32% driven by the effects of the approved corporate tax reform in Spain and by the increase in non-controlling interests sold to CTG in the context of EDP's strategic partnership, and fuelled by the success of its Asset Rotation Program.

Table I – EDPR Consolidated Income Statement (€ millions) (Source:EDPR)

Consolidated Income Statement	2015	g	2014	g	2013
Revenues	1.547	21%	1.277	-3%	1.316
EBITDA	1.142	33%	857	-2%	879
EBIT	578	53%	376	-12%	431
Net Profit	167	32%	126	-7%	135

Figure 6 shows the performance of EDPR's revenues in the 2013-2015 periods.

Europe registered an increase of 5.4% in revenues in 2013 due to a greater demand in the production of energy. Increasing growth in the Rest of Europe geographical area (Europe area excluding Portugal and Spain) led to a higher contribution in revenues (26% versus 24% in 2012). In 2014 production continued to increase but revenues registered a downfall of 9%, impacted by a decrease of 10% in the lower average selling price, mainly driven by changes in the remuneration framework for renewable assets in Spain and by the selloff of green certificate prices at the floor of the regulated collar in Romania. In 2015 revenues grew by 11% reflecting the impact from higher electricity output and an increase in average selling price of 3%, mainly driven by the recovery of the Spanish market.

In North America EDPR registered an increase in revenues of 4% in 2013 and 7% in 2014, supported by a 3% increase in the average selling price and a 2% increase in production, as a result of contracted price of escalators and the signing of new PPAs, e.

g., contract agreements between electricity buyers and sellers to facilitate the financing of distributed generation assets such as wind and photovoltaic energy. In 2015 revenues increased by 15%, fuelled by a 9% growth in production and a stable overall average selling price.

In Brazil EDPR registered an increase in revenues of 12% in 2013 and 2014 driven by a higher average selling price, reflecting the PPA update price according with the adjustment of inflation. In 2015 revenues grew by 1%, following an increase in the average selling price of 7%. The company has established long-term contracts to sell the electricity produced for a period of 20 years, guarantying a stable cash flow influx throughout the projects' life. Furthermore, and despite the current economic turmoil the country is facing, IFM projections forecast a recovery over the next years, which will have a positive impact on the development of the renewable sector.

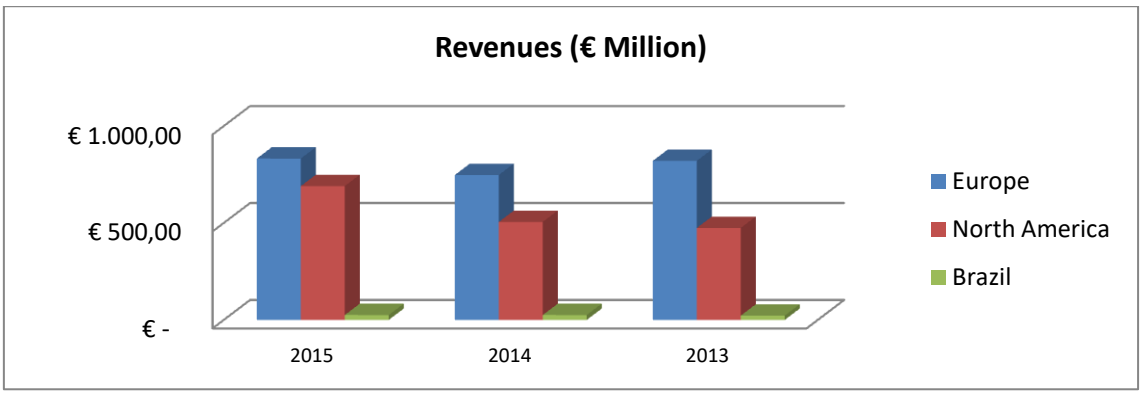

Figure 6 – EDPR Revenues (Source: EDPR)

In Europe the EBITDA margin decreased by 9pp in 2013, mainly due to an increase in operating costs derived from an up rise in the tax on electricity sales in Spain, whereas in 2014 it grew marginally by 1pp, impacted by a price adjustment in the sale of Portuguese assets to CTG, following lower corporate taxes in Portugal. In 2015 EBITDA

margin increase by 10pp following a decrease in operating costs subsequent to the acquisition control of ENEOP assets.

In North America the EBITDA margin increased 4pp in 2013 and 1pp in 2014, reflecting a decrease in operating costs due to the restructuring of the volumes of a PPA agreement made in 2013. In 2015 the EBITDA margin decrease 5pp following a significant increase in operating costs, derived from the booking of property taxes for the building of new wind farms.

In Brazil the EBITDA margin decreased 8pp in 2013 impacted by higher operating costs and increased in 2014 by 2pp, reflecting the good performance in revenues. An increase of 3pp was registered in 2015, mainly due to the increase in operating costs from projects in place.

Table II presents EDPR's financial position in the 2013-2015 periods.

EDPR's debt has continued to increase in 2015 to 4.2 billion Euros, due to currency appreciation, investments in new projects and investments from the asset rotation program. The company continues to follow a long-term fixed rate funding strategy, matching the operating cash-flow with its financial costs and thus mitigating interest rate risk. As of December 2015 90% of EDPR's financial debt had a fixed interest rate, with the average interest rate of 4.3%. Equity increased in the period from 2013 to 2015 driven by a growth in net profit.

The Net Debt/Equity ratio has remained stable in the three-year period in analysis, decreasing marginally in 2015. However, as a result of investments done, a robust cash-flow generation, the monitoring of operating costs and the successful execution

of the asset rotation strategy, the company expects a significant decrease of the ratio in the short run.

Table II – Financial Position EDPR (€ million) (Source: EDPR)

Financial Position	2015	g	2014	g	2013
Debt	4.22	8%	3.902	6%	3.666
Equity	6.834	8%	6.331	4%	6.089
Cash & Equivalents	437	18%	369	45%	255
D/E	0.62	-	0.62	-	0.6
Net Debt	3.783	13%	3.532	1%	3.411
Net Debt/Equity	0.55	-	0.56	-	0.56

Figure 7 shows the performance of the stock over a five year period.

EDPR is currently a constituent of the stock market indexes PSI 20, PSI 20 All-Share (Gross Return), Euronext 100, NYSE Euronext Iberia, Bloomberg World Energy Alternative Source and NASDAQ QMX Clean Edge Global Wind Energy.

EDPR's stock market performance between 2013 and 2015 periods was subject to fluctuations. In 2013, regulatory impositions and market deterioration pushed down the share's price. In contrast, in 2014, fuelled by a rebounding of the market and the closing of long-term projects, the share's price increased by 40%, outperforming the NYSE Euronext Lisbon PSI 20 and Dow Jones Eurostoxx Utilities SX6E indexes. In 2015, EDPR had a market capitalization of 6.3bn Euros, an increase of 34% year-on-year, equivalent to € 7.25 per share. The total shareholder return was 35%, considering the dividend paid on May 8th of € 0.04 per share. The company has a total of 872.3 million shares listed in NYSE Euronext Lisbon.

Figure 7 – EDPR share performance (Source: EURONEXT)

4. Business Risks and Opportunities

To better frame the assumptions presented in the next chapters, we will summarize the macroeconomic context and the renewable energy industry of the main regions where EDPR operates: Europe, the US and Brazil.

4.1. Macroeconomic Framework

We start by analyzing the Europe macroeconomic setting.

Beginning in 2012, Europe has gone through a severe financial crisis, struggling with a progressive and ongoing scenario of growing deflation, decreasing in GDP, high unemployment numbers and low interest rates. In face of such odds, the European Central Bank (ECB) presented in March 2015 its plan to reboot the economy in the Euro area zone, consisting in the implementation of an Asset Purchase Program (APP) to be applied across Europe, with the purpose of financing banks and stimulating economy by fuelling private consumption and addressing low inflation. The program will be in place until March 2017.

The collapse of Lehman Bros in late 2008 in the United States precipitated financial markets worldwide to a downward spiral. Facing a recession scenario, the Federal Reserve (FED) decided to set in motion a Quantative Easing Program consisting in the purchase of mortgage-backed securities to stimulate the US economy, aimed at achieving a robust and constant growth. As of May 2016, the unemployment rate was set at 4,7%, an increase in the request for mortgage loans was achieved, thus helping boost the housing sector and the construction industry, the country's inflation had reached at 1% and the projected GDP growth for 2016 and 2017 is set at 2%.

In the beginning of the decade Brazil was projected to register a consistent and robust growth in its economy. The country underwent a deep transformation via the implementation of a number of structural and economic reforms, which led to attract foreign capital. However, and contrary to IMF projections, inflation rate has risen to 9.32% and the unemployment rate has reached 11.2% by the end of 2015. As of April 2016, the country is experiencing a contraction (growth GDP of -1.30% for the year).

4.2. Sector Framework

According to the REN (2015) Renewable Global Status Report, in 2014, 58.5% of the net additions to global power capacity came from wind, solar, photovoltaic (PV) and hydro energy. In the same year, renewable energy comprised 27.7% of the world's power generating capacity**.** The GWEC (2015) Global Wind Energy Council stated that the wind power industry registered a 22% annual market growth, surpassing the 60 GW mark in a single year. Furthermore, the GWEO (2014) Global Wind Energy Outlook market forecast that global wind capacity will almost double over the next five years, between 2016 and 2020. For further information on the estimated growth of the industry see Appendix 1.

The IEA (2014) International Energy Agency estimates that renewable energy production will increase by average 1.7% per year until 2040, whereas wind-powered based electricity will grow 2.6% in the same period (Appendix 2)**.** In light of this, the NEO (2015) Bloomberg New Energy Outlook projects that by 2040 renewables will command 60% of new generating capacity and 2/3 of the estimated $12.2 trillion of investment, with onshore wind and solar plants being cheaper than new and existing fossil fuel ones by 2030 (Appendix 3).

In Europe, the EWEA (2015) European Wind Energy Association reported an increase of 108% offshore wind capacity installed over 2014. In October 2014 the European Council reached an agreement on 2030 Climate and Energy Policy Framework. According to the Terms and Projections report compiled by the EEA (2015) European Environment Agency, the EU is on track to meet its climate and energy targets for 2020, namely the reduction of green house gas emissions by 20% compared to 1990, a 20% share of renewable energy in its gross final energy consumption and a 20% saving of produced energy.

The United States expects to add 18 GW of renewable capacity per year until 2020 to meet Renewable Portfolio Targets (RPS) and wind energy competitiveness, according to the NREL (2014) National Renewable Energy Laboratory. The framework of wind development in the US is decentralized between Production Tax Credits (PTCs) and long-term bilateral Power Purchase Agreements (PPAs). Demand for PPAs has seen an up rise in the recent years, in order to meet RPS targets and an increasing competitiveness of wind energy economics. According to new legislation, companies will have the option to choose an ITC (Investment Tax Credit) for the development of new projects throughout its lifespan. The current framework provides an improved environment for the development of wind and solar projects, allowing EDPR to strengthen its position in the US via the execution of competitive projects.

Brazil installed 2.75 GW in 2015, totalizing 8.72 GW, representing 6.3% of Brazil's energy matrix. Overall more than R$ 1.6 billion have been invested, 41.000 jobs created and more than 5 million homes are currently supplied with electricity from

wind power, according to the GWEC (2014) Global Wind Energy Council. EDPR has successfully won a series of energy auctions in long term PPA with energy sellers in the country, the most significant one being the installation of 140 MW from a new wind farm project.

4.3. Strategic Analysis

Figure 8 summarizes the strengths, weakens, opportunities and threats (SWOT analysis). The company's strengths are based on its geographical distribution and an existing sales network, aligned with a diversified portfolio and a successful cash-flow generation capacity derived from the self-funding model in place. Changes in regulation and lower prices on non-renewable energy sources such as coal are qualified as weaknesses. The possibility of investing in new technologies represents an opportunity for EDPR. Solar PV consists in the generation of electric power through semiconductors and is becoming increasingly relevant in the renewable energy sector. Furthermore, the investment on new onshore and offshore facilities and tax incentives for wind and solar exploration is an opportunity to expand EDPR's position abroad. The company faces threats concerning its exposure to the political situation in Brazil, which may undermine wind exploration in the country, as well as rising cost of production materials and risk of fluctuations in the exchange rate.

Strengths	Weaknesses
Diversified geographical presence; Existing distribution and sales network; Skilled workforce; Diversified portfolio; Cash-flow generation capacity; Successful Asset Rotation strategy; Financial support by EDP and China Three Gorges.	Regulatory risks; Cost structure; Negatively influenced results due to changes in regulation; Lower prices on non-renewable energy sources. Lack of cooperation between political authorities and enterprises; Low public acceptance of wind energy.
Opportunities	**Threats**
Solar Photovoltaic System; New wind onshore and wind offshore; Increasing demand for Energy; Tax incentives in North America; US construction industry resurgence; Expansion to new markets.	Political environment in Brazil; Consolidation of utilities companies in Europe; Growing competition and lower profitability; Wind availability; Rising cost of raw materials; Volatile input prices; Exchange rate risk.

Figure 8 – SWOT Analysis EDPR

We also analyzed the five forces of Porter. The main force is rivalry between companies in the sector. The detail of the analysis is presented in Appendix 4.

5. Valuation

We use a DCF method and relative valuation to determine EDPR firm value. According to the literature review, the DCF method is the preferred method by analysts and investors worldwide in business valuation. We also compute relative valuation to complement the DCF method.

5.1. Discount Cash Flow Method

EDPR is valued using APV method. We choose this method because the capital structure of firm will change over the valuation period. EDP intends to reduce its Debt/EBITDA ratio over the next years. Also, as the wind power accounts for 99% of the company's revenues, no specific valuation will be performed on the minority business segment.

The valuation is performed using EDPR's consolidated financial statements for the period between 2011 and 2015 and using industry studies and reports.

5.1.1. Unlevered Cost of Capital

For the risk-free rate, we use the yield to maturity of the Spanish treasury rate with a maturity of 10 years. To this value, we subtract the Spanish Credit Default Spread (CDS). The risk-free interest rate is 0.1% on the 9th of September, 2016, with an YTM of 0.91% and a CDS of 0.81%. The computation of the risk-free rate is present in Appendix 5.

In order to compute the beta of EDPR we first estimated the average unlevered beta of the peer group. We then used the debt to equity ratio and marginal tax rate for EDPR

to estimate the levered beta of the firm, having reached a result of 0.81, as presented in Figure 9 and Appendix 6.

Beta EDP_R					
Horizon	5Y	5Y			
Returns	Week	Month	Damodaran	Datastream	Indústria
Unadjusted	0,83752	**0,6446**	N/A	N/A	
Adjusted	0,8917	0,7631	0,0000	0,0000	0,7837
		1,6548			
Beta da Empresa EDPR - média	0,8128	0,82738			

Figure 9 – EDPR Beta

The market risk premium considered was 6%, within the 5%-6% range defined by diversified companies, according to Damodaran. We opted to choose the upside limit given EDPR's exposition to different markets.

The unlevered cost of capital (Ru) is 0.05.

5.1.2. Cost of Debt

Figure 10 presents the computation EDPR's cost of debt (Rd). By applying the synthetic rating method, we compute a cost of debt of 4.16%. To the risk free rate, we add the country default risk and the company risk. The risk free rate is 0.1%. The default spread attributable to EDPR is 3.25%, following Damodaran's rating tables. The country default equals 0.81%, defined by Spain's CDS (Appendix 7).

Rating	BB+	rating da S&P	
R_f	0,10%		
Spread A-	3,25%		
CDS Spain	0,81%		
Interest Coverage Ratio			
R_D	4,16%		$R_D = CDC_{Spain} + Spread_{EDP\ R}$

Figure 10 – Cost of Debt (Rd) of EDPR

5.1.3. Revenue Assumptions

Revenues were computed for the main geographical markets where EDPR operates (Europe, North America and Brazil) for a period of four years (2016-2019) taking into consideration the historical data of each market's revenues and the outlook of the renewable sector. Estimations also consider EDPR's strategy plan 2014-2017. Note, that the new strategy plan 2016-2020, was already presented to its stakeholders only, and therefore unable to use as assumption. Table III presents the historical and future assumptions regarding the growth in revenues of EDPR.

EDPR predicts a growth of 20% in electricity generation for the period of 2014-2017 in Europe, in light of its low risk regulatory framework. According to strategy plan, the main growth will occur in France, where the company is developing projects scheduled to start generating revenues in 2015-2017, in Poland and in Portugal. A gradual increase of the 25% RES percentage in Europe is also expected until 2020.

Following the increase in revenues registered in Europe in 2015, and the estimates presented in the five-year plan we estimate that the company will have 9.5% growth rate in 2016, benefiting mainly from the higher capacity in production. For 2017 and 2018, we expect the growth to be slightly slower, estimated at 5.5% and 3.25%, respectively. For 2019 and perpetuity, we estimate a growth of 0.75%, in light of the decision by the company to alienate a number of its wind farms in Europe to further establish its position in North America, thus lowering the region's increase in revenues deliverance.

EDPR projects a continuous increase in revenues in the American market, according to strategy 2014-2017, with an expected growth in electricity production of 60% for the

period. This is attributable mainly due to the increasing demand for long term PPAs from wind and solar projects and the tax benefits derived from PTCs.

Following the revenue growth in 2015, and the strategic importance of the North American market to EDPR, we assume that the company will register a growth of 11% in 2016 and of 9% in 2017. For 2018, the growth will be slightly slower, 5%. For 2019 and perpetuity a growth of 1.5% was assumed, following the company's strategic decision to develop and further center its activities in North America in light of the favorable tax incentives in place for the industry.

According to the five year plan, EDPR projects a stable return on revenues in the Brazilian market, with an expected growth in electricity production of 20% for the period. Following the increase in revenues up until 2015, we assume a 1% growth in 2016. For 2017 and 2018, and in light of the recent signature of a series of PPAs, we estimate a growth in revenues of 5%, for both periods. For 2019 and perpetuity a growth of 0.5% was assumed, given the social and economic challenges that the country faces in addressing the current social and political changes.

Table III – EDPR Revenues Assumptions (€ millions)

		2013	2014	2015	2016F	2017F	2018F	2019F
Europe	**Revenues**	820	747	832	911	961	992	999
	g		-7%	11%	9.5%	5.5%	3.25%	0.75%
NA	**Revenues**	474	505	690	765	833	874	886
	g		9%	15%	11%	9%	5%	1.5%
Brazil	**Revenues**	22	25	25	25	26	27	27
	g		12%	1%	1%	5%	5%	0.5%
Total	**Revenues**	1316	1277	1547	1701	1820	1893	1912
	g	-	-3%	21%	10%	7%	4%	1%

5.1.4. EBITDA Assumptions

EBITDA was also calculated for the main geographical markets where EDPR operates for a period of four years (2016-2019) taking into consideration the historical data of each area and the company's five year plan.

Table IV presents the historical and future assumptions regarding the growth in EBITDA and EBITDA margin for EDPR.

In Europe, we assume that for 2016 and 2017 operating costs would grow, as a result of the relocation of business activities overseas, and therefore a reduction of 3pp and 2pp of the EBITDA margin was assumed. For 2018 and 2019 operating performance was projected to improve and consolidate at a solid pace, reflecting the company's asset rotation program, and thus an increase of 1% of the EBITDA margin was projected for both periods.

Taking into consideration the massive investment in new projects that are underway, we assume that EBITDA margin in the North America region will decrease in 3pp and 2pp in 2016 and 2017, respectively. Henceforth, we assume a decrease in operating costs, forecasting an increase of 1pp and 0.5pp for the years 2018 and 2019, respectively.

Following the investments underway in Brazil, an increase in operating costs is expected for 2016 and 2017, and therefore a decrease in the EBITDA margin is assumed for both years of 2pp. For 2018 and 2019 we expect a growth in operational performance in emerging markets, and therefore an increase of 0.5pp was considered for both periods.

Table IV – EDPR EBITDA Margin Assumptions (€ millions)

		2013	2014	2015	2016F	2017F	2018F	2019F
Europe	EBITDA	590	544	690	706	759	792	800
	EBITDA (m)	72%	73%	83%	80%	78%	79%	80%
US	EBITDA	276	298	438	447	474	489	493
	EBITDA (m)	70%	71%	66%	63%	61%	62%	62.5%
Brazil	EBITDA	13	15	14	14	16	17	18
	EBITDA (m)	59%	61%	58%	56%	54%	54.5%	55%
Total	EBITDA	879	857	1142	1167	1249	1298	1311
	EBITDA (m)	70.8%	68.8%	73.8%	68.5%	69%	68.5%	69%

5.1.5. Capital Expenditures and Depreciations Assumptions

Historical data was used to formulate the assumptions. The values for the Net Tangible Assets and Net Intangible Assets were computed by taking into consideration the average percentage change of the three previous years. We then assumed a scenario of progressive growth for the period.

Amortizations and depreciations were calculated using the average percentage of the previous three years and a scenario of progressive growth for the period was also assumed. The values obtained for CAPEX and depreciation are presented in Table V.

Table V – EDPR CAPEX and Depreciations Assumptions (€ millions)

	2014	2015	2016F	2017F	2018F	2019F
Depreciations	480.7	564.4	512.9	548.8	570.8	-
CAPEX	732	903	981.5	1050.2	1092.3	-

5.1.6. Change in Working Capital Assumptions

We compute investment in working capital by taking into consideration the historical data of the company and by calculating the average taxes payable for the period, and

the apply the result in function of the revenues of the periods in analysis, as presented in Table VI.

Table VI – EDPR Working Capital Assumptions (€ millions)

Working Capital	2014	2015	2016F	2017F	2018F	2019F
(+) Inventories	21.3	22.7	34.4	36.8	38.3	38.7
(+) Accounts Receivable	141.1	217.1	276.8	296.1	308.1	311.1
(+) Income Taxes	89.1	118.6	145.9	156.2	162.4	164.1
(+) Receivable Operational Deferred	-	-	-	-	-	-
(-) Accounts Payable	185.4	387.8	270.6	289.5	301.2	304.2
(-) Payable Operational Deffered	-	-	-	-	-	-
(-) Taxes Payable	56.7	64.2	67.6	72.3	75.2	76.0
Net working Capital	9.3	93.6	118.9	127.3	132.4	133.7
Change Working Capital	-	**102.9**	**212.5**	**8.3**	**5.1**	**1.3**

5.1.7. Tax Rate Assumptions

The tax rate is computed as the average of the last 4 years effective EDPR tax rates. Seeing as the company is headquarted in Spain, the Spanish nominal rate on taxable income was applied, corresponding to 28% in 2015.

5.2. Firm Value

EDPR's firm value was computed taking into consideration the balance sheet (Appendix 8) and the Provisional Income Statement (Appendix 9).

Table VII presents a FCFF value of € 527.6 for perpetuity.

Table VII – EDPR FCFF (€ millions)

	2015	2016F	2017F	2018F	2019F
EBIT*(1-t)	416.0	470.6	503.5	523.7	528.9
Depreciation	564.4	512.9	548.8	570.8	-
Change Working Capital	-102.9	-212.6	-8.33	-5.09	-1.32
Capex	903	981	1.050,2	1.092,3	-
FCFF	1.082,5	770	1.043,3	1.088,6	527.6
(1+Ru)		1.05	1.11	1.17	-

The explicit period as well as the perpetual period were estimated and used for the calculation of the FCFF, later discounted, and thus obtaining its valuation. Moreover, the value of each geographical unit was obtained and non-operating assets were added, deducting minorities, therefore resulting in a Firm Value of € 16.169 millions.

Based on the Firm Value, we removed the net debt, provisions and derivatives and financial leases and were able to reach an Equity Value of € 7.480 millions.

Value of Operations Explicit	2.593
Value of Operations Perpetuity	9.994
Tax Savings	3.194
Other Assets	387

Firm Value 2015	**16.169**
Other Liabilities	316
Debt 2015	7.400
Minority 2015	972
Equity Value 2015	**7.480**
Shares	**812.308.162**

Price Target	**€ 9.20**

Figure 11 – EDPR Valuation (€ millions)

The intrinsic value of EDPR share is € 9.20, representing a potential appreciation of 27% when compared to its price of € 7.25 in 31.12.2015, and an increase of 31% over the most recent share price (€ 7.02 on 03.10.2016).

6. Robustness Check

The value computed in the previous section derived from a series of assumptions and as such are subject to a degree of uncertainty. Hence, a sensitivity analysis and a Monte Carlo simulation were performed in order to estimate the stock price range.

In light of EDPR's business strategy to reduce its debt by changes made in the firm's capital structure, a sensitivity analysis was performed in Table VIII on the variables that directly impact EDPR's price target: the cost of debt and the g for emerging countries. Seeing as EDPR is present in Brazil, and being the country labeled as emergent, the g perpetual of Brazil was used as a proxy of the g for emerging countries.

Table VIII – EDPR Sensitivity Analysis: Rd and g emerging countries

g/Rd	2.50%	3.00%	3.50%	4.00%	4.16%	4.50%	5.00%	5.50%	6.00%
2.00%	13.01	11.17	10.07	9.33	9.15	8.81	8.41	8.11	7.86
2.50%	13.03	11.19	10.09	9.35	9.16	8.83	8.43	8.12	7.88
3.00%	13.05	11.21	10.1	9.37	9.18	8.84	8.45	8.14	7.9
3.50%	13.06	11.23	10.12	9.39	9.20	8.86	8.47	8.16	7.92
3.70%	13.07	11.23	10.13	9.39	9.21	8.87	8.48	8.17	7.92
4.00%	13.08	11.24	10.14	9.41	9.22	8.88	8.49	8.18	7.94
4.50%	13.1	11.26	10.16	9.42	9.24	8.9	8.51	8.2	7.95
5.00%	13.12	11.28	10.18	9.44	9.26	8.92	8.52	8.22	7.97
5.50%	13.14	11.3	10.2	9.46	9.28	8.94	8.54	8.24	7.99

In a *ceteris paribus* scenario, we can conclude that a variation of 0.5% in the cost of debt will have an impact of 16% in the price of EDPR's shares, whereas an impact of the same magnitude in the g perpetual will have an almost null variation on the share

price. The analysis further complements the valuation performed by the APV method that results in an undervalued stock, seeing as in all scenarios the intrinsic value is higher than the one registered in 31.12.2015 of € 7.25.

7. Monte Carlo Simulation

In order to evaluate the APV price target a Monte Carlo simulation was performed (Appendix 10), following the inputs form Table IX below:

Table IX – Monte Carlo simulation inputs

	Distribution	Values	Variation	Mean	Standard Deviation
rd	Uniform	4.16%	"3-5"	4.16%	
Bu	Uniform	0.6	0.32-0.82		
rf OT	Normal	0.10%		0.10%	
g sales	Normal	10.00%		**10.00%**	**3.87%**
g perpetual	Normal	1%		**1.00%**	**0.50%**
EBITDA/Sales	Normal	68.57%		**69%**	**3%**
STOCK AND W.I.P./ Sales	Normal	2.03%		**2.03%**	**0.42%**
Trade Debtors/Sales	Normal	16.27%		**16.27%**	**1.56%**
Trade Creditors/Sales	Normal	15.91%		**15.91%**	**5.49%**
Depreciation/Sales	Normal	30.16%		**30.16%**	**3.06%**
Capex/Sales	Normal	0.058%		**0.058%**	**0.01%**

We were therefore able to conclude from the Monte Carlo simulation after 10.000 observations that the average value of EDPR's share is € 11.46 with a standard variation of 5.4%. The company's minimum share price is of € 2.23 and a maximum of € 32.15.

8. Relative Valuation

A relative valuation was performed to complement the results obtained by the APV model. We used two multiples: EV/EBITDA and EV/Sales. We opted not to use the EV/EBIT multiple due to the low value of amortizations of EDPR. A peer group of companies of the same sector was selected, according to its performance, area of operations and future growth perspectives, with data collected from Bloomberg. Table X presents the valuation by multiples and the harmonic and arithmetic means.

Table X – EDPR Peer Group Analysis

Peer Group	EV/EBITDA	EV/Sales
Acciona, S.A.	2.86	1.15
Alerion Clean Power, S.P.A.	8.31	5.33
ENEL Green Power, S.P.A.	9.10	6.50
Iberdrola, S.A.	6.25	1.75
Arithmetic Mean	6.63	3.68
Harmonic Mean	5.41	2.24

Source: Bloomberg

According to Goedhart et al. (2005), the harmonic mean is the process that derives the most reliable results. We compute the value of EDPR stocks using the harmonic and arithmetic mean, as presented in Table XI.

Table XI – EDPR Harmonic and Arithmetic mean

Arithemetic Mean	**12.05**	10.99
Harmonic Mean	10.72	**8.6**

By analyzing the multiples we can conclude that the results vary between 8.6 and 12.05. The EV/EBITDA analysis shows that the share is undervalued in 48% when compared to its value in 31.12.2015. The EV/Sales presents a similar conclusion, with a

depreciation of 19% of the share price in the same terms. This analysis is further developed in Appendix 11. Once again, this method also suggests that EDPR's share price is undervalued.

9. Conclusions

One of the main goals of company valuation is to provide shareholders and stakeholders, as well as potential buyers/sellers, relevant information regarding a firm's value.

In this study we value EDPR, given its position as a key player in the renewable sector. Our purpose in choosing the company was to further enrich the research in the field of renewable energy by exploring and addressing the industry guidelines as a whole.

To do so, we use the Adjusted Present Value (APV) method given the capital structure will change as the firm intends to reduce the Debt/EBITDA ratio over the next years. We also apply a relative valuation to complement the previous valuation method.

The valuation of the company by the APV method resulted in a price target of € 9.20 per share, allowing us to conclude that EDPR shares were undervalued when compared to the share price in 31.12.2015 (€ 7.25). The sensitivity analysis performed further enhanced our conclusions, with all possible scenarios resulting in values above the one registered in 31.12.2015. The relative valuation conducted also shows that EDPR's share price is undervalued in 48% in the same terms. Finally, the Monte Carlo simulation performed presented an average share price of € 11.46, also above the value registered in the time period in analysis. We therefore give a BUY recommendation for EDPR on the date in analysis.

Taking into consideration the growth perspective and consolidation of the company in the industry, it is expected that investors will register a positive return on their investment, following an appreciation of the share price in the short-term.

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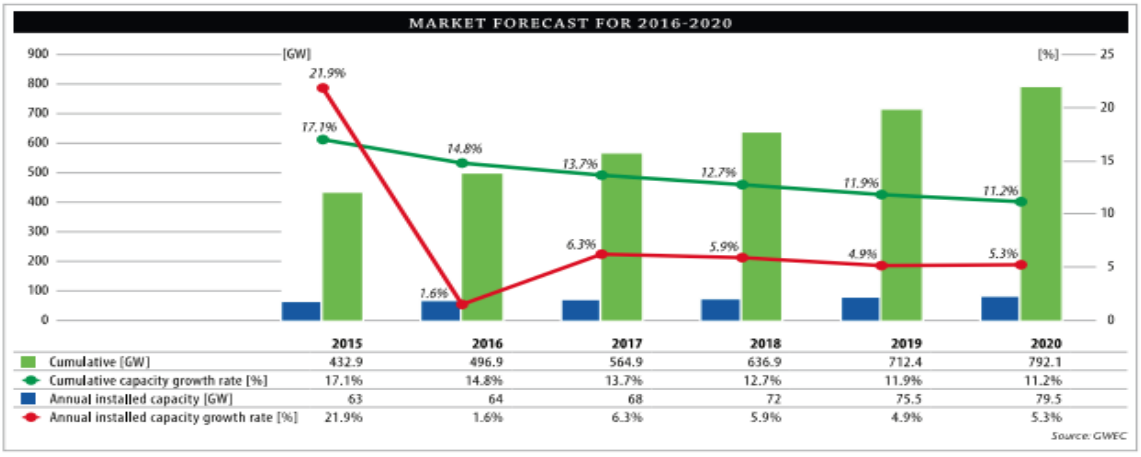
IEA (International Energy Agency)

NREL (National Renewable Energy Laboratory)

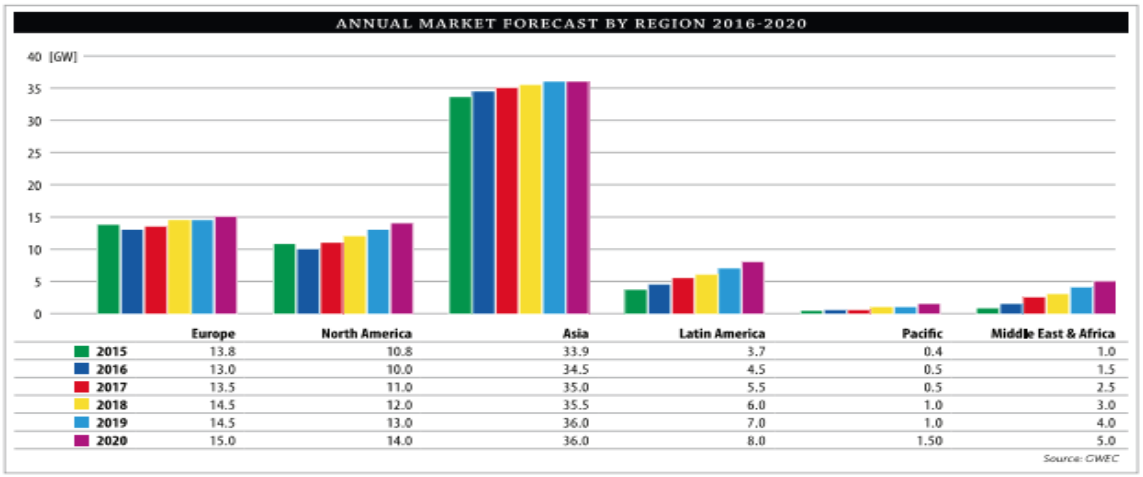
REN21 GSR (Renewables 2015 Global Status Report)

Appendix 1 – Market Forecast 2016 – 2020



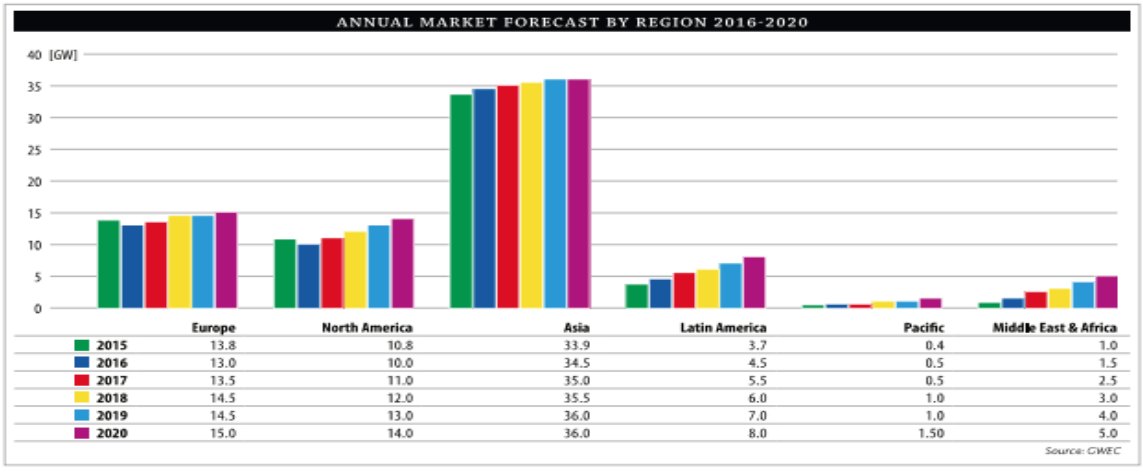
Source: Global Wind Energy Outlook 2014

Appendix 2 – Annual Market Forecast by Region 2016 – 2020



Source: International Energy Agency

Appendix 3 – Cumulative Market Forecast by Region 2016 – 2020



Source: Bloomberg New Energy Outlook 2015

Appendix 4 – Five Forces of Porter

Company

EDP Renováveis, S.A.

Rate each statement

1 – Totally disagree
2 – Disagree
3 – Statements partly false and partly true
4 – Agree
5 – Agree completely

Leave in blank if you don't know, or if it is not applicable

		RATE
A.	A small company can enter the business.	1
B.	Competitor companies have unknown brand or clients that are not loyal to the brand.	1
C.	Low investment in infra-structures, credit to clients and products.	1
D.	Clients will have low costs to change current suppliers.	3
E.	Competitor technology is not patented. Investing in research is not necessary.	1
F.	The location, compatible with the competitors, will involve low investment	4
G.	There are no demands from government benefiting existing companies limiting the entrance of new companies.	3
H.	Established companies have little experience in the business or high costs	1
I	A war between new competitors is unlikely.	2
J	The market is not saturated.	5
	TOTAL	22
	Force 1 average =	2,2

		RATE
A.	There are a numerous set of competitors, with relative balance regarding size and resources.	5
B.	The business' sector shows slow growth. Some companies prosper while others perish.	1
C.	High fixed costs and pressure for aggressive selling to lower costs.	5
D.	Fierce price dispute among competitors.	5
E.	No difference between products/services offered by competitors.	5
F.	It is very expensive for established companies to abandon the business	5
	TOTAL	22
	Force 2 average =	3,66

		RATE
A.	There is a large quantity of substitute products/services	5
B.	Substitute products/services have lower costs than those from the existing companies.	3
C.	Existing companies usually do not use publicity to promote their image and products/services.	2
D	Product/service selling sectors are expanding, increasing competition.	4
	TOTAL	14
	Force 3 average =	3,5

		RATE
A.	Clients buy in large quantities always demand for lower prices.	1
B.	Products/services sold represents a large part of the client costs and purchases.	3
C.	Products/services bought by clients are standardized.	4
D.	There are no significant additional costs to clients who change suppliers.	5
E.	Threat of clients eventually being able to manufacture the products/services acquired within the sector.	1
F.	Products/services sold are not essential for improvement of the buyer's products	1
G.	Clients are very well informed about prices and costs within the sector.	2
H.	Clients work with fat profit margins.	1
	TOTAL	18
	Force 4 average =	2,25

		RATE
A.	Necessary products and services supply is concentrated in a small number of supplying companies	4
B.	Products/services acquired by existing companies are not easily replaced by others.	4
C.	Existing companies are not important clients for suppliers	1
D.	Material/services acquired from suppliers are important for business success.	5
E.	Products bought from suppliers are differentiated.	2
F.	Change in supplier involves significant costs.	2
G.	Permanent threat of supplier entering the business sector.	1
	TOTAL	19
	Force 5 average =	3,14

FORCES	AVERAGE
Possibility of entering competitors	2,2
Rivalry among companies within the sector	3,66
Threat from substitute products	3,5
Buyers' negotiation power	2,25
Supplier's negotiation power	

Appendix 5 – Risk-free Rate

Europe, Middle East & Africa 10-Year Government Bond Yields

COUNTRY	YIELD	1 DAY	1 MONTH	1 YEAR	TIME (EDT)
Germany »	-0.10%	-10	-1	-69	11:59 AM
United Kingdom »	0.70%	-10	+15	-108	11:59 AM
France	0.20%	-10	+6	-77	11:59 AM
Italy	1.19%	-9	+9	-56	11:59 AM
Spain	0.91%	-8	-2	-104	11:59 AM
Netherlands	0.01%	-10	-1	-76	12:00 PM
Portugal	3.34%	-4	+34	+76	11:59 AM
Greece	8.26%	-8	+37	+27	11:59 AM
Switzerland	-0.52%	-6	+5	-39	11:57 AM

Maturity	10 Years
Spain Rating	Baa2
YTM	0.91%
CDS	0.81%
Prob Default	2.04%
Expected Rate Loss	51%
Rf	0.1% (YTM-CDS)

Appendix 6 – Beta

Beta Indústria

		β_L	E	$\frac{D}{E}$	τ	β_U	Total Debt	Net Debt	Market Value
Empresas Comparáveis	Acciona	1,054	3681,22	1,55698329	28,00%	0,496928855	7.050.148,00 €	5.177.112,00 €	4.528.082,00 €
	Alerion	0,794	90,03	2,12679989	31,40%	0,322897492	222.442,00 €	192.563,00 €	104.590,00 €
	ENEL Green Power	0,965	41032,7	1,4606589	31,40%	0,482015091	53.456.990,00 €	35.510.990,00 €	36.597.860,00 €
	Iberdrola	0,882	37720,76	0,70735716	28%	0,584377965	29.359.920,00 €	26.918.910,00 €	41.506.500,00 €
					Média	0,521107304			
	EDP_R	0,898	6325,1	0,6998482	28%		4.426.001,00 €	3.955.423,00 €	6.324.230,00 €

Industry Name	*Number of firms*	*Beta*	*D/E Ratio*	*Tax rate*	*Unlevered beta*	*Cash/Firm value*	*Unlevered beta corrected for cash*
Green & Renew	48	1,24	124,34%	12,79%	0,60	6,40%	*0,637572531*

Appendix 7 – Cost of debt (Rd)

Modelo de Risco e Incumprimentos País

Rating	Baa2
R_F	0,10%
Spread Ba2/BB	2,25%
R_D	**2,35%**

If long term interest coverage ratio is

greater than	≤ to	Rating is	Spread is
-100000	0,049999	D2/D	20,00%
0,05	0,099999	C2/C	16,00%
0,1	0,199999	Ca2/CC	12,00%
0,2	0,299999	Caa/CCC	9,00%
0,3	0,399999	B3/B-	7,50%
0,4	0,499999	B2/B	6,50%
0,5	0,599999	B1/B+	5,50%
0,6	0,749999	Ba2/BB	4,25%
0,75	0,899999	Ba1/BB+	3,25%
0,9	1,199999	Baa2/BBB	2,25%
1,2	1,49999	A3/A-	1,75%
1,5	1,99999	A2/A	1,25%
2	2,49999	A1/A+	1,10%
2,5	2,99999	Aa2/AA	1,00%
3	100000	Aaa/AAA	0,75%

Appendix 8 – Balance Sheet

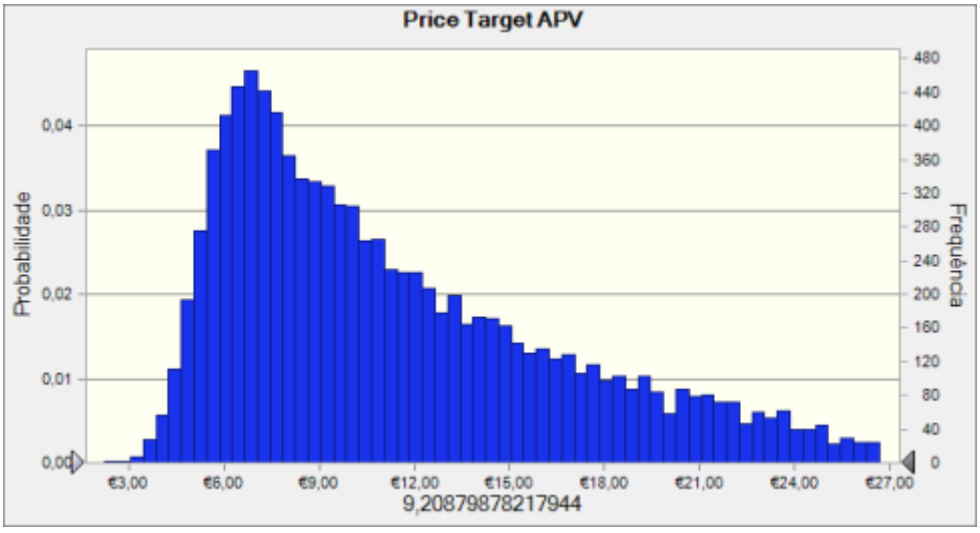
Balance Sheet	2011	2012	2013	2014	2105
ASSETS					
Ativo Não Corrente					
Ativos fixos tangíveis	10.454.621.000	10.241.035.000	10.095.459.000	11.012.976.000	12.612.452.000
Ativos intangíveis	21.819.000	22.837.000	87.933.000	117.704.000	172.128.000
Goodwill	1.311.845.000	1.259.704.000	1.213.500.000	1.287.716.000	1.362.017.000
Investimentos em associadas	51.381.000	349.176.000	338.646.000	369.791.000	333.800.000
Afinanceiros disp. Pr venda	9.618.000	9.407.000	7.434.000	6.336.000	6.257.000
Ativos por impostos diferidos	55.558.000	88.420.000	109.213.000	46.488.000	47.088.000
Clientes	0	0	0	4.879.000	4.407.000
Devedores e outros Devedores	249.535.000	318.551.000	373.595.000	433.300.000	110.821.000
Depositos coletarais associados à Divida Financeira		34.988.000	72.206.000	65.597.000	65.299.000
Total do Ativo Não Corrente	**12.154.377.000**	**12.324.118.000**	**12.297.986.000**	**13.344.787.000**	**14.714.269.000**
Ativo Corrente					
Inventários	23.751.000	16.145.000	15.425.000	21.320.000	22.762.000
Clientes	146.105.000	175.848.000	202.264.000	141.145.000	217.135.000
Devedores de actividades comerciais e Outros Devedores	459.275.000	429.913.000	177.696.000	336.210.000	108.856.000
EOEP	41.288.000	55.079.000	103.392.000	89.093.000	118.658.000
Diferimentos	0	0	0	0	0
AF ao justo valor através de resultados	211.000	389.000	76.000	0	0
Outros Ativos Correntes	0	7.416.000	6.054.000	15.141.000	8.054.000
Caixa e Equivalentes de Caixa	219.922.000	221.978.000	255.462.000	368.623.000	436.732.000
Ativos detidos para Venda	0	0	0	0	109.691.000
Total do Ativo Corrente	**890.552.000**	**906.768.000**	**760.369.000**	**971.532.000**	**1.021.888.000**
TOTAL DO ATIVO	**13.044.929.000**	**13.230.886.000**	**13.058.355.000**	**14.316.319.000**	**15.736.157.000**
CAPITAL PRÓPRIO E PASSIVO					
Capital Próprio					
Capital	4.361.541.000	4.361.541.000	4.361.541.000	4.361.541.000	4.361.541.000
Prémios de emissão de acções	552.035.000	552.035.000	552.035.000	552.035.000	552.035.000
Reservas	324.986.000	383.817.000	622.574.000	742.063.000	890.810.000
Resultados transitados	0	0			
Outras Variações no Capital Próprio	0	0			
Resultado Líquido do Período	88.604.000	126.266.000	135.116.000	126.007.000	166.614.000
Interesses não Controlados	126.559.000	324.993.000	418.057.000	549.113.000	863.109.000
Total do Capital Próprio	**5.453.725.000**	**5.748.652.000**	**6.089.323.000**	**6.330.759.000**	**6.834.109.000**
Passivo Não Corrente					
Passivo não corrente					
Financiamentos obtidos	3.691.068.000	3.628.765.000	3.520.859.000	3.716.434.000	3.832.413.000
Benefícios aos empregados	163.000	0	0	0	0
Provisões	57.982.000	59.898.000	64.536.000	98.911.000	120.514.000
Diferimentos	0	0	0	0	0
Passivos por impostos diferidos	381.468.000	361.291.000	367.184.000	270.392.000	316.497.000
Parcerias institucionais	1.783.861.000	1.679.753.000	1.508.495.000	1.801.963.000	1.956.217.000
Credores e Outros Credores	593.483.000	630.681.000	657.052.000	895.802.000	1.178.801.000
Total do Passivo Não Corrente	**6.508.025.000**	**6.360.388.000**	**6.118.126.000**	**6.783.502.000**	**7.404.442.000**
Passivo corrente					
Contas a pagar	135.054.000	209.505.000	145.018.000	185.489.000	387.857.000
Benefícios aos empregados	0	0	0	0	0
Provisões			0	0	919.000
EOEP	51.416.000	52.270.000	97.142.000	56.704.000	64.285.000
Financiamentos obtidos	896.709.000	860.071.000	608.746.000	959.865.000	989.139.000
Diferimentos	0	0	0		0
Passivos detidos para venda	0	0	0		55.406.000
Total do Passivo Corrente	**1.083.179.000**	**1.121.846.000**	**850.906.000**	**1.202.058.000**	**1.497.606.000**
Total do Passivo	**7.591.204.000**	**7.482.234.000**	**6.969.032.000**	**7.985.560.000**	**8.902.048.000**
TOTAL CAPITAL PRÓPRIO + PASSIVO	**13.044.929.000**	**13.230.886.000**	**13.058.355.000**	**14.316.319.000**	**15.736.157.000**

Appendix 9 – Provisional Income Statement

Demostração de Resultados	2016E	2017E	2018E	2019P
	0,38 €	0,38 €	0,38 €	0,38 €
Vendas e serviços prestados	1.701.051.678,73 €	1.820.055.294,12 €	1.893.057.511,96 €	1.912.091.924,19 €
EBITDA	1.166.386.013,02 €	1.247.985.034,51 €	1.298.041.577,10 €	1.311.093.192,45 €
Depreciações	512.972.651,14 €	548.859.626,74 €	570.874.326,05 €	576.614.382,64 €
EBIT	**653.413.361,88 €**	**699.125.407,78 €**	**727.167.251,05 €**	**734.478.809,80 €**
Interest	331.525.440,40 €	354.718.578,21 €	368.946.301,40 €	372.656.001,69 €
EBT	**321.887.921,48 €**	**344.406.829,57 €**	**358.220.949,65 €**	**361.822.808,12 €**
Tax	90.128.618,01 €	96.433.912,28 €	100.301.865,90 €	101.310.386,27 €
RL	**231.759.303,47 €**	**247.972.917,29 €**	**257.919.083,75 €**	**260.512.421,85 €**

Balanço	2016	2017	2018	2019
ATIVO				
Ativo Não Corrente				
Ativos fixos tangíveis e Intangi	12.297.004.429,37 €	12.295.954.189,20 €	12.294.861.824,01 €	12.293.758.475,24 €
Outros ativos não correntes				
Ativo Corrente				
Inventários	34.459.627,44 €	36.870.383,27 €	38.349.250,29 €	38.734.846,31 €
Contas a Receber	276.832.533,25 €	296.199.418,29 €	308.079.944,41 €	311.177.642,51 €
Caixa e Equivalentes de Caixa	5.444.735.100,28 €	4.507.115.162,52 €	4.003.734.070,64 €	4.034.893.993,11 €
Outros Ativos Correntes	668.853.398,57 €	715.645.611,64 €	744.350.078,48 €	751.834.408,00 €
TOTAL DO ATIVO	**18.721.885.088,91 €**	**17.851.784.764,92 €**	**17.389.375.167,82 €**	**17.430.399.365,17 €**
CAPITAL PRÓPRIO E PASSIVO				
Capital e Reservas	5.252.351.000,00 €	5.484.110.303,47 €	5.732.083.220,75 €	5.990.002.304,50 €
Net Income	231.759.303,47 €	247.972.917,29 €	257.919.083,75 €	260.512.421,85 €
Interesses não Controlados	1.741.691.743,24 €	1.820.445.152,39 €	1.902.357.352,14 €	1985093167
Outros Instrumentos Capital Pr	977.262.594,29 €	1.045.630.759,32 €	1.087.570.894,17 €	1098506258
Total do Capital Próprio	**8.203.064.640,99 €**	**8.598.159.132,47 €**	**8.979.930.550,81 €**	**9.334.114.151,28 €**
Passivo Não Corrente				
Financiamentos obtidos	4.762.944.700,45 €	3.458.105.058,82 €	2.460.974.765,55 €	2.198.905.712,82 €
Outros Passivos M/L Prazo	4.195.662.725,38 €	4.489.186.455,14 €	4.669.247.230,54 €	4.716.195.818,22 €
Passivo corrente				
Contas a pagar	270.650.761,53 €	289.585.176,94 €	301.200.406,57 €	304.228.931,94 €
Financiamentos obtidos	1.189.818.896,87 €	910.027.647,06 €	867.020.340,48 €	764.836.769,68 €
Outros passivos correntes	99.743.363,69 €	106.721.294,49 €	111.001.873,88 €	112.117.981,24 €
Total do Passivo	**10.518.820.447,92 €**	**9.253.625.632,45 €**	**8.409.444.617,01 €**	**8.096.285.213,89 €**
TOTAL CAPITAL PRÓPRIO + PASSIVO	**18.721.885.088,91 €**	**17.851.784.764,92 €**	**17.389.375.167,82 €**	**17.430.399.365,17 €**

Appendix 10 – Monte Carlo simulation



Estatística	Valores de previsão
Avaliações	10.000
Caso Base	9,20
Média	11,46
Mediana	10,00
Moda	---
Desvio Padrão	5,44
Variância	29,54
Obliquidade	0,9531
Curtose	3,23
Coeficiente de Variação	0,4741
Mínimo	2,23
Máximo	32,15
Largura do Intervalo	29,91
Erro Padrão Média	0,05

Appendix 11 – Relative Valuation

PE Forward	Empresas Comparáveis	11,73
	EDP_R	0,19
	Valor da Acção	2,89 €
PEG	N/A	
PBV	Empresas Comparáveis	0,96
	EDP R	8,41
	Valor da Acção	8,20 €
PS	Empresas Comparáveis	1,24
	EDP R	1,66
	Valor da Acção	3,12 €
EV/EBIT	Empresas Comparáveis	Média Harm - 16,11
	EDP R	EBIT 577 838 000,00 €
	Valor da Acção	28,43 €
EV/EBITDA	Empresas Comparáveis	Média HArm.- 5,41
	EDP R	EBITDA 879 146 000€
	Valor da Acção	12,05 €
EV/SALES	Empresas Comparáveis	Média Harm. -2,24
	EDP R	Saless 1 349 605 000,00 €
	Valor da Acção	10,99 €

	EV/EBITDA	EV/Sales
Harmonic EV	5.828.737.980,00 €	4.969.920.412,00 €
Arithmetic EV	4.752.927.965,00 €	3.028.639.335,00 €