EDP Renewables

Equity Valuation Thesis

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Abstract

This dissertation valuates EDP Renewables, a subsidiary company from EDP, listed on PSI20, operating in the Utilities industry - renewables energies field. Due to the energy sector transformations, the continuous search for clean sources of power plus the plausible worldwide utilities industry transformation, becomes imperative to valuate companies that can be game changers. To achieve the value per share it was used the Discounted Cash Flow, both the Free Cash Flow to the Firm & the Free Cash Flow to Equity approaches, giving us an equity value of m7.569€ and m7.564€ respectively – this translates in an 8.68€ and 8.67€ price per share. Based on the Dividend Discount Model, the equity value is m7.555€ meaning a price per share of 8.66€. According with the Multiples EV/Revenue, EV/EBITDA and Price/CF per share, we reached prices of 8.19€, 8.88€ and 8.57€. A real option approach was also developed to quantify a recent investment project (wind farm) in the UK. Due to the uncertainty related with the industry and the markets, sensitivity analysis were incorporated into the model to absorb real life volatility. In the end, we reached a final price of 8.6€ per share and we recommend a buy action (actual price: 7.11€). As benchmark for the final price per share were used valuations from Morgan Staley (8.3€) and Haitong Bank (8.2€) which allowed us to conclude that the value reached in this thesis is in line with the opinion of others financial institutions and provides this dissertation with practical usefulness.

Resumo

Esta dissertação tem como missão avaliar financeiramente a empresa EDP Renováveis, subsidiária da EDP, S.A, listada no PSI20 que opera no mercado das energias renováveis. Devido às transformações do sector, à procura contínua de fontes de energia limpa e a uma plausível transformação do modelo de negócio das Utilities a nível mundial torna-se pertinente avaliar empresas que podem desempenhar um papel crucial nesta mudança. Para obter o valor por acção recorreu-se ao método de Discounted Cash Flow method, foram usados ambos o Free Cash Flow to the Firm e o Free Cash Flow to Equity que indicou um valor de m7.569€ e m7.564€ para o capital próprio o que se traduz num preço por acção de 8.68€ e 8.67€. Com base no modelo Dividend Discount Model o capital próprio é de m7.555€ e um preço por acção de 8.66€. Através dos múltiplos EV/Revenue, EV/EBITDA e Price/CF per share, os preços alcançados foram de 8.19€, 8.88€ e 8.57€ por acção. Foi ainda desenvolvido uma avaliação de um recente projeto de investimento (parque eólico) no UK com base em real options. Devido à incerteza inerente da indústria e dos próprios mercados financeiros foram também criados senários de sensibilidade para incorporar a volatilidade do mundo real. Em termos comparativos, foram revistas avaliações financeiras do Morgan Stanley (8.3€) e do Haitong Bank (8.2€) o que nos permite concluir que os valores alcançados nesta tese estão em harmonia com a opinião de bancos internacionais de investimento e caracteriza esta tese com utilidade prática.

Acknowledgments

The cumulative knowledge that I have been incorporating since the beginning of my bachelor degree and now during the master program is expressed in this thesis dissertation.

After a three-year program and an internship of one year I was convinced to pursuit a master program in finance. Now, that my University path is coming to an end I truly believe that my choice was the right one. I strongly believe that all the knowledge about the several financial fields that I absorbed in the master program will provide a milestone in my career along with invaluable experiences that will allow me to become a successful, innovative professional and assist in accomplishing my goals. By working under the guidance of your distinguished organization, I was certainly able to exploit my potential to the fullest.

Despite the individual process of learning, without the help and collaboration of others, this path of mine would not be possible. I express here my gratitude to the Professor José Carlos Tudela Martins for his seminars and very valuable advices and help during this dissertation; to the Investor Relations Department of the EDP Renewables; to all the University community that have contributed for my growth as a person and professional and last but not the least to my family, in particular to my patents, my sister and my uncle that have created all the conditions for me to accomplish this goal of mine.

To all of you I express my gratitude.

EDP Renewables | Research Note

Industry

Global demand for energy is projected to growth, more intensively in developing, non-OECD countries – 2.5%/year from 2012 to 2040. Renewables energy world share is expected to growth 2.9%/year until 2040.

In terms of global investment in renewable energy, 2015 was a new record year - €290 billion – more than the double of the invested in coal and gas generation. In terms of wind and solar, the capacity installed reached the 118GW (94GW in 2014). Although this substantial increase increases, clean energy was responsible for only 10% of the all world electricity generation.

Renewable generation costs continue to decrease, particularly in solar technology (2009-2015, -61%), plus the continuous demand for electricity allied to a faster installation of solar and wind parks provides these type of energy source with competitive advantages and increase acceptance among countries.

Company

EDPR is a market top player (4# wind player) with 9.7GW if installed capacity and present in 12 countries (North America, Europe, Brazil). Delivered in 1Q2016 7.5TWh of clean energy; for the same period, the revenues totaled €508m and the EBIT €232m. Respectively to 2015 the net investment was €719m and the operating cash-flow €701m.

This company delivers its projects on time and accomplishes its goals, for instance: 500MW of new capacity per year. The announced selective growth strategy for the next years in markets with presence already established and with a very large margin in terms of market share and consumers demand constitutes a very solid pillar for company growth.

The asset rotation strategy developed allows EDPR to sell some assets and allocate the cash in more recent and higher value investments. Moreover, this strategy also allows the company to reduce the regulatory risk and intensify its presence in core and more desirable markets.

EDP Renewables (EDPR.LS, EDPR PL)
Utilities/Portugal

Stock Rating	**Undervalued**
Industry View	**Promissing**
Price target	**€ 8,60**
Share price close (24/10/16)	€ 7,11
Recomendation	**Buy**

BS & IS (m€)	**2015**	**2020E**	**2025E**
Total Assets	15.736	17.186	21.407
Total Liabilities	8.902	9.167	12.925
Revenues	1.547	1.947	2.324
EBITDA	1.142	1.398	1.740
EBIT	578	664	901
Net Income	245	316	514

Installed Capacity (MW)	**2015**	**2020E**	**2025E**
Europe	4.965	5.522	7.526
North America	4.233	6.969	21.267
Brazil	84	464	747

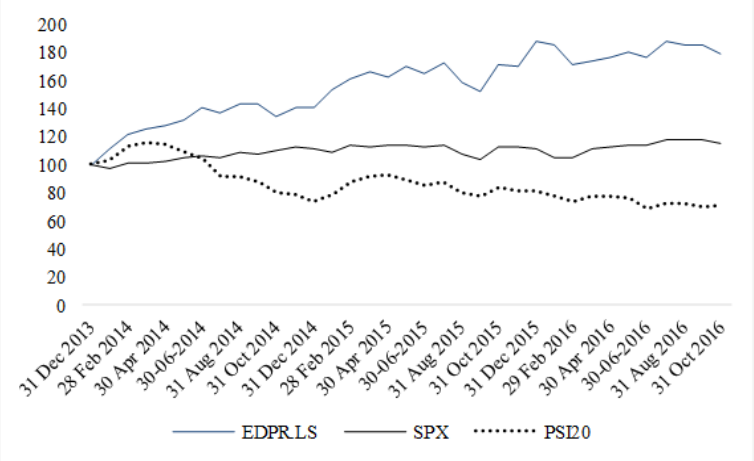
PPE (€m)	**2015**	**2020E**	**2025E**
PPE (€m)	12612	13819	17638

Capex (€m)	**2015**	**2020E**	**2025E**
Capex	903	991	1.071

Cash-Flow (€m)	**2015**	**2020E**	**2025E**
Op. CF	701	868	1.206
Decrease/(Increase) in Net Debt	(425)	(368)	27

Net Debt (€m)	**2015**	**2020E**	**2025E**
Net Debt (€m)	3.707	4.107	5.373

Share Price Performance



Bull	**€ 9,9**
Base	**€ 8,6**
Bear	**€ 7,5**

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List of Abbreviations

MW Megawatt

GW Gigawatt

TW Terawatt

MWh Megawatt hour

GWh Gigawatt hour

TWh Terawatt hour

EBITDA/MW EBITDA per Megawatt

RENIXX Renewable Energy Industrial Index

IREA International Renewable Energy Agency

OECD Organization for Economic Co-operation and Development

RoE Rest of Europe

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1. Introduction

Every rational investor persecutes an increase in the value of his/her investment. To determine if the investment has positive value and to know the right price per share it is mandatory an objective, rigorous and well-designed valuation; choosing the right assumptions, forecasting with accuracy and treating the financial data with objectivity is crucial. Furthermore, the type of company, industry, the volatility of the markets and the heterogeneous opinions among the literature related with the different models to valuate, characterize a valuation process as not only as quantitative but also qualitative due to the different interpretations of the present and opposite beliefs about the future.

To conduct a proper valuation of EDP Renewables and in order to choose the best approach, several articles among the literature were reviewed in the next stage of this dissertation with the purpose of determining the best models available to valuate this company and approach this Industry. Since there is no consensus among the authors, a solid theoretical support is necessary to produce reliable results and not an ambiguous outcome.

The third and fourth chapters of this dissertation provides a macroeconomic and Industry contextualization. This is useful for the reader who can better understand the macro and micro environment that the company faces and constitutes the very basics assumptions and general ideas for the valuation process.

In the valuation section, the economic and financial data were submitted into the models to achieve a global value for the company and hence a final stock price; the models used were the DCF (FCFF & FCFE), DDM, Multiples and Real Options valuation. Gathering these models had the purpose of assign with robustness and quality the valuation itself. Combining the major approaches ensures us a more reliable final price per share and a better understanding of the company and Industry specifics. This section includes the methodology used, the results achieved and a detailed explanation about the assumptions made.

The next step, after the valuation exercise, it was to conduct a sensitivity analysis to submit the models to reality changes and, in an exercise of risk management, observe the deviations in the price and in the global value when the micro and macro environment varies. Volatility in the company, industry and markets was replicated here for the major assumptions.

This dissertation ends with a comparison between the values achieved here and the ones computed by two international financial institutions - Morgan Stanley & Haitong Bank - to ensure veracity and practical relevance to the work developed within this thesis.

2. Literature Review

2.1. Introduction

In order to achieve an accurate value per share it's necessary to understand all the vantages and disadvantages of the models and choose the best one that better applies depending of the company and industry context. This section analyses the existing literature, compares the pros and cons of the different approaches and selects the best valuation models to apply in this dissertation. Ultimately, the quality of a valuation depends how well the analyst understands the firm and its competitive position, its operating strategy and how well forecasts the future Parrino (2005). Goedhart, Koller & Wessels (2005) reinforce the importance of accurate forecasts.

According to Luehrman (1997) a valuation exercise relies on three crucial factors: cash, timing and risk. Despite this, different micro and macro environments lead the analysts to adopt different methodologies. For a valuation exercise the analyst shall not consider a wide range of models since that it will undermine the final result Young et al. (1999); the same authors also indicate that for a proper valuation the data and the assumptions must be consistent, existence of comparability between models, only one fair value estimation and free will for the analysts to decide about the best method.

Damodaran (2002) states that the final value is not merely quantitative. Although a strong analytical basis is crucial, the heterogeneous characteristics among companies and industries must be exploited to reach a more accurate final value. The author also indicates the timeless property of a valuation due to changes in the economy, markets and company. The likelihood of change among the assumptions across time is very high.

*

"In a market economy, a company's ability to create value for its shareholders and the amount of value it creates are the chief measures by which it is judged."

(Koller, Goedhart & Wessels, 2010)

Figure 1 – Valuation Approaches

	Equity Values	Enterprise Values (Equity and Debt)
Cash Flow Approaches	Dividend Discount Model	Discounted Cash Flow
Returns Based Approaches	Dynamic ROE	Economic Value Added
Multiples	Dividend yield Price to Eranings ratio Price to Book Value	Free Cash Flow Yield Enterprise Value to EBIT Enterprise Value to Capital

Source: Goldman Sachs

2.2. Discounted Cash Flow Methods (DCF)

This method has a great acceptance among the literature and is one of the most accepted approaches in equity valuation (Havnaer, 2012). Copeland et al. (2000) emphasizes the fact that cash is king to promote the acceptance of this method. Estridge J. & Lougee B. (2007) state that this is a crucial method to valuate a company and point out the lower susceptibility of manipulation of the Cash Flows, the same does not happen with accounting standards. As mentioned before, Luerhman (1997) qualifies a valuation as a function of cash, timing and risk; the discounted CF's, the growth rate and the discount rate measure of the DCF method respectively.

This approach requires an estimation of the present and future earnings plus cash flows, an estimation of the CF's, the risk for the stable growth and a discount rate. Within this method there is two perspectives: The Free Cash Flow to the Firm (FCFF) and the Free Cash Flow to Equity (FCFE). The first one is the expected CF from operations, after taxes and before interest payment plus company investments. It also reflects all the CF's available for all the financial parties.

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

The second one is the CF available to pay dividends, which is also the FCFF net of all payments to debt holders.

$$Equity\ Value = \sum_{t=1}^{N} \frac{FCFE_t}{(1 + r_e)^t} \tag{2}$$

Hence:

$$FCFE = FCFF - Interest\ \times (1 - t) + \Delta\ Net\ Debt \tag{3}$$

Theoretically, due to the direct relations between the two methods, considering coherent assumptions, the final value should be the same. However, considering the differences in the table below, in practice, the methods differ.

Figure 2 - FCFF vs. FCFE

	FCFF	**FCFE**
Cash Flows	Pre Debet CF	Post Debt CF
Expecyed Growth	Growth in Operating Income	Growth in Net Income
Discount Rate	WACC	Cost of Equity

Source: McKinsey

According to Pinto et al. (2010) if the company is levered, has a negative FCFE or a changing capital structure the choice must go to the FCFF method due to the fact that the cost of equity (r_e) is more sensible to changes in the capital structure.

The Discounted Cash Flow Method has some limitations. Luerhman (1997) argues that companies with complex capital structures, strategies of fund raising and tax positions may lead to an increase in the number of errors in the valuation. Another issue is related with the estimation of the Weighted Average Cost of Capital (WACC), this one is sensible to tax shields, issue costs, debt securities and volatile capital structures (Luerhman 1997).

Fernández (2003) also points out the problem of some analysts using book values to compute the weights in the WACC, only market values shall be used within this method. According with Damodaran (2002) the analysts don't have access to all information available to build some assumptions and due to this the intrinsic value is never the real one.

The DCF method, in both senses, will be used to perform the valuation exercise due to its positive attributes and to the non-existing disadvantages of this method in the company structure.

2.2.1. Terminal Value

It is impossible to estimate all the cash flows *ad infinitum.* To address this problem, it's necessary to assume a steady growth and a constant reinvestment of its operating profits – also translated in the Return on Invested Capital (ROIC). Young et al. (1999) states that this is the most important element in a valuation, the figure obtained represents 80% to 90% of the all valuation value.

According with Damodaran (2012) there are three approaches to deal with the terminal value. Firstly, the liquidation in the final year of all the assets and how much they worth in market prices after debt repayments. Secondly, apply market multiples to the company's earnings or sales revenues from the terminal year to reach the terminal value; multiples today contain the expected future growth. Mixing a DCF valuation with a relative one may reduce the accuracy of the valuation. Thirdly, the stable growth model assumes a perpetual reinvestment of a percentage of the CF's into new assets (by opposite with the liquidation model), a stable growth and assumes also that the company is already in a steady-state.

$$Terminal\ Value_t = \frac{CF_{t+1}}{R - g} \tag{4}$$

The perpetual growth rate (g) represents a limitation of this method. It is impossible for a company to growth always more than the overall growth of the world economy (Damodaran 2005).

"One practical drawback common to all present value models is that they are highly sensitive to things we do not know. More specifically, the terminal value is usually by far the most important element in any valuation estimate and yet it is extraordinarily difficult to estimate it with any degree of accuracy." (Young et al., 1999).

2.2.2. Adjusted Present Value (APV)

Regarding the issues discussed above about the DCF method emerges another method that nowadays has also acceptance among the literature. In the APV method the value of a

company is computed based only in equity financing and then posteriorly adding the present value of the expected tax benefits and subtracting the bankruptcy costs. Luehman (1997) states that this method provides transparency due to the fact that all the components are separated which allows a better view of the methodology.

$$APV = PV_{CF\ Assets} + PV_{All\ financing\ side\ effects} \quad (5)$$

Once the company is valuated exclusively equity based, i.e. unlevered, it is necessary to compute the present value of the expected tax benefits (tax shields) and the bankruptcy costs. Relatively to the tax benefits, Damodaran (2006) points out the importance of choosing the right tax rate and if this rate may change across time, to know what is the right level of debt and if this level may change over time and finally what discount rate to use to reach the present value.

$$PV_{tax\ shields} = \frac{Debt_t * Interest\ Rate_t * Tax\ Rate_t}{(1 + r_d)^t} \quad (6)$$

Respectively to the bankruptcy costs, Damodaran (2006) argues that this is the larger issue in APV because those costs represent a large amount and their probability and exact amount are difficult to estimate with accuracy.

$$E(Bankruptcy\ Costs) = Probability\ of\ Default \times Bankruptcy\ Costs \quad (7)$$

The cons about the second equation are the lack of consensus about how to compute both terms. Damodaran (2002) suggests an approach based on the trading bonds ratings to reach the probability of default or consult specific rating agencies. For the Costs, Branch (2002) says that the figure should be around 28% of the pre-distressed company's value.

The final step of the APV method is to reach the levered value of the company adding up all the variables. Hence:

$$V_L = V_U + PV_{tax\ shields} + EBC \quad (8)$$

APV method is mostly used and outperforms FCF when the capital structure of company is expected to change substantially during the investor horizon. Since the historical ratio of

our company is significantly stable, its politics is to keep it in that way and due to the issues of the method itself and its possible lack of accuracy this method won't be applied.

2.3. Dividend Discount Model (DDM)

This section approaches the Dividend Discount Model (DDM) firstly present by Williams in 1938 and then updated by Gordon and Shapiro in 1956. It only considers dividends as cash flows to equity and assumes that shareholders expect to receive dividends payment during the holding period plus a price when they sell their share (Damodaran 2002). According with Foerster & Sapp (2005) the risk of CF's from equity comes from the timing and growth associated with the company's earnings and the availability in paying dividends. Relying on the present value of the summation of all expected future dividends, using cost of equity to discount them, the company's stock price is obtained.

Following Damodaran (2005), depending on the growth forecasts, the model must be applied in two different ways:

$$Stable\ Growth\ Model: P_0 = \frac{Expected\ DPS}{K_e - Expected\ Growth\ in\ Perpetuity} \tag{9}$$

$$Two\ Stages\ g\ Model: P_0 = \sum_{t=1}^{n} \frac{E(EPS_t)}{(1 + K_e^t)} + \frac{\frac{E(DPS_{n+1})}{K_e - Expected\ Growth\ in\ Perpetuity}}{(1 + K_e)^t} \tag{10}$$

Only the expected dividends, obtained through out future growth assumptions and the cost of equity, are necessary to apply the equations. Damodaran (2006) highlights the simplicity and intuitive understanding of the model and its accurate estimations of the value per share when companies pay out their free cash flows to equity in the form of dividends.

Despite the apparent facility and effectiveness of the method, this model has some drawbacks. Paying dividends is a political decision: some companies do not pay them, others only do it in punctual years and some even increase debt to be able to do it and to give a (fake) signal to the market. Moreover, expecting a constant dividend growth is not suitable for the all the companies. If the company holds back cash this leads to an undervalued price per share, if it uses debt or equity to pay dividends this leads to an

overvalued price per share. This methodology can only be applied in specific cases, in companies with specific characteristics otherwise leads the analyst to inaccurate valuations.

Due to the regular and consistent dividend's payments of our company, this model will be also used.

2.4. Returns Based Approach

The models discussed so far do not indicate directly to investors the company's performance. The following to models are designed based on profitability and aim to address in which terms the company produces value or not.

2.4.1. Economic Value Added (EVA)

This method intends to account the excess value produced by an investment comparing the company's cost of capital and its return on the invested capital. Damodaran (2005) classifies EVA as an indicator of the increase in value created by an investment or a portfolio of investments. Shareholders' interests tend to be more addressed with this method due to the computation of the value created with the new investment that, if positive, represents a good indicator of a future payback.

$$EVA = After\ Tax\ Operating\ Income - Cost\ of\ Capital\ \times Capital\ Invested \quad (11)$$

According with Damodaran (2005) the estimation of the capital invested and the cost of capital it is crucial. The first one relies on the capital invested initially plus the cumulative market value; the second is the market measure of the cost. Book values must be ignored.

Salmi et al. (2001) identified higher sensitivity from EVA to the cost of equity and lower sensitivity to the cost of debt. Moreover, specific management policies as pursuing growth or leverage tend to affect substantially this methodology. Hence, using this method requires a understanding of the intern policies and the macroeconomic environment.

Damodaran (2005) associates Enterprise Value with the EVA model in the following equation where the value comes from the capital invested in assets plus the present value of these same assets plus the value added by the future projects.

$$EV = Invested\ Capital + \sum_{t=1}^{n} \frac{EVA_{t\ assest\ in\ place}}{(1+WACC)^t} + \sum_{t=1}^{n} \frac{EVA_{t\ future\ projects}}{(1+WACC)^t} \quad (12)$$

2.4.2. Dynamic ROE

This approach is very similar to the one discussed above, the difference relies in the fact that this method has its perspective over equity instead of the enterprise. The dynamic ROE compares the return on equity (ROE) with the cost of equity (K_e).

$$V_{eq} = E_0 \times \sum_{t=1}^{n} \frac{E_{t-1} \times (ROE - K_e)}{(1+K_e)^t} \quad (13)$$

*

The two models addressed in the Returns based approach chapter differ from the previous ones in the sense that provides us information about the economic profit that has been generated by the company. However, since this methodology relies more into accounting information and the time horizon is considerably short, their acceptance is not universal and hence they will not be considered.

2.5. Relative Valuation

Within this methodology the value of an asset is derived from the pricing of others similar assets and to do so it is used a common variable like earnings, revenues, cash flows or book value; relative valuation reaches the value of an asset by looking to the market and seeing how much worth it similar assets Damodaran (2006). This method, due to its straightforward application and immediate output, allows companies to understand its

positions among its peers. Asquith et al. (2005) says that the majority of top analysts uses multiples for enterprise valuation.

Lie et al. (2001) point out this method as a facilitator for understanding other valuations since the results provided by multiples are easy to read. They also defend its application as a complement to other valuation methods. Fernandez (2002) also supports this methodology but also as a complement to others methods. Furthermore, Goedhart et al. (2005) states that the relative valuation and the DCF should be combined in the valuation exercise.

For Ferris & Pettit (2013), "multiple is a ratio between two financial variables. In most cases, the numerator of the multiple is either the company's market price (in the case of price multiples) or its enterprise value (in the case of enterprise value multiples). The denominator of the multiple is an accounting metric, such as the company's earnings, sales, or book value."

2.5.1. Peer Group

For an accurate relative valuation, it's necessary a well-designed peer group, the companies within the group must share similar characteristics to allow a comparison between them. According with Damodaran (2006) comparable firms do have similar cash flows, growth pattern, and same level of risk. For Koller et al. (2005) the peer group must share a similar return on invested capital (ROIC) and the same level of growth in the long-run.

Moreover, Liu et al. (2012) defend that choosing companies from the same industry increases the accuracy of the valuation. Foushee et al. (2012) states that for this analysis the companies should operate in similar markets and face the same macro-economic environment.

The main drawback about this methodology is to create a list with companies that share a large amount of similarities with the company under valuation. Damodaran (2006) also points out that the quality of the result depends of how good the market evaluates the others companies into the peer group. For instance, a general undervaluation of the group translates into an undervalued valuation for the company in analysis.

2.5.2. Multiples

According with Goedhart et al. (2003), to use the multiples approach, an analyst must consider some basic steps: peers with similar ROIC and growth pattern, apply forward-looking plus enterprise-value multiples and adjust enterprise-value multiples for non-operating items.

Liu et. al. (2001) and Kim and Ritter (1999) are also in favor of using forward-looking multiples due to a more accurate outcome. The most used are the Price-to-earnings ratio (PER) and the Enterprise-Value multiples (EV), this last one can have as the denominator EBITDA, Sales, EBIT and Capital for instance. According with Fernandez (2001) the major ones are the PER and the EV/EBITDA.

Nevertheless, according with the industry in analysis, the preference changes: for Utilities the author refers the PER and the Price to cash flow (P/CF). Despite this industry segregation, Lie and Lie (2002) state that the application of several multiples performs better than the application of only a few.

$$PER = \frac{Current\ Market\ Price}{Earnings\ per\ Share} \tag{14}$$

$$Enterprise\ Value\ Multiples = \frac{EV}{EBITDA\ or\ Sales\ or\ EBIT\ or\ Capital} \tag{15}$$

$$Price\ to\ Cash\ Flow = \frac{Share\ Price}{Cash\ Flow\ per\ Share} \tag{16}$$

Due to its large acceptance as a support valuation model and its immediate and comparable results this approach will be considered in the valuation exercise.

2.6. Option Pricing Theory

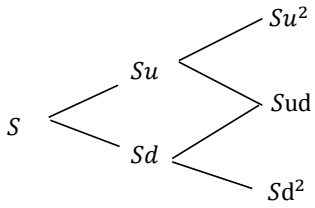
This methodology reaches the value based on options, derivative securities that derive its value based on an underlying asset. According with Damodaran (2002) this method can be useful to value assets whose value varies depending on the intrinsic characteristics of options whose value cannot be reached conventionally. Moreover, when the company has substantial operations' volatility, this method can be applied.

More recent literature states that due to the necessity of management to adjust its decisions to address unexpected events, due to the fact that companies do learn and respond to new developments the DCF model may not capture it. Hence, the option price theory can be used allowing managers to adjust decisions to the new faced environment (Trigeorgis 1993).

Luerhman (1997) states that this method should be a complement to other methodologies and not being used as a single valuation model. Furthermore, Wooley and Cannizzo (2005) argue that DCF undervalues investment projects; Copeland and Keenan (1998) go further by saying that NPV is responsible for several underinvestment decisions across time.

The two separate models to valuate companies within this methodology are the Black Scholes model and the Binomial Model. Luerhman (1997) defends the use of the first one since it shares with DCF more inputs and thus allows a more homogeneous comparison.

Binomial Model



(17)

S is the current stock price and moves up to Su with probability p and moves down to Sd with probability 1 - p.

Black Scholes Model

$$d_1 = \frac{\ln\left(\frac{S}{K}\right) + \left(r + \frac{\sigma^2}{2}\right)t}{\sigma\sqrt{t}}$$

$$d_2 = d_1 - \sigma\sqrt{t}$$

S - current value of the underlying asset
K - strike price of the option
t - option expiration life
r - risk free interest rate
σ^2 - variance of the underlying asset

(18)

The company in analysis has a premature project related with natural resources and to account its asset value this method will be applied specifically to this investment project.

2.7. The Cost of Capital

To reach the present value of the future cash flows it's required a discount rate which reflects the cost of money, it represents the opportunity cost of investing in a particular project instead of allocate the capital to another one. Cost of equity for projects only financed with equity, cost of debt when using debt only and the weighted average cost of capital for a mixed solution.

2.7.1. Weighted Average Cost of Capital (WACC)

"The required return for the equity holders and debt holders taking into account the proportion in which way the company is financed and embedded in this rate are the tax benefits of the debt." Miles & Ezzell, 1980

$$WACC = \frac{E}{E+D+P} \times K_e + \frac{D}{E+D+P} \times K_d \times (1-T) + \frac{P}{E+D+P} \times K_p \qquad (19)$$

X/(E+D+P) - market value proportion of X in funding mix
Ke - cost of equity
Kd - cost of debt
Kp - cost of preferred stock
T - tax rate

Although the simplicity of this method, the literature only approves this methodology for companies with a relatively stable capital structure. Luerhman (1997) states the lack of efficiency of WACC for companies with complex tax structures.

2.7.2. Cost of Equity

This represents the expected return for an investor who invests in a project and faces the risk of it. Following Damodaran (2001) and Koller et al. (2005), to reach the cost of equity the most used approach is the Capital Asset Pricing Model (CAPM) – further discussed in more depth.

$$K_e = R_f + \beta_L\left[E\left(R_m - R_f\right)\right] \qquad (20)$$

Ke - cost of equity
Rf - risk-free rate
(Rm - Rf) - market risk premium
β - beta

2.7.3. Cost of Debt

According with Damodaran (2006) the cost of debt incorporates the default risk and the market interest rates. Thus, it reflects the cost of borrowing money for a company. Due to the fact that interest payments are tax deductible is often computed the after tax cost of debt i.e. the effective rate. The cost has the risk free component plus the premium demanded by investors to invest in a specific company (Damodaran 2002).

$$K_d = R_f + Premium \tag{21}$$

The premium component can be obtained based on the company's yield to maturity (YTM) of long term bonds, based on the estimation of the default spread on the company's credit rating or based on the recent borrowing company's rates.

2.7.4. Capital Asset Pricing Model (CAPM)

As briefly discussed before in the cost of equity section of this dissertation the CAPM[1] is widely used to estimate companies' cost of capital and evaluate the performance of investment portfolios.

Fama and French (2004) state that this methodology "offers powerful and intuitively pleasing predictions about how to measure risk and the relation between expected return and risk". According with the model the investor must be remunerated for the risk taken and for the time value of the money invested, this last one is measured by the risk-free rate in the following equation:

$$K_e = R_f + \beta\left[E\left(R_m - R_f\right)\right] \tag{22}$$

2.7.4.1. Risk Free

According Damodaran (2005) the risk free rate must have no default risk and no reinvestment risk. Only government bonds, not all by far, apply for this criteria based on the principle that they can print their currency. The maturity of the bonds must match investment horizon.

[1] Introduced by Sharpe in 1964; further developed by Markowitz, Fama & French (1992) and Carhart (1997).

The risk free rate is the return of a portfolio which has no covariance with the market, those rates in the long-term government bonds in the US and Western Europe do have a significantly low covariance relationship with the market (Koller et all., 2005).

2.7.4.2. Beta

The β variable in the equation measures the volatility or the systematic risk of the company relative to its market adjusted for the level of leverage. Due to the fact that debt is tax deductible and provides tax benefits, the levered beta contains a lower level of volatility than the unlevered one.

Following Damodaran (2002), this presents two ways of computing beta: raw beta (levered) and adjusted beta. The raw beta is reached through a regression of the stock markets versus the market returns and gives us an historical measure. The adjusted one is merely an estimation for the future beta of the company.

$$Raw\ \beta: R_a = \alpha + \beta R_m \qquad with: \beta = \frac{(Cov(R_a, R_m))}{\sigma_m^2}$$
$$Adjusted\ \beta = \frac{2}{3} \times Raw\ \beta + \frac{1}{3} \tag{23}$$

To reach the unlevered beta it is used the following equation:

$$\beta_L = \beta_U \times \left[1 + (1 - t) \times \frac{D}{E}\right] \tag{24}$$

2.7.4.3. Risk Premium

The trade-off risk-return states that the higher the level of risk in an investment the higher must be the return to compensate the investor for facing riskier conditions. As reasons to justify facing the risk we have the diversifiable risk (company related) and the non-diversifiable risk (market related). The first one affects a specific investment or position while the second one impacts a higher amount of investments.

The risk premium consists in the difference between the expected return on an investment and the risk free rate gathering all of these three concepts: historical market risk premium, required market risk premium, expected market risk premium.

According with Damodaran (2011), to estimate the risk premium, one has several distinct methods. For instance: the historical premium approach which consists in computing the premium based on the average historical differences between the market returns and the risk free rates across a long period; the implied equity premium approach focusing on the estimation of forward-looking premiums based on the prices of today's market.

This dissertation uses the historical approach computing the average and geometric average and then uses the Marshall Blume estimator to adjust estimations errors and autocorrelations returns.

$$Rp = \frac{T-N}{T-1} \times Ra + \frac{N-1}{T-1} \times Rg \quad (25)$$

T - number of observations
N - period to forecast in years
Ra - arithmetic average
Rg - geometric average

2.8. Further Considerations

2.8.1. Cross-border Valuation

Evaluate a company that operates overseas rises the necessity of addressing issues related with international operations. Kester and Froot (1997) and Koller et al. (2010) refer the foreign currencies associated with the cash flows and with the cost of capital as the major ones. Despite the currency used, the intrinsic value must be the same (Koller et al. 2010). According with the same author there are two methods to address this situation: (1) run the model and then, in the end, use spot exchange rates to convert all the figures into the same currency; (2) use forward exchange rates to convert the forecasted cash flows for the following years and then, once discounted, they will all be already in the same currency.

2.8.2. Utilities Valuation

Each Industry may require different approaches and some adjustments to the valuation methods. The methodology to valuate a bank or an industrial company strongly differs due to their differences in the financial accounts.

Multiples seem to be the approach with more adjustments requires depending of the industry (Blacconieri et al. 2000).

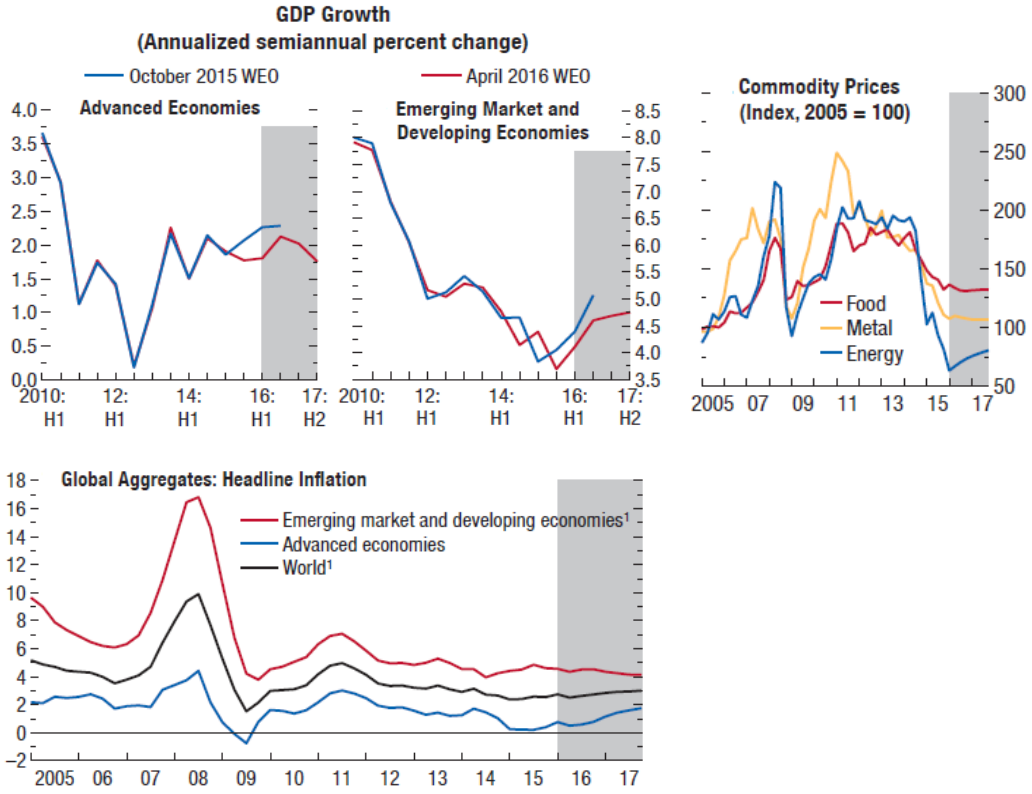
The Utilities industry is strongly legislated and cross-agreements between the companies, private and governmental agencies within the industry and the government itself are common. Menegaki (2008) recommends adjustments for this industry, model based valuations about environmental, resource and energy economics.

3. World Economic Outlook

This chapter aims to provide the reader with macroeconomic and financial illustrative data about the past, current and forecasted worldwide economic and financial situation. It has general economic indicators and some more specific measures for the commodities and utilities sector. The ultimate purpose is to present economic and financial information about the macro environment and to serve as the very basis for the valuation assumptions.

3.1. Economic and Financial Indicators

Figure 3 – Economic Indicators

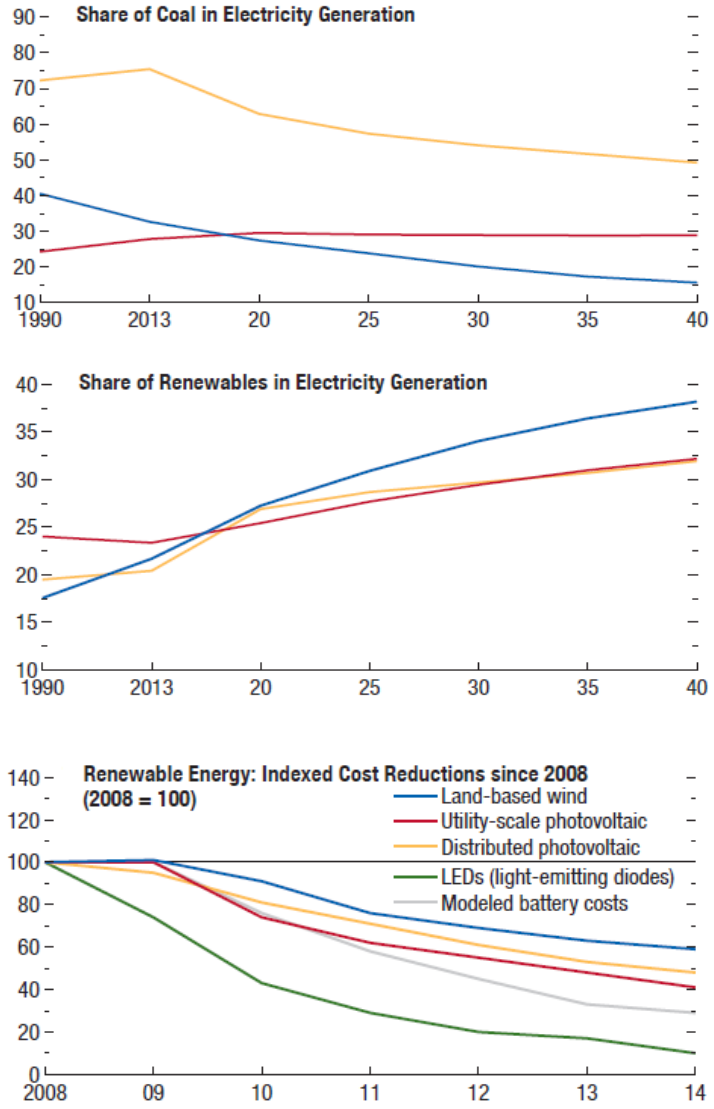


Source: IMF - World Economic Outlook, April 2016.

According with the World Bank the worldwide GDP will have a non-growth for advanced economics and it will increase for emerging markets, inflation will remain flat and the price of energy will rise after a significant drop.

3.2. Commodities and Utilities related

Figure 4 - Commodities and Utilities Indicators



Source: IMF. 2016. World Economic Outlook, April 2016.

Important observations such as the decrease in the use of coal for electricity generation, substantial increase in the share of electricity production via clean energies and a sharp decrease in the costs of R&D for renewables sources of energy are positive indicators and anticipate a bright future for renewable energy companies.

4. Industry Overview

4.1. Industry Changing

Nowadays, the discussion over the world's future energy is ongoing and concerns a huge number of institutions: governments, private industrial companies from several industries, financial sector and others. The world demand for energy for the next 20 years it will growth over 30% and the necessity to address this issue and at the same time prevent climate change and greenhouse gases opens a path even more optimistically for renewable energies.[2]

The energy Industry is responsible for 72% of all the emission of greenhouse gases and to control global warning this value needs to be reduced[3]. In December 2005, in Paris, was signed an agreement by 195 countries where they compromised to keep global warming under 2ºC. Within this scenario is imperative to give to the renewables energies a crucial role, they have proved to be a competitive energy source and to contribute for the country's GDP.

4.2. Major Players

The top thirty major players in terms of market capitalization are identified in the Renewable Energy Industrial Index (RENIXX 30). One can observe a clear domination by the US and China (CN) with 8 companies each, followed by countries like Canada, Germany, Denmark and Spain with 2 each.

[2] Intergovernmental Panel on Climate Change 2015
[3] World Resource Institute 2015

Figure 5 - Renewable Energy Industrial Index by market capitalization (10/2016)

Company	Country	Price per Share (€)
Albioma SA	FR	15,37
Brookfield Renewable LP	BM	26,92
Canadian Solar Inc	CA	13,18
China High Speed Group Co	CN	0,94
China Longyuan Power	CN	0,72
Dong Energy	DK	36,68
EDP Renovaveis SA	ES	6,55
First Solar Inc	US	35,42
Gamesa Corporacion Tech	ES	21,26
GCL Corp. Energy	CN	0,12
Innergex Renewable Energy	CA	9,54
JA Solar Holdings Co Ltd	CN	6,13
JinkoSolar Holding Co Ltd	CN	14,87
Meyer Burger Technology	CH	3,17
Nordex SE	DE	26,81
Ormat Technologies Inc	US	41,81
Plug Power Inc	US	1,53
REC Silicon ASA	NO	0,11
SMA Solar Technology AG	DE	28,82
SolarCity Corp	US	17,86
Solaredge Technologies Inc	US	15,27
SunPower Corp	US	7,84
Sunrun Inc	US	5,58
SunZlon	IN	0,75
Tesla Motors Inc	US	175,98
Trina Solar Ltd	CN	9,11
Verbund AG	AT	14,95
Vestas Wind Systems	DK	75,27
Xinjiang Goldwind Science & Technology Co Ltd	CN	1,36
Yingli Green Energy Holding Co Ltd	CN	3,41

4.3. Renewables Energy Advantages

According with the International Renewable Energy Agency (IREA), doubling the productivity capacity until 2030 of the renewables energies would be enough to achieve the Paris's goals. It is expected a 34% rate of global production of clean energy by 2040.

Although environmental causes and issues shall be addressed usually they are bellow in terms of priorities comparatively with the economics interests. Despite possible drawbacks relatively to the progress of renewables energies this is not the case. In the present world, green energies have the power of mitigate climate changes and are classified as investments that catalyze direct and indirect economic benefits through the reduction of dependency to import energy (most often oil and gas), improving air condition and, as consequence of the economic development, improve unemployment rates.

- GDP growth: the development of a new industry and new technology that represent each time more the worldwide economy.

- Employment improvement: due to its labor-intensive proprieties, by opposite with fossil fuel industries more mechanical and capital-intensive, they create new jobs. According to IREA, the renewable sector employed, in 2015, 8.1 millions of people. Wind energy is responsible for more than 1 million jobs, 31% are in Europe.

- Less energy dependency from other countries: since wind, solar and hydro energy are endogenous to the countries they increase its intern energy support and mitigate the exposition risk to energy import.

4.4. Economic Viability

The technological improvement pushes prices down and has been making green energy an investment with a lower initial investment. The aero-generators have seen they price decrease in one third from the past 6 years which leads to an increase in competitively; Bloomberg estimates that this source would produce 2.000 GW in 2040 (433 GW was the production in 2015). Photovoltaic panels' prices decreased about 75% since 2009 and it is expected from them to keep this tendency. Bloomberg predict that this source of energy will rule all the new constructions in the future; 5000GW of capacity in 2040 (178GW in 2015).

It is notorious the impact of tech evolution in the Industry and how it enables the investment in renewables energy.

4.5. Governmental Political Support

The economic reasons, the environmental concerns and the new green policies have been boosting the growth of renewables energies all across the world.

China broke a record and completely oversteps the analysts' forecasts creating in the past year a new power capability of 31GW. In Europe the figure was 13GW (Germany 6GW, Poland 1.3GW, France 1.1GW, UK 1GW, others 3.6GW). About North America, USA installed 8GW and Canada 2GW. Latin America created 3GW and emergent economies around also 3GW.[4]

The European council in the past year formulated a binding agreement between countries to achieve in 2030 a level of 27% of clean energy for the European Union (EU), a reduction of 40% in the greenhouse gases and a 27% level of energy efficiency. A report from the Environmental European Agency states that the EU it is in a good path to achieve the targets.

The following list presents the legal procedures and the government's measures of some European countries to reach the goals of the agreement (plus the situation of the EUA):

- Spain: January 2016, Spanish government opened an auction for private companies to build 700MW of renewable energy.

- France: July 2015, new law pretends to cut by 40% greenhouse gases emission until 2040 and increase clean energy production up to 32% of all electricity produced.

- Poland: February 2015, creation of a new system of support to all the new renewable energy companies.

- Italy: 2016 1st trimester, new law bill authorizing new auctions to install up to 800MW of clean energy.

[4] World Resource Institute 2016

- UK: February 2016, British government stablishes contracts with the private sector to construct 27 projects and install more 2,1GW of renewable energy.

- Romania: December 2015, for 2016 13% of all electricity produced must come from clean sources.

- EUA: December 2015, more fiscal incentives (fiscal credits during 10 years) for the wind generations parks.

4.6. European Reform of the Emissions Licenses

The emissions licenses commerce was founded in 2005 with the purpose of reducing greenhouse gases emissions in a more effective and economically viable way. The agreement has pre-stablished maximum levels of emissions and this limit is reduced every year to reach the final purpose of the contract. Private companies receive and can also buy rights according with their needs. Due to the scarcity of rights and to the economic crisis the contract's boundaries have been crossed.

To address it the European Commission created two mechanisms, in 2014 a deferral for new licenses and in 2015 a market stability reserve. The first one aims the short-term and intends to rebalance the supply and demand as decrease price volatility. The second one, focused in the long-run, pretends to decrease the historic surplus in licenses attribution and adjust better the rights given. The European Commission pretends to cut the number of licenses assigned by 2.2% per year.

4.7. The future of Energy

"Hydroelectric generation, onshore and offshore wind power, and solar photovoltaic will spearhead this transformation, which should be accompanied by improvements in networks and back-up and storage technologies." Ignacio Galán, at the World Economic Forum 2016

According with the World Economic Forum the expected demand for energy until 2040 it will growth 40% and the necessity of comply with the Paris agreement implies new ways to

produce electricity, throughout renewables sources. To address both the demand and the gases restrictions a $7 billion investment is required in OECD countries.

New trends in electricity production[5]:

Sectoral

- Renewable Energy will increase in 8,300 TWh by 2040, 50% in Europe, 30% in China and Japan, 25% in the USA and India; coal will represent no more than 15% for outside Asia.
- Increase in the number of policies in favor of low gases emissions energy production due to cost trends, cost of renewables continues to go down.
- World population 4 times larger by 2050, unsustainability issues of natural resources.

Technological

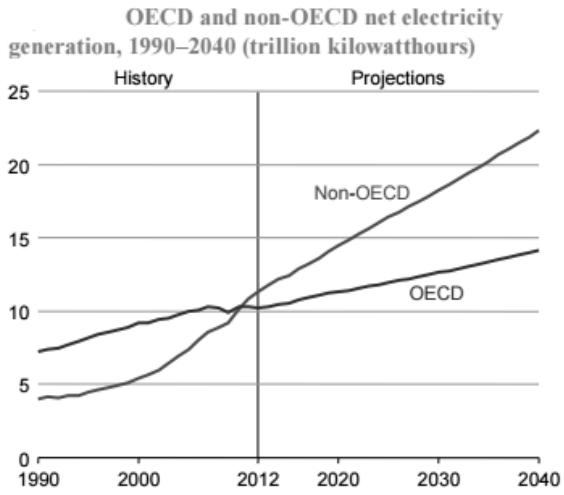
- Tech advances and better efficiency allied with political pressures to continuous development.
- Smart grids will allow house automation and personal management of electricity.
- Technological advances for new renewables energies and for the distribution process may change the current market model.
- Electricity storage, still embryonic, will allow a personal management of the power systems.

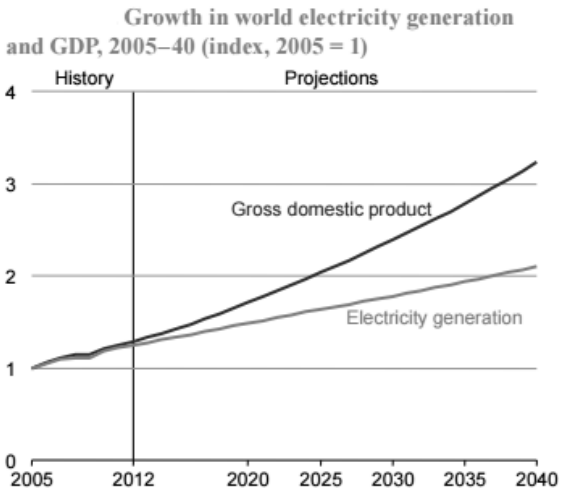
Consumption

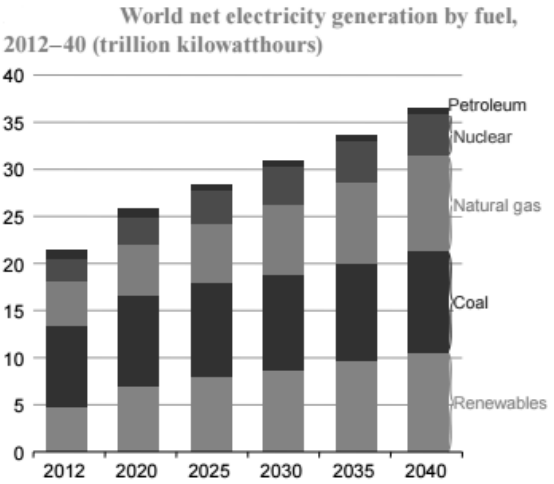
- 17% of the global population (1.2 billion people) doesn't have access to electricity and 38% (2.7 billion) risk their health using traditional ways in order to cook.
- Development of new uses may create new markets and opportunities: electrical vehicles, robots.

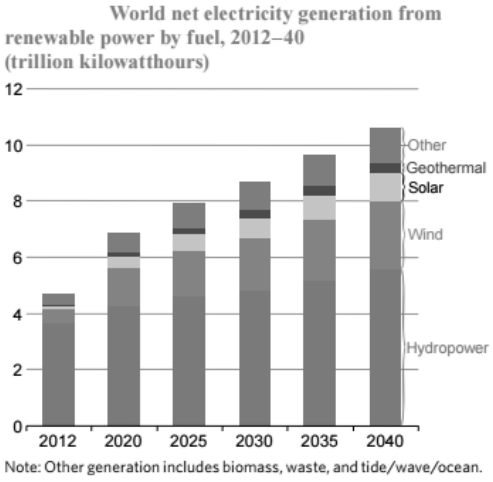
[5] World Energy Outlook 2015; Energy Roadmap of the European Parliament

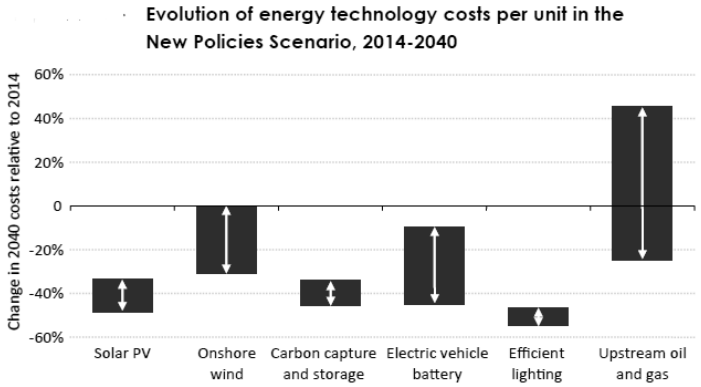
Figure 6 - Electricity Forecasts











Source: World Energy Outlook. 2015.

5. Company Overview

5.1. Introduction

EDP Renewables integrates development, construction and operations of wind farms and solar power plants in order to produce and to sell renewable energy. Its activity is present in twelve countries (Portugal, Spain, Italy, France, Belgium, Poland, Romania, UK, Canada, USA, Mexico and Brazil) and has as geographic business regions Europe, North America and Brazil.

The amount of electricity produced worldwide in 2015 was 21.4 TWh, with an installed capacity of 9.6 GW (plus 344MW under construction), employs more than 1000 collaborators.

Figure 7 - EDPR main 2015 Indicators

Key Figures for 2015

Net Investment	719m €
Collaborators	1018
Intalled Capacity	9,6 GW
Operating CF	701m €
EBITDA	1142m €
EBITDA/MW	137k €/MW
Production	21,4 TWh
Net Debt	3,7m €
Net Income	167m €

5.2. Share Performance and Shareholder structure

EDPR is listed in the Euronext Lisbon since 2008 – was created through an IPO. The share opened at 8€, went to 5€ in mid-2008, raised to 7.6 in later 2009 and then felt until 2.7€ in mid-2012. Since then, rose again until 7€ in later 2015 – this price has been partially constant until now.

Figure 8 - EDPR Share Price evolution and other Indexes

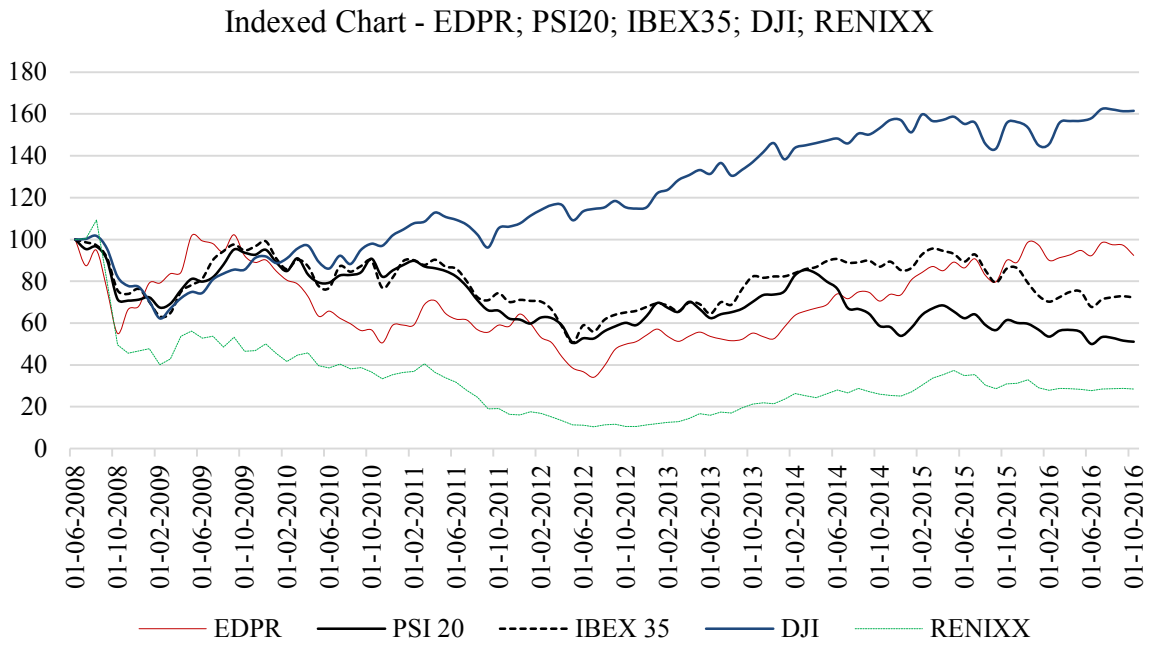


Figure 9 - EDPR Share price details

EDPR - Market	2015	2014	2013	2012	2011
Opening Price (€)	5,4	3,86	3,99	4,73	4,34
Close Price (€)	7,25	5,4	3,86	3,99	4,73
Market Cap (m€)	6324	4714	3368	3484	4124
Volume (m)	289,22	396,84	448,15	446,02	463,56
Total Return (%)	35%	41%	-2%	-16%	9%
PSI 20 (%)	11%	-27%	16%	3%	-28%
Dow Jones Utilities (%)	-5%	12%	9%	-9%	-25%

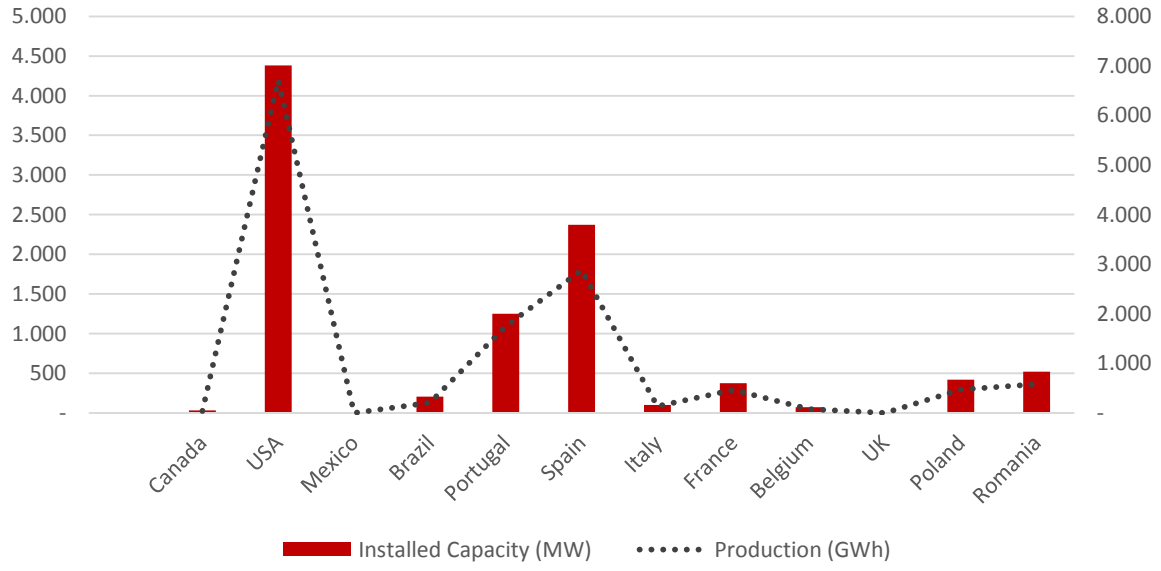
The shareholders are divided by 23 countries, the major one is EDP S.A. with 77.5% of all the 872.308.162 shares followed by the MSF Investment Management with 3%, the remaining 19% is distributed by other shareholders.

5.3. Portfolio

EDPR portfolio is well diversified across several countries, its larger business areas in terms installed capacity and production are the US, Spain and Portugal.

Figure 10 - EDPR Portfolio

Portfolio 1H2016	Installed Capacity (MW)	Production (GWh)	Load Factor (%)	Under Construction (MW)	Market Share 2015
Canada	30	39	30%	-	*n.a.*
USA	4.382	6.712	37%	429	37%
Mexico	-	-	0%	200	0%
Brazil	204	205	29%	-	1%
Portugal	1.249	1.751	32%	2	25%
Spain	2.371	2.879	31%	-	10%
Italy	100	132	31%	14	1%
France	376	464	29%	12	4%
Belgium	71	76	25%	-	3%
UK	-	-	0%	1.116	0%
Poland	418	472	24%	-	9%
Romania	521	583	26%	-	16%



5.4. Operational Performance

EDPR possesses a diversify portfolio across Europe and America with 9.6 GW and with an average of 6 years old. The EBITDA per GW comes from Spain 46%, North America 24%, Rest of Europe 16% and Portugal 16%. By the end of 2015, to operate in 2016, EPDR had in construction 200MW in Mexico, 120MW in Brazil and 24MW in France.

In terms of Electricity production, EDPR produced in 2015 21.4 TWh – North America 52%, Spain 23%, Rest of Europe 15%, Portugal 9% and Brazil 1%.

Figure 11 - EDPR Operational Data

Operating Data	2013	2014	2015	1H16
Installed Capacity (EBITDA MW + Eq. Consolida	**8.565**	**9.036**	**9.637**	**9.721**
Europe	4.796	4.938	5.141	5.105
North America	3.685	4.014	4.412	4.412
Brazil	84	84	84	204
Electricity Generated (GWh)	**19.187**	**19.763**	**21.388**	**13.314**
Europe	9.187	9.323	10.062	6.358
North America	9.769	10.204	11.103	6.750
Brazil	230	236	222	205
Load Factor (%)	**30%**	**30%**	**29%**	**33%**
Europe	28%	27%	26%	30%
North America	32%	33%	32%	37%
Brazil	31%	32%	30%	29%
Average Selling Price (€/MWh)	**62,6**	**58,9**	**64,0**	**59,9**
Europe (€/MWh)	89,3	80,3	83,0	79,1
North America ($/MWh)	48,4	50,8	51,0	46,5
Brazil (R$/MWh)	309,2	346,4	370,4	265,1
Employees	**890**	**919**	**1.018**	**1.055**
Europe	467	434	445	459
North America	298	316	383	395
Brazil	23	26	32	33
Holding	102	143	158	168

5.5. Financial Performance

Revenues in 2015 reached 1.547 million euros (+21%), EBITDA totaled 1.142 million (+26%) benefiting from top-line changes. Net profit increased by 32% to €167m. The Operating Cash-flow was €701m and the net investment €719m due also to asset rotation strategy[6]. CAPEX reached €903m reflecting the new investments in terms of electrical capacity made by the company, from this value 72% is attributed to North America, 20% to Europe and 8% to Brazil. Financial Debt was €4.1b (+€326m) due to new investments and US dollar appreciation, the interest rate is 90% fixed, has a maturity of on average 3 years and the book cost of debt is 4.3%. The Institutional Partnership (not considered for the net debt) increased due to US dollar appreciation and tax equity operations[7]

Figure 12 - EDPR Financial Data

Financial Data (€m)	2013	2014	2015	1H16
Revenues	**1.316,4**	**1.276,7**	**1.547,1**	**888,9**
Operating Costs & Other Operating Income	(395,8)	(373,5)	(404,8)	(240,7)
EBITDA	**920,5**	**903,2**	**1.142,3**	**648,2**
EBITDA / Revenues	70%	71%	74%	73%
EBIT	473,0	422,4	577,8	353,7
Net Financial Expenses	(261,7)	(249,9)	(285,5)	(178,7)
Net Profit (Equity holders of EDPR)	**135,1**	**126,0**	**166,6**	**58,8**
Operating Cash-Flow	677	707	701	474
Capex	627	732	903	378
PP&E (net)	10.095	11.013	12.612	12.563
Equity	6.089	6.331	6.834	7.356
Net Debt	3.268	3.283	3.707	3.303
Institutional Partnership Liability	836	1.067	1.165	1.165

[6] Selling minor assets or ones for those is expected more unfavorable conditions in order to use the cash to invest in new investments with more value to the portfolio.

[7] Type of partnership that allows an investor to take advantage of the benefits without a long term commitment to the project for the term of the lease or power purchase agreement. Firms that have a tax liability and chose to invest the capital in an income producing asset instead paying the government tax.

5.5. Operational and Financials by Region

Here are presented the resuming financial and operational maps per country to provide the reader with a detailed view about the company. An overall view allows us immediately to conclude that Spain is the biggest market in Europe for EDPR in terms of installed capacity and electricity output, looking however for the revenues those are more similar across the three regions. As mentioned before, future investment plans will be focused in RoE since Portugal and Spain already have a good portfolio of assets for its needs.

Figure 13 - Financial and Operational data for Europe

Portugal	**2013**	**2014**	**2015**	**1H16**
Installed Capacity (MW)	1.074	1.157	1.247	1.249
Load Factor (%)	29%	30%	27%	32%
Electricity Output (GWh)	1.593	1.652	1.991	1.751
(€m)				
Revenues	160,5	165,7	190,2	161,1
Operating costs and Other operating income	(31,1)	(31,4)	87,6	(23,8)
EBITDA	129,4	134,4	277,8	137,3

Spain	**2013**	**2014**	**2015**	**1H16**
Installed Capacity (MW)	2.194	2.194	2.194	2.194
Load Factor (%)	29%	28%	26%	31%
Electricity Output (GWh)	5.463	5.176	4.847	2.879
(€m)				
Revenues	438,3	344,8	375,4	169,9
Operating costs and Other operating income	(136,3)	(118,1)	(126,0)	(62,8)
EBITDA	302,0	226,7	249,4	107,1

Rest of Europe	**2013**	**2014**	**2015**	**1H16**
Installed Capacity (MW)	1.353	1.413	1.523	1.485
Load Factors (%)	25%	24%	27%	26%
Electricity Output (GWh)	2.132	2.495	3.225	1.728
(€m)				
Revenues	217,4	233,8	272,0	146,6
Operating costs and Other operating income	(56,5)	(65,0)	(93,0)	(37,4)
EBITDA	160,9	168,8	179,0	109,3

Figure 14 - Financial and Operational data for North America and Brazil

North America	**2013**	**2014**	**2015**	**1H16**
Installed Capacity (MW)	3.506	3.835	4.233	4.233
Avg. Load Factors (%)	32%	33%	32%	37%
Electricity Output (GWh)	9.769	10.204	11.103	6.750
(€m)				
Revenues	472,9	505,6	695,7	375,3
Operating costs	(143,4)	(156,4)	(153,8)	(165,5)
EBITDA	329,5	359,3	461,9	271,0

Brazil	**2013**	**2014**	**2015**	**1H16**
Installed Capacity (MW)	84	84	84	204
Load Factor (%)	31%	32%	30%	29%
Electricity Output (GWh)	230	236	222	205
(€m)				
Revenues	24,3	25,1	21,4	12,2
Operating costs	(9,8)	(9,9)	(9,1)	(4,5)
EBITDA	14,5	15,3	12,3	7,7

The difference here is even more substantial. Although North America is the biggest market both regions are viewed as core markets and new investment are expected due to the growing demand and miss of renewable power plants.

6. Valuation

6.1. Introduction

After reviewing and choosing the best suitable models available among the literature, after an explanation about the macro and micro environment that the company faces and having in account the financial and operational data about EDPR it's time to gather all the information and incorporate it in a technical financial model in order to achieve the final purpose – a price per share and an investment recommendation.

The model incorporates quantitative and qualitative assumptions and data about the present and future performance of the company for the next 10 years.

6.2. Macro Assumptions

The first steps in a valuation exercise must comprehend assumptions that can be applied to any industry and company and reflect the overall world economic framework.

Figure 15 - GDP growth 2016-2021

GDP Growth	Source	Comments	Unit	2016	2017	2018	2019	2020	2021
Portugal	WEO 2015		%	1,12	1,26	1,16	1,16	1,15	1,15
Belgium	WEO 2015		%	1,16	1,39	1,48	1,48	1,46	1,44
Brasil	WEO 2015		%	0,60	0,00	1,05	1,96	2,02	2,02
Canada	WEO 2015		%	1,47	1,91	2,06	2,02	2,00	2,00
Italy	WEO 2015		%	1,15	1,15	1,04	1,05	0,00	0,00
Mexico	WEO 2015		%	2,41	2,57	2,77	2,91	3,09	3,12
Poland	WEO 2015		%	3,57	3,59	3,46	3,50	3,50	3,50
Spain	WEO 2015		%	2,44	2,26	1,97	1,86	1,77	1,58
UK	WEO 2015		%	1,89	2,22	2,21	2,14	2,11	2,12
USA	WEO 2015		%	2,40	2,50	2,38	2,13	1,96	1,98
GDP Weighted Average (Business Activity)				2,027					

Figure 156 - Inflation 2016-2021

Inflation	Source	Comments	Unit	2016	2017	2018	2019	2020	2021
Portugal	WEO 2015		%	0,81	1,28	1,28	1,28	1,28	1,28
Belgium	WEO 2015		%	0,56	1,58	1,31	1,44	1,58	1,46
Brasil	WEO 2015		%	7,15	6,04	5,51	4,99	4,48	4,47
Canada	WEO 2015		%	1,40	2,01	2,00	2,00	2,00	2,00
Italy	WEO 2015		%	0,52	0,84	0,90	1,14	1,20	1,30
Mexico	WEO 2015		%	3,31	3,02	2,99	3,00	3,00	3,00
Poland	WEO 2015		%	0,48	1,74	2,25	2,50	2,50	2,50
Spain	WEO 2015		%	0,67	0,68	1,04	1,49	1,51	1,58
UK	WEO 2015		%	1,30	1,90	2,00	2,00	2,00	2,00
USA	WEO 2015		%	0,82	2,17	2,47	2,45	2,22	2,15

The first two tables present the expected GDP growth[8] and Inflation rate for the countries where EDPR has business activity according with the World Economic Outlook 2015, the numbers don't deviate significantly from the acceptable values.

Figure 167 - Tax rate 2016-2021

Tax Rate	Source	Comments	Unit	2016	2017	2018	2019	2020	2021
Portugal	Government		%	27,50	27,50	27,50	27,50	27,50	27,50
Spain	Government		%	25,00	25,00	25,00	25,00	25,00	25,00
France	Government		%	33,33	33,33	33,33	33,33	33,33	33,33
Belgium	Government		%	33,99	33,99	33,99	33,99	33,99	33,99
Poland	Government		%	19,00	19,00	19,00	19,00	19,00	19,00
Romania	Government		%	16,00	16,00	16,00	16,00	16,00	16,00
Italy	Government		%	31,40	31,40	31,40	31,40	31,40	31,40
UK	Government		%	20,00	20,00	20,00	20,00	20,00	20,00
Brazil	Government		%	34,00	34,00	34,00	34,00	34,00	34,00
USA	Government		%	38,20	38,20	38,20	38,20	38,20	38,20
Mexico	Government		%	30,00	30,00	30,00	30,00	30,00	30,00
Canada	Government		%	26,50	26,50	26,50	26,50	26,50	26,50

Figure 18 - Exchange Rates 2016-2021

Exchange Rates	Source	Comments	Unit	2016	2017	2018	2019	2020	2021
EUR/USD	IMF		#	1,10	1,30	1,30	1,30	1,30	1,30
EUR/BRL	IMF		#	3,28	3,41	3,41	3,41	3,41	3,41
EUR/CAD	IMF		#	1,41	1,39	1,44	1,43	1,43	1,43
EUR/GBP	IMF		#	0,90	0,90	0,90	0,90	0,90	0,90
EUR/MXN	IMF		#	16,26	16,47	17,05	17,35	17,65	18,00

The second pair of tables offers information about the tax rate applied by the governments and its expectations plus the expected exchange rates of some currencies where EDPR has business activity.

[8] Based on the different installed capacity in MW among the countries a GDP weighted average was computed to use further in the terminal value calculation.

6.3. Market Assumptions

The micro assumptions are common to the companies that operate within the same industry and related industries. In this case, Renewables and Utilities companies.

Figure 19 - Commodity Prices 2016-2021

Commodity prices	Source	Comments	Unit	2016	2017	2018	2019	2020	2021
Coal	EDPR		$/ton	94,0	101,0	112,0	123,1	134,2	137,3
Brent	EDPR		$/bbl	97,7	98,4	104,7	109,2	113,9	122,8
CO2	EDPR		€/ton	7,4	14,1	17,1	19,6	22,2	23,6
Fuel	EDPR		$/ton	558,3	562,4	599,5	625,7	652,8	705,2

Figure 17 - Net Generation 2016-2021

Net Generation	Source	Comments	Unit	2016	2017	2018	2019	2020	2021
Portugal	DPE		GWh	49.972	50.699	51.476	52.337	53.252	54.115
Spain	DPE		GWh	263.708	269.198	276.142	280.598	285.130	289.557

Figure 21 - Electricity Demand 2016-2021

Electricity Demand/consumption	Source	Comments	Unit	2016	2017	2018	2019	2020	2021
Portugal	EDPR		GWh	45.187	46.006	46.861	47.736	48.631	49.419
Spain	EDPR		GWh	229.368	233.268	237.233	241.266	245.368	249.373
Brazil	EDPR		GWh	28.058	29.112	29.910	30.889	31.901	32.947
USA	Energy Outlook 2015		GWh	3.998.309	4.060.269	4.108.257	4.142.981	4.168.050	4.207.959

We can observe a positive tendency among all the variables. The expected increase of price in this specific commodities means more market space for the renewables sources of energy as the increase demand of electricity and the production. Resuming: its expected more demand for energy, an increase in cost of production of electricity in the traditional forms and, as seen in the World Economic Outlook chapter, a decrease in terms of renewable technology.

6.3. Micro Assumptions

The tables presented below contain historical data and values only for EDPR, both operational and financial. Although forecasted values are not available, it's crucial information to have an idea about past performance and trends.

These three tables present historic operational indicators, we clearly observe an increase in terms of installed capacity and electricity production, great indicators of industry and company growth. The load factor, average load in percentage of the peak load, has a marginal growth because of its dependence in terms of technological evolution and more presence of renewable energy in the market. Tends to increase over the following years.

Figure 192 - Installed Capacity 2008-2015

Installed Capacity (MW)	Source	2008	2009	2010	2011	2012	2013	2014	2015
Spain	EDPR	1.692	1.861	2.050	2.201	2.310	2.194	2.194	2.194
Portugal	"	553	680	838	939	1.005	1.074	1.157	1.247
RoE	"	232	277	551	838	951	1.353	1.413	1.523
North America	"	1.923	2.624	3.224	3.422	3.637	3.506	3.835	4.233
Brazil	"		14	14	84	84	84	84	84

Figure 18 - Load Factor and Electricity Output 2008-2015

Avg. Load Factor (%)	Source	2008	2009	2010	2011	2012	2013	2014	2015
Spain	EDPR	26%	26%	27%	25%	27%	29%	28%	26%
Portugal	"	27%	28%	29%	27%	27%	29%	30%	27%
RoE	"	23%	23%	24%	23%	24%	25%	24%	27%
North America	"	34%	32%	32%	33%	33%	32%	33%	32%
Brazil	"	0%	22%	26%	35%	31%	31%	32%	30%

Electrecity Output (GWh)	Source	2008	2009	2010	2011	2012	2013	2014	2015
Spain	EDPR	2.634	3.275	4.355	4.584	5.106	5.463	5.176	4.847
Portugal	"	1.028	1.275	1.472	1.391	1.444	1.593	1.652	1.991
RoE	"	238	426	804	1.326	1.727	2.132	2.495	3.225
North America	"	3.907	5.905	7.689	9.330	9.937	9.769	10.204	11.103
Brazil	"	0	26	31	170	231	230	236	222

Figure 214 - Average Selling Price 2008-2015

Average Selling Price (€/MWh)	Source	2008	2009	2010	2011	2012	2013	2014	2015
Spain	EDPR	101	84	79	83	88	80	36	37
Portugal	"	94	94	94	99	102	99	98	95
RoE	"	71	90	94	96	107	105	96	86
North America	"	35	33	36	35	36	35	42	47
Brazil	"		105	105	115	106	95	108	86

Figure 20 - Revenues and EBIT 2008-2015

Revenues (€m)	Source	2008	2009	2010	2011	2012	2013	2014	2015
Spain	EDPR	265	273	344	370	445	438	345	375
Portugal	"	98	123	140	139	149	160	166	190
RoE	"	17	39	78	126	183	217	234	272
North America	"	193	286	382	415	483	473	506	696
Brazil	"		2	3	19	25	24	25	21

EBIT (€m)	Source	2008	2009	2010	2011	2012	2013	2014	2015
Spain	EDPR	166	118	131	153	166	160	93	117
Portugal	"	51	71	82	83	92	104	107	234
RoE	"	4	12	41	10	124	98	65	70
North America	"	51	57	76	74	98	129	157	195
Brazil	"		0	-2	9	10	8	9	7

Although the demand increases the average selling price didn't increase as well due to the fact that the electricity market is heavily regulated and however there is an open market for the electricity the supply and demand forces don't completely formulate the price. For some projects it's signed a power purchase agreement (PPA) between two parties and the price to sell, not the same for the following years, its previously stablished. In other situations, the company has the power plant and sells the electricity produced in a free market where the price is defined by supply and demand.

Nevertheless, one can observe over the past years and increase in revenues and in the EBIT, reflecting good management decisions in terms of investments. Notice that the company was founded in 2008.

6.4. Company Assumptions

To valuate a company, analyzing the annual reports and others internal indicators is mandatory to build an idea about more specific values and the intentions about the future. A critical judgment it's although necessary but if the information seems reasonable must be used and incorporated in the valuation model. Apart from the 2015 annual report, EDPR released a half year report of 2016 with real data and its Business plan for 2016-2020.

Figure 22- EDPR Business Plan 2016-2020

Strategy	**Unit**	**Increase 2016-2020**
More Investments in core markets	n.a.	n.a.
Invest in growth opportunities	bn€	€4,8bn

Operational		**GW Increase 2016-2020**
Load Factor (not brasil)	%	6%
Production (TWh)	%	10%
OPEX	%	-3%
EBITDA	%	8%
Net Profit	%	16%
Dividends	%	25%

Capacity Additions	**Unit**	**2015**	**Increase 2016-2020 (% ;GW)**
North America	GW	4,2	65%
Europe	GW	5,0	13%
Portugal	GW	1,2	20%
Spain	GW	2,2	10%
RoE	GW	1,5	30%
Brazil	GW	0,1	38%

The assumptions discussed in the precedent subchapters are essential to build the basics for a valuation, however once we are narrowing the scope it's necessary to understand the company's policies and investment plans for the future. According with the Business Plan of EDPR for 2016-2020 they expected a €4.8 billion investment in growth opportunities as a significant increase in the installed capacity across all the portfolio. They expect an increase in production, which means more space for the renewable energy in the market, and at the same time an increase in the net profit. Those beliefs are taking into consideration and seen has accurate based on the historical BP's, EDPR management has a good history of accomplishment and over perform their operational and financial targets.

6.5. Historical Data

In order to forecast the EDPR Business Plan for the next 10 years, apart from the assumptions already discussed, it's necessary data from the past and then start from here on. The financial and operational data used was available in a consolidated form and also per country, starts from 2008 and goes until mid-2016 - the consolidated financial maps are presented below[9].

Figure 27 - Consolidated IS 2008-1H16

Consolidated Income Statement (€m)

	2008	2009	2010	2011	2012	2013	2014	2015	1H16
Electricity sales and other	520	642	841	957	1.158	1.191	1.153	1.350	785
Income from institutional partnerships	61	83	107	112	127	125	124	197	103
Revenues	**581**	**725**	**948**	**1.069**	**1.285**	**1.316**	**1.277**	**1.547**	**889**
Other operating income	28	43	73	85	63	41	46	162	21
Operating costs	-172	-225	-308	-353	-411	-437	-419	-566	-262
EBITDA	**438**	**543**	**713**	**801**	**938**	**921**	**903**	**1.142**	**648**
EBITDA/Revenues	*75%*	*75%*	*75%*	*75%*	*73%*	*70%*	*71%*	*74%*	*73%*
Provisions	1	0	0	0	0	-1	0	0	-1
Depreciation and amortisation	-208	-314	-434	-468	-503	-465	-500	-587	-305
Amortisation of deferred income (government grants)	1	2	11	15	15	18	19	23	11
EBIT	**232**	**231**	**290**	**348**	**450**	**473**	**422**	**578**	**354**
Financial income/(expense)	-75	-72	-174	-234	-275	-262	-250	-285	-179
Share of profit from associates	4	4	5	5	7	15	22	-2	-3
Pre-tax profit	**161**	**163**	**121**	**119**	**182**	**226**	**194**	**291**	**172**
Income taxes	-49	-45	-38	-28	-46	-57	-16	-45	-43
Profit of the period	112	118	83	91	136	169	178	245	129
Equity holders of EDPR	**104**	**114**	**80**	**89**	**126**	**135**	**126**	**167**	**59**

We can observe a constant increase in terms of revenues due to mostly to the increase of EDPR portfolio (installed capacity) and its consolidation in being a market player. The EBITDA increases due to top performance having this one a very satisfactory margin over the revenues. Provisions represent marginal values while Depreciations and Amortizations reflect an increase tendency reflecting the increase investment realized by EDPR over the years. EBIT growths across time also due to top performance, reproducing the more significant growth in revenues. Net profit also increases in a good rhythm over the years not being damaged by non-existing substantial financial expenses.

[9] To see the data detailed by country please consult the Chapter 5 – Company Overview

Figure 238 - Consolidated BS 2008-1H16

Consolidated Balance Sheet (€m)									
Assets (€m)	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**1H16**
Property, plant and equipment, net	7.053	8.635	9.982	10.455	10.537	10.095	11.013	12.612	12.563
Intangible assets and goodwill, net	1.395	1.336	1.367	1.334	1.327	1.301	1.405	1.534	1.533
Financial Investments, net	53	60	64	61	57	346	376	340	332
Deferred tax asset	22	28	39	56	89	109	46	47	52
Inventories	12	11	24	24	16	15	21	23	22
Accounts receivable	595	743	900	896	980	857	1.005	560	599
Financial assets at fair value through profit and loss	36	37	36	0	0	0	-	-	-
Collateral deposits	-	-	-	-	49	78	81	73	55
Assets held for sale	1	-	-	-	-	-	-	110	-
Cash and cash equivalents	230	444	424	220	246	255	369	437	467
Total Assets	**9.397**	**11.294**	**12.835**	**13.045**	**13.302**	**13.058**	**14.316**	**15.736**	**15.623**
Equity (€m)									
Share capital + share premium	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	1.117
Consolidated net profit attrib. to equity holders of the parent	104	114	80	89	126	135	126	167	59
Non-controlling interests	83	107	126	127	325	418	549	863	1.267
Total Equity	**5.190**	**5.328**	**5.394**	**5.454**	**5.749**	**6.089**	**6.331**	**6.834**	**7.356**
Liabilities (€m)									
Financial Debt	1.462	2.673	3.534	3.826	3.874	3.666	3.902	4.220	3.826
Institutional Partnership	895	920	1.009	1.011	942	836	1.067	1.165	1.165
Provisions	51	67	54	58	64	65	99	121	127
Deferred Tax liability	303	343	372	381	381	367	270	316	354
Deferred revenues from institutional partnerships	202	434	635	773	738	672	735	791	768
Other liabilities	1.293	1.529	1.839	1.542	1.555	1.363	1.912	2.288	2.027
Total Liabilities	**4.206**	**5.966**	**7.442**	**7.591**	**7.553**	**6.969**	**7.986**	**8.902**	**8.267**
Total Equity and Liabilities	**9.397**	**11.294**	**12.835**	**13.045**	**13.302**	**13.058**	**14.316**	**15.736**	**15.623**

The assets, mostly the fixed ones, increased due to the expansion of the portfolio and realized investment in power plants, related to these activities are also associated to the Financial investments account. Accounts receivables are mostly related with related parties, warrants and fiscal credits. The cash account performance and its constant and solid values represent a good liquidity indicator.

The equity rises due to an as well increase in net profit as seen in the income statement map and retained earnings. Non-controlling interests increased sharply due to EDPR acquisitions[10].

[10] 2015 major acquisitions: 100% of Central Eólica Aventura II, S.A., 20% of WindPlus, S.A., 100% of Stirlingpower, Unipessoal Lda., 100% of Brent Investments, S.A.

In respect to Liabilities, the increase in assets is accompanied mainly by the increase in financial debt as to an increase in institutional partnerships (US contributed significantly for this last one due to tax equity operations). Deferred revenues are related with fiscal credits already received by investors. Deferred tax reflects the temporary differences between assets and liabilities. The company was founded in 2008 so the cash generated wasn't enough to finance all the portfolio expansion.

Figure 29 - Capex & Cash Flow 2008-1H16

Capex & Cash Flow (€m)									
Capex (€m)	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**1H16**
Spain	684	561	111	70	65	5	5	5	2
Portugal	85	102	8	11	9	10	8	16	23
RoE	124	351	420	287	349	372	151	163	28
Europe	**893**	**1014**	**539**	**368**	**423**	**387**	**164**	**184**	**53**
North America	**1.198**	**826**	**783**	**405**	**179**	**212**	**543**	**646**	**282**
Brazil		**2**	**72**	**62**	**9**	**25**	**25**	**73**	**43**
Other		4	7	(6)	1	3	0	0	0,0
Total Capex	**2091**	**1.846**	**1.401**	**829**	**612**	**627**	**732**	**903**	**378**
Cash-Flow (€m)									
EBITDA		**543**	**713**	**801**	**938**	**921**	**903**	**1.142**	**648**
Current income tax		(34)	(29)	(29)	(85)	(89)	(50)	(51)	(36)
Net interest costs		(87)	(167)	(189)	(205)	(199)	(207)	(188)	(92)
Share of profit from associates		4	5	5	7	15	22	(2)	(3)
FFO (Funds From operations)		**425**	**522**	**588**	**655**	**648**	**668**	**901**	**516**
Net interest costs		87	167	189	205	199	207	188	92
Income from group and associated companies		(4)	(5)	(5)	(7)	(15)	(22)	2	3
Non-cash items adjustments		(91)	(143)	(158)	(120)	(125)	(130)	(263)	(108)
Change in working capital		(25)	26	29	(66)	(30)	(16)	(127)	(30)
Operating Cash-Flow		**392**	**567**	**643**	**666**	**677**	**707**	**701**	**474**
Capex		(1.846)	(1.401)	(829)	(612)	(627)	(732)	(903)	(378)
Financial (investments) divestments		(117)	(79)	(237)	(22)	(47)	(19)	(157)	(11)
Changes in working capital related to PP&E suppliers		116	(20)	(23)	2	(180)	196	26	(387)
Cash Grant		156	169	3	5	91	22	1	0
Net Operating Cash-Flow		**(1.299)**	**(764)**	**(444)**	**39**	**(86)**	**173**	**(330)**	**(303)**
Sale of non-controling interests		-	-	4	176	402	215	395	829
Proceeds from institutional partnerships [2]							217	242	212
Payments to institutional partnerships		334	228	141	(15)	(36)	(70)	(174)	(99)
Net interest costs		(87)	(167)	(156)	(189)	(183)	(180)	(165)	(81)
Dividends net and other capital distributions		-	-	-	-	(58)	(79)	(115)	(110)
Forex & others		(12)	(35)	(161)	22	(21)	(291)	(277)	(45)
Decrease / (Increase) in Net Debt		**(1.064)**	**(737)**	**(616)**	**33**	**19**	**(14)**	**(425)**	**404**

The total capital expenditure was higher in the first years and then decreased to more stable values. The funds from operations increase in a very satisfactory rhythm affecting positively the operating CF. The net debt was high again in the first years, reduced and increased again in the last couple of years due to portfolio expansion.

Figure 30 - Net Debt and Financials 2008-1H16

Net Debt and Financials									
Net Debt (€m)	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**1H16**
Bank Loans and Other	560	542	733	837	917	848	937	1.082	963
Loans with EDP Group related companies	902	2.132	2.800	2.989	2.957	2.818	2.965	3.138	2.864
Nominal Financial Debt + Accrued interests	**1.462**	**2.673**	**3.534**	**3.826**	**3.874**	**3.666**	**3.902**	**4.220**	**3.826**
Collateral deposits associated with Debt	-	-	-	-	49	78	81	73	55
Total Financial Debt	**-**	**-**	**-**	**-**	**3.825**	**3.588**	**3.821**	**4.147**	**3.771**
Cash and cash equivalents	230	444	424	220	246	255	369	437	467
Loans to EDP Group related companies and cash pooling	128	59	226	219	274	64	170	3	2
Financial assets held for trading	36	37	36	0	0	0	-	-	-
Cash & Equivalents	**393**	**540**	**685**	**439**	**520**	**319**	**538**	**439**	**468**
Net Debt (€m)	**1.069**	**2.134**	**2.848**	**3.387**	**3.305**	**3.268**	**3.283**	**3.707**	**3.303**
Net Debt Breakdown by Assets (€m)									
Net Debt related to assets in operation		1.666	2.435	3.169	3.023	3.028	3.168	3.658	2.707
Net Debt related to assets under construction & develop.		468	413	218	283	241	115	49	596
Institutional Partnership (€m)									
Net Institutional Partnership Liability	852	835	934	1.011	942	836	1.067	1.165	1.165
Net Financial Expenses (€m)									
Net interest costs	(49)	(87)	(167)	(189)	(205)	(199)	(205)	(189)	(92)
Institutional partnership costs	(44)	(54)	(65)	(62)	(67)	(61)	(57)	(79)	(46)
Capitalised costs	39	75	68	34	16	16	27	23	12
Forex differences & Forex Derivatives	22	(5)	(1)	(20)	6	(8)	(5)	(3)	0
Other	(44)	(0)	(10)	5	(24)	(10)	(10)	(37)	(52)
Net Financial Expenses	**(75)**	**(72)**	**(174)**	**(234)**	**(275)**	**(262)**	**(250)**	**(285)**	**(179)**

Net debt was discussed above and we can observe that the one associated with assets under construction increased sharply in 2016 meaning investment in power plants. The net financial expenses present stable values since 2011 and the major component is the interest costs.

6.6. Business Plan 2016-2025 Forecast

6.6.1. 2016

Having in mind all the assumptions and data presented before, in this section is explained how the financial and operational maps were forecasted. The consolidated maps analyzed are the IS, BS, CF and CAPEX map, Asset base map and Net Debt and Financials map. The non-consolidated maps, per country, only have operational and IS data.

Considering yearly data from 2008-2015 plus quarterly data from 2015 and half year data for 2016 the first step is forecast the all 2016 year. To do so, in some cases, the final value for 2016 is the average growth of 1Q2015-1Q2016 and 1H2015-1H2016. Taking the electricity sales example: we know that it growth 21% for the first case and 14% for the second. The final value (1.584) is then the average (17%) multiplied by the final value of 2015 (1.350).

Income Statement (€m)					2015 - 2016F				
	2014	2015	1Q15	1H15	1Q16	g from last Q	1H16	g from last H	2016
Electricity sales and other	1.153	1.350	375	688	452	21%	785	14%	1.584
Income from institutional partnerships	124	197	43	84	55	29%	103	23%	249
Revenues	**1.277**	**1.547**	**418**	**773**	**508**		**889**		**1.833**

Other cases, like property, plant and equipment, where is no expected a great increase in terms of value from the 1H2016 figure to the 2016 final year, the final value was considered to be the amount of the 1H2016 period.

Consolidated Balance Sheet (€m)									
Assets (€m)	2014	2015	1Q15	1H15	1Q16	g from last Q	1H16	g from last H	2016
Property, plant and equipment, net	11.013	12.612	11.782	11.533	12.284	n.a.	12.563	n.a.	12.563

In the end of the year the revenues increased 17% due to a higher capacity in operations and outstanding load factor which affected the bottom lines, Operating CF increased 27% and Net Debt decreased 3% based on the asset rotation transaction strategy.

6.6.2. 2017-2025

Having the forecasted 2016, this section focus on the remain years of the BP. The forecast will firstly rely on the non-consolidated financial and operational data, this values will be incorporated in the consolidated maps and then all the accounts not available per country will be forecasted in a consolidated way. This method intends to provide accuracy to the quantitative valuation since the installed capacity, selling price and revenues differ among countries and to the qualitative part of the analysis once the strategy is not the same across regions.

The following tables present the assumptions per country for the non-consolidated forecasts:

Figure 31 - Assumptions for Portugal

Portugal				
Installed Capacity (MW)	**2015**	**2016**	**2020**	**2025**
EBITDA MW	1.247	1.249	1.449	2.129
Avg. Load Factors (%)				
Load Factor	27%	32%	34%	36%
Electricity Output				
GWh	1.991	4.208	4.547	5.020
Average Selling Price (€/MWh)				
Avg. Selling Price	95,0	81	98	125
				0,05
Income Statement (€m)	**2015**	**2016**	**2020**	**2025**
Revenues	**190,2**	**338**	365	403
Operating costs and Other operating income	87,6	(31)	(34)	(20)
EBITDA	**277,8**	**306,7**	**331,3**	**383,1**
EBITDA / Revenues	146%	91%	91%	95%
Depreciation, amortisation and provisions	(43,5)	(108)	(131)	(167)
EBIT	**234,3**	**199,0**	**200,3**	**216,0**

EBITDA MW Until 2020: BP 16-20 (+16%); Until 2025: PT is not a core market and already has electrical overcapacity so lower growth (+8%)

Load Factor Until 2020: BP 16-20 (+6%); Until 2025: not easy to increase every year due to tech evolution so also flat growth (+1%)

Output Expected growth of electricity demand of 2%

Price According with the Energy Outlook is expected an average growth per year of 5% for Portugal. Since 2008 the average growth was only 0,2% so I cut this prevision to 2%

EBITDA Until 2020: BP 16-20 (+8%); Until 2025: Expected to growth more than global economy due to expansion Industry and Company but not easy to maintain the rate before so +4%

Figure 32 - Assumptions for Spain

Spain				
Installed Capacity (MW)	**2015**	**2016**	**2020**	**2025**
EBITDA MW	2.194,2	2.194	2.294	2.533
Avg. Load Factors (%)	**2015**	**2016**	**2020**	**2025**
Load Factor	26%	31%	33%	35%
Electricity Output (GWh)	**2015**	**2016**	**2020**	**2025**
GWh	4.847	5.238	5.604	6.120
Selling Price + Capacity Compleme	**2015**	**2016**	**2020**	**2025**
Avg. Selling Price (inc. Hedging)	45,3	28	55	70
Income Statement (€m)	**2015**	**2016**	**2020**	**2025**
Revenues	**375,4**	**323**	349	385
Operating costs and Other operating inc	(126,0)	(125)	(135)	(142)
EBITDA	**249,4**	**198,2**	**214,1**	**243,5**
EBITDA / Revenues	66%	61%	61%	63%
Depreciation, amortisation and provision	(132,6)	(133)	(147)	(166)
EBIT	**116,8**	**65,3**	**67,4**	**77,6**

EBITDA MW Until 2020: BP 16-20 (+5%); Until 2025: Spain is losing importance due to market saturation and is not a core market so almost flat growth (+2%).

Load Factor Until 2020: BP 16-20 (+6%); Until 2025: not easy to increase every year due to tech evolution so also flat growth (+1%)

Output Expected growth of electricity demand of 2%

Price According with the Energy Outlook is also expected an average growth per year of 5% for Spain. Since 2008 the average growth was negative so I cut this prevision to 2%

EBITDA Until 2020: BP 16-20 (+8%); Until 2025: Expected to growth more than global economy due to expansion Industry and Company but not easy to maintain, plus not expected to growth as Portugal so +2%

Figure 33 - Assumptions for RoE

Rest of Europe

Installed Capacity (EBITDA MW)	**2015**	**2016**	**2020**	**2025**
EBITDA MW	**1.523**	**1.485**	**1.778**	**2.863**
Load Factors (%)	**2015**	**2016**	**2020**	**2025**
Average Load Factor	**27%**	**27%**	**28%**	**30%**
Electricity Output	**2015**	**2016**	**2020**	**2025**
Total GWh	**3.225**	**3.581**	**3.876**	**4.280**
Average Selling Price (€/MWh)	**2015**	**2016**	**2020**	**2025**
Avg. Selling Price	**86,0**	**93,2**	**109,0**	**132,6**
Income Statement (€m)	**2015**	**2016**	**2020**	**2025**
Revenues	**272,0**	**299**	323	393
Operating costs and Other operating inc	(93,0)	(98)	(106)	(117)
EBITDA	**179,0**	**201,3**	**217,4**	**276,4**
EBITDA / Revenues	66%	67%	67%	70%
Depreciation, amortisation and provision	(108,7)	(144)	(156)	(172)
EBIT	**70,3**	**57,1**	**61,3**	**104,1**

EBITDA MW Until 2020: BP 16-20 (+20%); Until 2025: RoE may gain importance with the European electrical sector liberalization, opportunity to growth (France and Germany with lot of nuclear) so 10%

Load Factor Until 2020: BP 16-20 (+6%); Until 2025: not easy to increase every year due to tech evolution so also flat growth (+1%)

Output Expected growth of electricity demand of 2%

Price According with the Energy Outlook is expected an average growth per year of 4%. Since 2008 the average growth was 3,5%, I keep the EO prevision

EBITDA Until 2020: BP 16-20 (+8%); Until 2025: Expected to growth more than global economy due to expansion Industry and Company, several markets but not easy to maintain so +5%

Figure 34 - Assumptions for North America

North America				
Installed Capacity (MW)	**2015**	**2016**	**2020**	**2025**
EBITDA MW	**4.233**	**4.233**	**6.969**	**21.267**
Avg. Load Factors (%)	**2015**	**2016**	**2020**	**2025**
North America	**32%**	**34%**	**36%**	**37%**
Electricity Output (GWh)	**2015**	**2016**	**2020**	**2025**
Total GWh	**11.103**	**14.044**	**14.640**	**15.401**
Average Selling Price ($/MWh)	**2015**	**2016**	**2020**	**2025**
North America	**51,0**	**46,1**	**54,0**	**68,9**
Income Statement (€m)	**2015**	**2016**	**2020**	**2025**
Revenues	**695,7**	**818,9**	**884,4**	**1.111,5**
Other operating income	19,6	11,7	12,7	13,3
Operating costs	(253,4)	(259)	(280)	(309)
EBITDA	**461,9**	**571,8**	**617,6**	**816,2**
EBITDA / Revenues	66%	70%	70%	73%
Provisions	0,2		0	0
Depreciation and amortisation	(287,9)	(315)	(341)	(376)
Amortisation of deferred income (gover	20,8	21,1	22,8	25,2
EBIT	**195,0**	**278,0**	**299,5**	**465,0**

EBITDA MW Until 2020: BP 16-20 (+65%); Until 2025: North America represents the core market, 65% of growth in 5 years is hard to maintain but with the renewables industry growing I expected more investment so 25%

Load Factor Until 2020: BP 16-20 (+6%); Until 2025: not easy to increase every year due to tech evolution so also flat growth (+1%)

Output Expected growth of electricity demand of 1%

Price According with the Energy Outlook is expected an average growth per year of 5%. Since 2008 the average growth was 4%, I keep the EO prevision

EBITDA Until 2020: BP 16-20 (+8%); Until 2025: Expected to growth more than global economy due to expansion Industry, Company and core market, not easy to maintain the previous so +5%

Figure 245 - Assumptions for Brazil

Brazil				
Installed Capacity (MW)	**2015**	**2016**	**2020**	**2025**
EBITDA MW	84	204	464	747
Avg. Load Factors (%)	**2015**	**2016**	**2020**	**2025**
Load Factor	30%	29%	41%	43%
Electricity Output (GWh)	**2015**	**2016**	**2020**	**2025**
Total GWh	222	374	420	487
Average Selling Price (R$/MWh)	**2015**	**2016**	**2020**	**2025**
Avg. Selling Price	370,4	314,8	321,2	329,3
Income Statement (€m)	**2015**	**2016**	**2020**	**2025**
Revenues	**21,4**	**23,7**	**25,6**	**31,2**
Other operating income	0,6	0,3	0,3	0,3
Operating costs	(9,7)	(8)	(9)	(10)
EBITDA	**12,3**	**16,1**	**17,4**	**21,1**
EBITDA / Revenues	58%	68%	68%	68%
Provisions	-	-	-	-
Depreciation and amortisation	(5,1)	(4)	(5)	(5)
Amortisation of deferred income	0,0	0,0	0,0	0,0
EBIT	**7,2**	**11,7**	**12,6**	**15,8**

EBITDA MW Until 2020: BP 16-20 three new projects almost finished (+453%); Until 2025: Although is expected a continuous investment, political instability and already several electrical parks cut the rate for 10%

Load Factor Until 2020: BP 16-20 (+40%); Until 2025: not easy to increase every year due to tech evolution so also flat growth (+1%)

Output Expected growth of electricity demand of 3%

Price According with the Energy Outlook is expected an average growth per year of 0,5%. Since 2008 the average growth was almost 0%, I keep the EO prevision

EBITDA Until 2020: BP 16-20 (+8%); Until 2025: Expected to growth more than global economy due to expansion population and number of projects, still consider a good market to explore deeper, although not easy to maintain the previous so +4%

*

Gathering the past values gives us the IS Consolidated, to complete the BP it's yet necessary to forecast the BP and the remain maps. Above are represented the forecasted financial maps for the relevant years. [11]

Figure 36 - IS 2015-2025

Income Statement (€m)

	2015	2020	2025
Revenues	**1.547**	**1.947**	**2.324**
Operating costs and Other operating i	(405)	(550)	(584)
EBITDA	**1.142**	**1.398**	**1.740**
EBITDA/Revenues	74%	72%	75%
Provisions	0		
Depreciation and amortisation	(587)	(757)	(862)
Amortisation of deferred income (gover	23	23	23
EBIT	**578**	**664**	**901**
Financial income/(expense)	(285)	(285)	(285)
Share of profit from associates	(2)	44	71
Pre-tax profit	**291**	**422**	**686**
Income taxes	(45)	106	172
Profit of the period	245	528	858
Equity holders of EDPR	**167**	**391**	**707**
Non-controlling interests	79	137	151

BS Assumptions:

PPE - Average of 20% increase in electrical production until 2020 so 10% increase in PPT (average is also 10 per year); After 2020 5%

Intangible assets and goodwill - More global reputation so increase of 2% per year until 2020, in line with historic average, after 1%

Financial Investments - Expected to keep the same volume +/- every year

Accounts receivable - More business volume so expected to growth, 10% same as Production (historical growth per year is 17%)

Cash and cash equivalents - Increase at the same rate of the Cash Flows

[11] The complete maps are available in the appendix of this dissertation.

Reserves and retained earnings - NP is expected to growth 16% until 2020

Financial Debt - Decrease until end of BP due to positive cash flows and increase after due to expected new investments

Institutional Partnership - Expansion strategy so expected increase, historical average 4%

Provisions - Expansion strategy so expected increase, historical average 14%

Figure 37 - BS, Asset Base, PPE, Capex, CF, Net Debt 2015-2025

Balance Sheet (€m)

	2015	2020	2025
Total Assets	15.736	17.186	21.407
Total Equity	6.834	8.018	8.482
Total Liabilities	8.902	9.167	12.925
Total Equity and Liabilities	15.736	17.186	21.407

Asset Base

Installed Capacity (MW)	**2015**	**2020**	**2025**
Europe	4.965	5.522	7.526
North America	4.233	6.969	21.267
Brazil	84	464	747

PPE (€m)	**2015**	**2020**	**2025**
Property, Plant & Equipment (net)	12612	13819	17638

Capex (€m)	**2015**	**2020**	**2025**
Europe	184	173	186
North America	646	795	877
Brazil	73	23	7
Total Capex	903	991	1.071

Cash-Flow (€m)	**2015**	**2020**	**2025**
EBITDA	1.142	1.398	1.740
FFO (Funds From operations)	901	1.194	1.540
Operating Cash-Flow	701	868	1.206
Net Operating Cash-Flow	(330)	(246)	12
Decrease / (Increase) in Net Debt	(425)	(341)	103

Net Debt (€m)	**2015**	**2020**	**2025**
Total Financial Debt	4.147	4.600	5.772
Cash & Equivalents	439	493	399
Net Debt (€m)	3.707	4.107	5.373
Net Financial Expenses	(285,5)	(216,0)	(217,4)

The maps bellow the BS were forecasted based on the IS and BS assumptions in order to keep the coherence among the financial maps.

6.7. CAPM

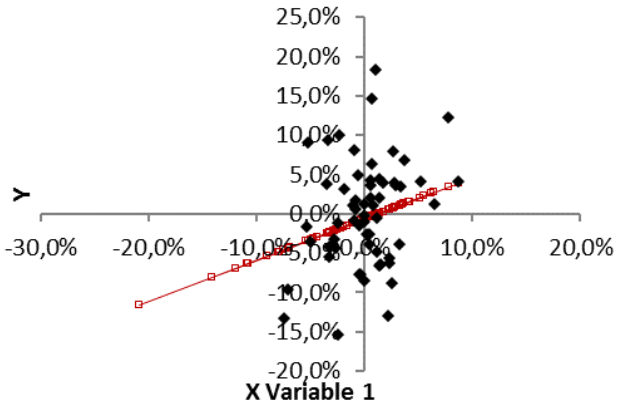
Before to reach the WACC and discount the CF's it's necessary to compute the Beta and the Market risk premium, to do so we use the CAPM methodology.

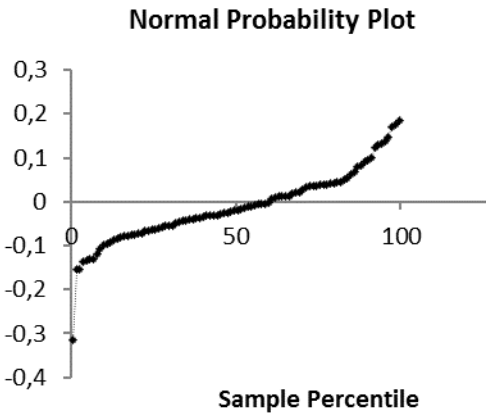
Using monthly data from the time that EDPR trades in the stock market (31/01/2013 - 30/09/2016), the excess returns were computed with the stock prices close, the S&P 500 prices and the risk free of a 10y German bond. Running a regression analysis for the excess returns gives us a beta of 0.5261.

Figure 258 - CAPM statistics

Regression Statistics	
Multiple R	0,30573075
R Square	0,093471292
Adjusted R Square	0,083827369
Standard Error	0,077479402
Observations	96

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	-0,006773552	0,008101202	-0,836116928	0,405209527
X Variable 1	**0,52605408**	0,168973315	3,113237607	0,002452189





For the Market risk premium was used annual data (1927-2015) from the S&P500 and 10y US Bonds, resulting in a rate of 5.82%. The arithmetic average premium was computed based on the difference between S&P returns and bonds returns and the geometric average premium based on the compounded values of the S&P and Bonds. Afterwards was applied the Marshall Blume estimator[12] to adjust for estimation errors and autocorrelations of returns.

Figure 39 - Risk Premium

	S&P 500	10y Bonds	Rp
Arithmetic Average 1930-2015	11,26%	5,29%	5,97%
Standard error			*2,28%*
Geometric Average 1930 - 2015	9,61%	5,02%	4,60%
Market Risk Premium			**5,82%**

6.8. Market Cost of Debt

EDPR finances itself mostly from EDP (75%) at a fixed rate (90%), the remain 25% comes from bank loans. For 2015 the pretax cost of debt was 4.2% and with average maturities of 3 years. The rate for the market cost of debt was computed based on rankings and due to no outstanding bonds for EDPR the market value was estimated treating the book value as a one coupon bond.

The market cost of debt is the summation of the BPS attributed to the company based on the rating plus the risk free rate. For a rating of BBB- (EDP) the BPS are 425 and the risk-free, based on a 10 year German government bond. is 0; this means a rate of 4.25%.

The market value has as inputs the book value of net debt (m3.707,42€), the interest to pay (m154,76€), the average maturity (3y) and the market cost of debt (4.3%). Applying the formula[13] for the one coupon bond we reached a value of m3694.57€.

[12] Literature Review – equation (25)
[13] Market debt = interest ((1-(1/ (1 + Kd) ^Y))/Kd) + T/ (1 + Kd) ^Y

6.9. WACC

The WACC was computed based on the following method and assumptions. The only value not explained yet is the after taxes cost of debt and consist in the market cost of debt times one minus the Spanish corporate tax rate[14] (25%).

Figure 40 – WACC calculations

Equity beta calculation		**Remarks**
1. Beta	0,526	*Based on Regressions Analysis*
2. D/E target ratio	72,6%	*Average past 5 years (policy to keep a constant ratio)*
3. Corporate tax rate (Tc)	25%	*Spanish tax rate*
4. Equity beta = [βa+(βa - 0) x D/E x (1-Tc)]	0,81	
WACC calculation		
1. Risk free interest rate	0,00%	*Yield of 10y Bund*
2. Market risk premium	5,82%	
3. Average equity beta	0,81	
4. Equity cost of capital (1+2x3)	4,73%	
5. After taxes cost of debt	3,19%	
6. Target Debt/Assets Value (D/V)	42%	
7. Target Equity/Assets Value (D/V)	58%	
WACC (4 x 7 + 5 x 6)	**4,08%**	

[14] Tax used according with the EDPR 2015 report.

6.10. DCF

Having the assumptions established, the forecasts executed and the tax rates computed the following process is discount the CF's to achieve an Enterprise Value and a price per share. This section approaches the FCFF and the FCFE methods.

6.10.1. FCFF

Using the FCFF approach we obtain an Equity Value of €7.569m, translating it in a price per share of €8.68. Since 2016 was an exceptional year the CF's are foreseen to decrease until 2020, also because high investment policies, and then increase due to investment returns, less investment (more cash available) and mainly industry growth.

Figure 4126 - FCFF results

Free Cash Flow to the Firm (FCFF)

(m€)	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**
EBIT	766	651	656	652	663	696	743	793	845	899
(-) Tax on EBIT	192	163	164	163	166	174	186	198	211	225
	575	**488**	**492**	**489**	**497**	**522**	**558**	**595**	**634**	**675**
(+) Depreciation	684	701	719	737	757	776	797	818	839	862
(+) Changes in deferred taxes	23	23	23	22	22	22	22	21	21	21
(-) Working Capital Variation	(155)	(156)	(158)	(159)	(161)	(162)	(164)	(166)	(167)	(169)
(-) CAPEX	(787)	(817)	(860)	(924)	(991)	(1.001)	(1.040)	(1.036)	(1.084)	(1.071)
(-) Other Investments in fixed assets	(22)	(22)	(23)	(23)	(23)	(23)	(24)	(24)	(24)	(24)
FCFF	**317**	**216**	**193**	**143**	**101**	**133**	**148**	**209**	**219**	**293**
g rate		*-31,9%*	*-10,8%*	*-26,0%*	*-29,2%*	*31,9%*	*11,5%*	*40,5%*	*5,0%*	*34,0%*

DCF

(m€)	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**
FCFF	317	216	193	143	101	133	148	209	219	293
Perpetuity										14.422
g rate										2,01%
´@ WACC	4,08%	4,08%	4,08%	4,08%	4,08%	4,08%	4,08%	4,08%	4,08%	4,08%
`@ Discount Factor	96%	92%	89%	85%	82%	79%	76%	73%	70%	67%
(=) Discounted Cash Flows	305	200	171	121	83	105	112	151	153	9.863
(=) Value of Operations	**11.263**									

Equity Value

	2016
Value of Operations	11.263
(+) Excess Market Securities	-
(=) EV	11.263
(-) Net Debt@mv (end of 2015)	(3.695)
(=) Equity Value	7.569
Value per Share	**8,68**

6.10.2. FCFE

Using the FCFE approach we obtain an Equity Value of €7.564m, translating it in a price per share of €8.67. The increase in CF's are as well mostly due to increase in the revenues based on the company portfolio and industry growth.

Figure 4227 - FCFE results

Free Cash Flow to Equity (FCFE)

(m€)	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Net Income	511	398	406	406	422	458	511	566	624	685
(+) Depreciation	707	723	741	760	779	798	818	839	861	883
(-) Investment in Working Capital	(155)	(156)	(158)	(159)	(161)	(162)	(164)	(166)	(167)	(169)
(-) CAPEX	(787)	(817)	(860)	(924)	(991)	(1.001)	(1.040)	(1.036)	(1.084)	(1.071)
(-) Principal Repayments	(157)	(141)	(127)	(114)	(103)	(100)	(97)	(94)	(91)	(88)
(+) New Debt Issues	515	269	363	369	368	322	226	144	49	(27)
FCFE	**633**	**277**	**366**	**338**	**314**	**315**	**255**	**253**	**191**	**212**

DCF

(m€)	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
FCFE	633	277	366	338	314	315	255	253	191	212
Perpetuity										7.941
g rate										2,01%
´@ **Ke**	4,73%	4,73%	4,73%	4,73%	4,73%	4,73%	4,73%	4,73%	4,73%	4,73%
`@ **Discount Factor**	95%	91%	87%	83%	79%	76%	72%	69%	66%	63%
(=) Discounted Cash Flows	605	253	319	281	249	239	184	175	126	5.135
(=) Equity Value	**7.564**									

Equity Value

	2016
Value per Share	**8,67**

6.11. DDM

Until 2020 and according with the EDPR 2016-2020 business plan the dividends are expected to growth 25%, company's policy is to have a trustful dividends policy so this assumption was considered. After that was considered a 5% growth per year, in line with the historical average. This methodology gives us an Equity Value of €7.555m and a price per share of €8.66.

Figure 43 - DDM results

DDM

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
DDM	159	173	182	187	199	209	220	231	242	254
Perpetuity										9.491
g rate										2%
´@ **Ke**	4,73%	4,73%	4,73%	4,73%	4,73%	4,73%	4,73%	4,73%	4,73%	4,73%
`@ **Discount Factor**	95%	91%	87%	83%	79%	76%	72%	69%	66%	63%
(=) Discounted Cash Flows	152	157	158	156	158	159	159	159	160	6.137
(=) Equity Value	**7.555**									

Equity Value

	2016
Value per Share	**8,66**

6.12. Multiples

To perform the relative valuation, we used as peer group the companies present in the 30 RENIXX Index discussed before in this dissertation. The peer group is highly heterogeneous so after the first results some statistics were applied to produce more accurate and logical results. The multiples chosen were the EV/Revenue, EV/EBITDA and the Price/CF per share.

6.12.1. EV/Revenue

Due to a substantial heterogeneity among the Index and since EDPR it's on the top 25% the new stat analysis (peer group) includes only the values from the 4th percentile from the first stat analysis (2.86-10.60). After this adjustment the price per share is 8.19€ (before was 1.14€).

Figure 4428 - EV/Revenue

Company Name	EV / Revenue
Innergex Renewables	10,60
Brookfield Renewable	8,22
SolarCity	6,66
EDP Renovaveis	**5,91**
China Longyuan Power	5,33
Ormat Technologies	4,82
Tesla Motors Inc	3,03
Albioma SA	2,81
Sunrun Inc	2,71
Verbund AG	2,14
Plug Power Inc	1,98
Bourbon SA	1,98
CGG SA	1,89
Dong Energy A/S	1,80
Yingli Green Energy Co	1,76
Xinjiang Goldwind Co	1,73
China High Speed Group	1,68
Vestas Wind Systems	1,49
Gamesa Corporacion Tech	1,22
REC Silicon ASA	1,14
Solaredge Technologies	1,02
SunPower Corp	1,02
Meyer Burger Technology	0,96
First Solar Inc	0,86
JinkoSolar Holding Co Ltd	0,86
Canadian Solar Inc	0,83
Nordex SE	0,73
SMA Solar Technology AG	0,70
Trina Solar Ltd	0,69
JA Solar Holdings Co Ltd	0,35

Statistics	
Median	1,75
Mean	2,56
Low	0,35
25th percentile	0,93
75th percentile	2,86
High	10,60
Standart deviation	1,97
Skewness	1,88

Results	
EV	4.698,41
Equity Value	990,99
Price per Share	1,14

Adjusted measures	
Median	5,33
Mean	5,92
Low	2,81
25th percentile	3,03
75th percentile	6,66
High	8,22
Standart deviation	1,79
Skewness	0,11

Adjusted Results	
EDPR Revenue	1.832,64
EV	10.852,67
Net Debt	(3.707)
Equity Value	7.145,25
Price per Share	8,19

6.12.2. EV/EBITDA

Due to a substantial heterogeneity among the Index and since EDPR, for this second case, it's in a middle position the new stat analysis (peer group) excluded the 1st and 4th percentile from the first stat analysis (only 6.47-9.709. After this adjustment the price per share is 8.88€ (before was 10.44€).

Figure 4529 - EV/EBITDA

Company Name	EV / EBITDA
Tesla Motors Inc	26,72
Innergex Renewables	14,08
Yingli Green Energy Holding	13,60
Brookfield Renewable LP	13,00
Meyer Burger Technology	12,02
Xinjiang Goldwind Co	10,31
Ormat Technologies Inc	9,70
Vestas Wind Systems A/S	9,13
SunPower Corp	8,95
Bourbon SA	8,92
Gamesa Corporacion Tech	8,77
EDP Renovaveis SA	**8,47**
Nordex SE	8,07
Albioma SA	7,98
China Longyuan Power	7,89
Trina Solar Ltd	7,81
REC Silicon ASA	7,76
Verbund AG	7,66
JinkoSolar Holding Co Ltd	7,35
Canadian Solar Inc	7,11
China High Speed Group Co.	6,47
Solaredge Technologies Inc	5,86
Dong Energy A/S	5,70
First Solar Inc	5,61
CGG SA	5,08
SMA Solar Technology AG	4,26
JA Solar Holdings Co Ltd	4,15

Statistics	
Median	7,98
Mean	8,98
Low	4,15
25th percentile	6,47
75th percentile	9,70
High	26,72
Standart deviation	4,32
Skewness	2,68

Results	
EV	12.815,16
Equity Value	9.107,74
Price per Share	10,44

Adjusted measures	
Median	7,94
Mean	8,02
Low	6,47
25th percentile	7,59
75th percentile	8,81
High	9,13
Standart deviation	0,74
Skewness	-0,31

Adjusted Results	
EV	11.453,39
Equity Value	7.745,97
Price per Share	8,88

6.12.3. Price/CF per share

Due to a substantial heterogeneity among the Index and since EDPR, also for the third case, it's in a middle position the new stat analysis (peer group) excluded the 1st and 4th percentile from the first stat analysis (only 4.77-11.28). After this adjustment the price per share is 8.57€ (before was 9.22€).

Figure 4630 - Price/CF per share

Company Name	Price / CF Per Share
Tesla Motors Inc	34,65
Yingli Green Energy Holding	15,70
SunPower Corp	13,09
Vestas Wind Systems	12,93
Gamesa Corporacion Tech	12,27
Nordex SE	11,62
Meyer Burger Technology	11,17
Ormat Technologies Inc	10,79
First Solar Inc	10,43
Innergex Renewable Energy	10,25
Brookfield Renewable LP	10,00
EDP Renovaveis SA	**8,36**
SMA Solar Technology AG	8,09
Verbund AG	8,06
Xinjiang Goldwind	7,92
Dong Energy A/S	7,26
China High Speed Group Co.	6,84
Solaredge Technologies Inc	6,16
Albioma SA	5,82
REC Silicon ASA	4,93
Bourbon SA	4,30
China Longyuan Power	3,49
JinkoSolar Holding Co Ltd	2,53
Canadian Solar Inc	2,03
CGG SA	1,68
JA Solar Holdings Co Ltd	1,50
Plug Power Inc	

Statistics	
Median	8,07
Mean	8,92
Low	1,50
25th percentile	4,77
75th percentile	11,28
High	34,65
Standart deviation	6,40
Skewness	2,47

Results	
EV	8.038,53
Price per Share	9,22

Adjusted measures	
Mean	8,29
Low	1,50
25th percentile	4,61
75th percentile	10,98
High	15,70
Standart deviation	3,87
Skewness	-0,03

Adjusted Results	
Price per Share	8,57

6.12.4. Resume and Different Scenarios

The following tables present the resumed results from the subchapters above plus a conservative and optimistic scenario.

Figure 4731 - Multiples, different scenarios

The base case for EV/Revenue only considers the 4th percentile, the conservative considers also the 3th percentile and the optimistic excludes the lower value of the 4th percentile.

EV/Revenue

	Conservative	Base	Optimistic
mean	4,11	5,92	6,37
Equity Value	3.822,80	7.145,25	7.960,91
Share price	4,38	8,19	9,13

The base case for EV/EBITDA excludes the 1st and 4th percentile, the conservative considers also the 1st percentile and the optimistic considers the 4th percentile excluding the higher value (Tesla - clearly an outlier).

EV/EBITDA

	Conservative	Base	Optimistic
mean	7,27	8,02	9,25
Equity Value	6.670,85	7.745,97	9.498,49
Share price	7,65	8,88	10,89

The base case for Price/CF per share excludes as well the 1st and 4th percentile, the conservative considers also the 1st percentile and the optimistic considers the 4th percentile excluding the higher value (Tesla - clearly an outlier).

Price/CF per share

	Conservative	Base	Optimistic
mean	6,58	8,29	9,56
Equity Value	5.931,21	7.472,98	8.619,11
Share price	6,80	8,57	9,88

6.13. Option Valuation

The methods previously presented were focused in to achieve an Enterprise Value and then a price per share. EDPR has currently a wind farm project in the UK that is expected to operates in 2017 and although no financial data is still available we intend to quantify this project and obtain already some insights about its characteristics for future research. The values obtain were no directly incorporated in the BP 16-25, the general assumptions for future fixed assets and CF's have thought this project in mind.

Figure 4832 - Option valuation inputs

UK Project Valuation		
Inputs		**Remarks**
Reserves of the natural resource (MW)	97.650.000,00	1116 MW wind farm with load factor of 20%
Current Price (€/MWh)	76,7	85 GBP/MW - fixed contract (EUR/GBP)
Marginal Cost per Unit (€/MWh)	5	Production cost is 0, only considered mantaining costs
Standart Deviation in the price	15%	Fixed tariff so low st dev
Estimated annual CF (€)	59.951.045,70	1MW produces 3500 MW/h per year
PV of the Cost of Developing (€)	1.674.000.000,00	€1,5m/MW
Rights to resource	25	EDPR feedback and sector average
Risk-free rate	0,0%	10y Bund

The reserves are the capacity (1116 MW) times the years to resource (25) times the ratio installed MW/produced MW (1/3500). The annual CF computation is the capacity times the years, times the ratio times the load factor. The PV follows also a ratio of costing (€1.5m/MW). Using the Black-Scholes Model and applying the inputs in the model, as the table below shows, we achieved an asset value of €4.030m.

Figure 49 - Option valuation outputs

Outputs			
Stock Price	7.005.630.712,50	T.Bond rate	0,00%
Strike Price	1.674.000.000,00	Variance	2,3%
Expiration (years)	25	Annualized Dividend Yield	0,9%
Black-Scholes Model			
d1	1,998413	d2	1,248413
N(d1)	0,977164	N(d2)	0,894060
Results			
Value of the Natural Resource	4.030.506.604,12		

6.14. Sensitivity Analysis

In order to evaluate how the enterprise value and the price per share react to different variables and scenarios it's extreme important to conduct a test were those variations are quantified in terms of single variables and scenarios.

6.14.1. Single variables

We can observe a high sensitivity in terms of EV and share price throughout changes in the WACC and Ke – expected in valuation exercises. A positive point to conclude is that the volatility is lower when the rates increase, for instance: an increase in 0.5 BPS on the WACC (adverse situation) drops the price in 30%; the opposite increases the share in 49%.

Figure 50 - Sensitivity Analysis, Financials

Single Variable

Financial

WACC	Decrease 1 BPS	Decrease 0,5 BPS	Base Case	Increase 0,5 BPS	Increase 1 BPS
	3,08%	3,58%	4,08%	4,58%	5,08%
FCFF					
EV (m€)	22.223	14.999	11.263	8.984	7.451
Equity Value (m€)	18.528	11.304	7.569	5.290	3.756
Price per Share	**21,24**	**12,96**	**8,68**	**6,06**	**4,31**
	145%	*49%*		*-30%*	*-50%*

Ke	Decrease 1 BPS	Decrease 0,5 BPS	Base Case	Increase 0,5 BPS	Increase 1 BPS
	3,73%	4,23%	4,73%	5,23%	5,73%
FCFE					
Equity Value	11.367	9.042	7.564	6.541	5.788
Price per Share	**13,03**	**10,37**	**8,67**	**7,50**	**6,64**
	50%	*20%*		*-14%*	*-23%*
DDM					
Equity Value (m€)	12.040	9.294	7.555	6.355	5.477
Price per Share	**13,80**	**10,65**	**8,66**	**7,28**	**6,28**
	59%	*23%*		*-16%*	*-28%*

In terms of operational data, deviations of the load factor and in the GDP growth in business activity areas (marginal deviations because doesn't make sense greater figures) have a lower impact in the price. For the EBITDA/Revenues variable, the case is not the same, the range is substantial which attributes a great impact of Revenues into the company's CF's.

Figure 51 - Sensitivity Analysis, Operational and Macro

Operational

EBITDA/Revenues	Decrease 0,02 BPS	Decrease 0,01 BPS	Base Case	Increase 0,01 BPS	Increase 0,02 BPS
	71,31%	72,31%	73,31%	74,31%	75,31%
FCFF					
EV (m€)	9.872	10.568	11.263	11.959	12.655
Equity Value (m€)	6.178	6.873	7.569	8.265	8.960
Price per Share	**7,08**	**7,88**	**8,68**	**9,47**	**10,27**
	-18%	*-9%*		*9%*	*18%*
FCFE					
Equity Value	6.155	6.860	7.564	8.269	8.973
Price per Share	**7,06**	**7,86**	**8,67**	**9,48**	**10,29**
	-19%	*-9%*		*9%*	*19%*

Load Factor g	Decrease 2 BPS	Decrease 1 BPS	Base Case	Increase 1 BPS	Increase 2 BPS
	-2,00%	-1,00%	0,00%	1,00%	2,00%
FCFF					
EV (m€)	11.241	11.252	11.263	11.275	11.286
Equity Value (m€)	7.546	7.557	7.569	7.580	7.592
Price per Share	**8,65**	**8,66**	**8,68**	**8,69**	**8,70**
	-0,3%	*-0,2%*		*0,2%*	*0,3%*
FCFE					
Equity Value	7.504	7.534	7.564	7.595	7.625
Price per Share	**8,60**	**8,64**	**8,67**	**8,71**	**8,74**
	-0,8%	*-0,4%*		*0,4%*	*0,8%*

Macro/Industry

GDP Weighted Average (BA)	Decrease 0,02 BPS	Decrease 0,01 BPS	Base Case	Increase 0,01 BPS	Increase 0,02 BPS
	1,987%	1,997%	2,007%	2,017%	2,027%
FCFF					
EV (m€)	11.169	11.216	11.263	11.311	11.359
Equity Value (m€)	7.475	7.522	7.569	7.617	7.665
Price per Share	**8,57**	**8,62**	**8,68**	**8,73**	**8,79**
	-1,2%	*-0,6%*		*0,6%*	*1,3%*
FCFE					
Equity Value	7.527	7.546	7.564	7.583	7.602
Price per Share	**8,63**	**8,65**	**8,67**	**8,69**	**8,72**
	-0,5%	*-0,2%*		*0,2%*	*0,5%*

6.14.2. Scenarios Analysis

This approach combines different combinations of sensitivity variables (the most significant ones) in order to quantify the overall impact. We again observe a diverse range of possibilities. This provides a sense of concern since variations of not a great amplitude can largely affect the share price, nevertheless the probability of some scenarios is very low.

Figure 52 - Scenario Analysis

Scenarios Analysis

FCFF Price per Share

EBITDA/Revenues vs. WACC	3,08%	3,58%	4,08%	4,58%	5,08%	
71,3%	18,15	10,85	7,08	4,78	3,23	
72,3%	19,69	11,91	7,88	5,42	3,77	
73,3%	21,24	12,96	**8,68**	6,06	4,31	
74,3%	22,79	14,01	9,47	6,71	4,84	
75,3%	24,33	15,06	10,27	7,35	5,38	*StDev 2,925359*

FCFE Price per Share

EBITDA/Revenues vs. Ke	3,73%	4,23%	4,73%	5,23%	5,73%	
71,3%	10,47	8,38	7,06	6,14	5,46	
72,3%	11,75	9,37	7,86	6,82	6,05	
73,3%	13,03	10,37	**8,67**	7,50	6,64	
74,3%	14,31	11,36	9,48	8,18	7,22	
75,3%	15,59	12,35	10,29	8,86	7,81	*StDev 1,360636*

6.14.3. Monte Carlo Analysis

To better address the revenues impact on the share price, due to its high importance in terms of CF's, was conducted a MC simulation per region to see how far and likely the revenues can deviate.

The Methodology consisted in multiply the per year revenues by a growing standard deviation (increasing volatility) and then fit the results in a normal distribution to see how disperse can be the total value for the revenues.

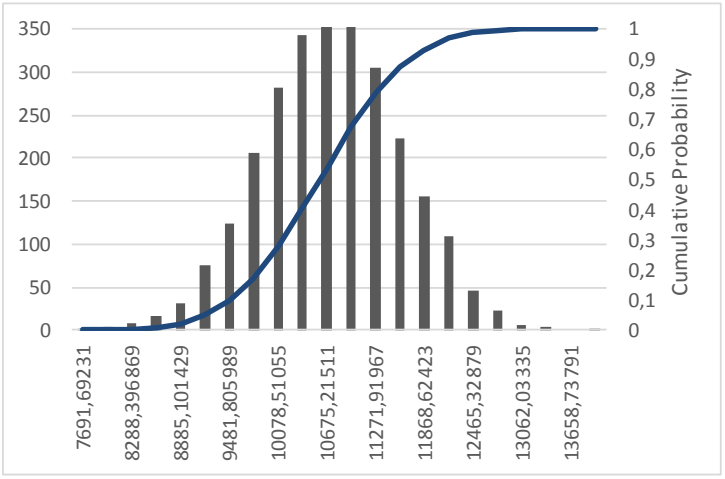
In Europe, the summation of the revenues for all the years is €10.611m, after the analysis only 264 observations were under the €10.000m and only 365 were above €11.000m in a universe of 2700 observations. The standard deviation starts in 20% and growths 1 BPS per year. The deviation likelihood is low.

Figure 53 - Monte Carlo Analysis, Europe

Europe

Revenues	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	
Portugal	338	347	353	357	365	372	380	387	395	403	
Spain	323	332	337	341	349	356	363	370	378	385	
RoE	299	307	312	316	323	336	349	363	378	393	
	960	986	1.003	1.014	1.037	1.064	1.092	1.121	1.151	1.181	10.611
Std Dev	0,2	0,21	0,22	0,23	0,24	0,25	0,26	0,27	0,28	0,29	
	192	207	221	233	249	266	284	303	322	343	
Norm Dist	601	1.107	902	633	1.225	839	1.377	456	261	1.067	8.468

Mean	10590,5
Std Dev.	845,2
Min	7.779
Top 25%	10006,5
Median	10582,1
Top 75%	11156,2
Max	13.774
Count	2700
<10.000	264
>11.000	365
	2071



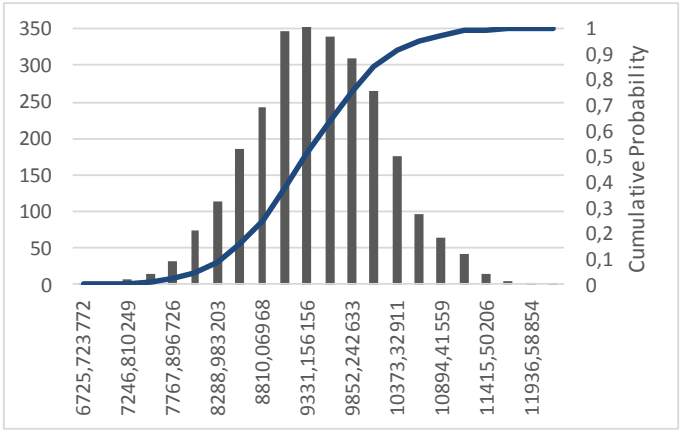
Relatively to North America, the summation of the revenues for all the years is €9.317m, after the analysis only 136 observations were under the €8.500m and only 456 were above €9.500m in a universe of 2700 observations. The standard deviation starts in 20% and growths 1 BPS per year. The deviation likelihood is low.

Figure 54 - Monte Carlo Analysis, North America

North America

Revenues	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	
North Am	819	841	855	865	884	914	960	1.008	1.059	1.112	9.317
Std Dev	0,2	0,21	0,22	0,23	0,24	0,25	0,26	0,27	0,28	0,29	
	164	177	188	199	212	229	250	272	296	322	
Norm Dist	727	853	879	603	612	754	828	1.247	1.089	830	8.422

Mean	9.328
Std Dev.	743,2
Min	6.605
Top 25%	8817,1
Median	9341,4
Top 75%	9815,9
Max	11.949
Count	2700
<8.500	136
>9.500	456
	2108



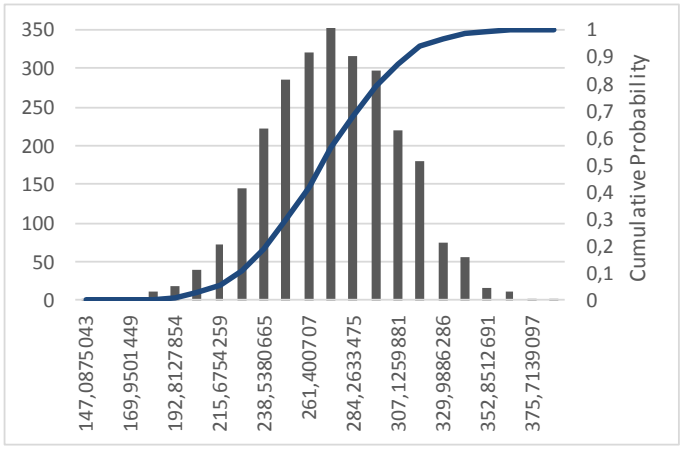
In respect to Brazil, the summation of the revenues for all the years is €268m, after the analysis only 325 observations were under the €250m and only 204 were above €300m in a universe of 2700 observations. The standard deviation starts in 35% (higher due to higher region instability) and growths 1 BPS per year. The deviation likelihood is low.

Figure 55 - Monte Carlo Analysis, Brazil

Brazil

Revenues	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	
Brazil	24	24	25	25	26	27	28	29	30	31	268
Std Dev	0,35	0,36	0,37	0,38	0,39	0,4	0,41	0,42	0,43	0,44	
	8	9	9	10	10	11	11	12	13	14	
Norm Dist	23	25	22	26	28	9	36	24	1	39	233

Mean	268
Std Dev.	34,6
Min	156
Top 25%	244,8
Median	267,6
Top 75%	291,0
Max	386
Count	2700
<250	325
>300	204
	2171



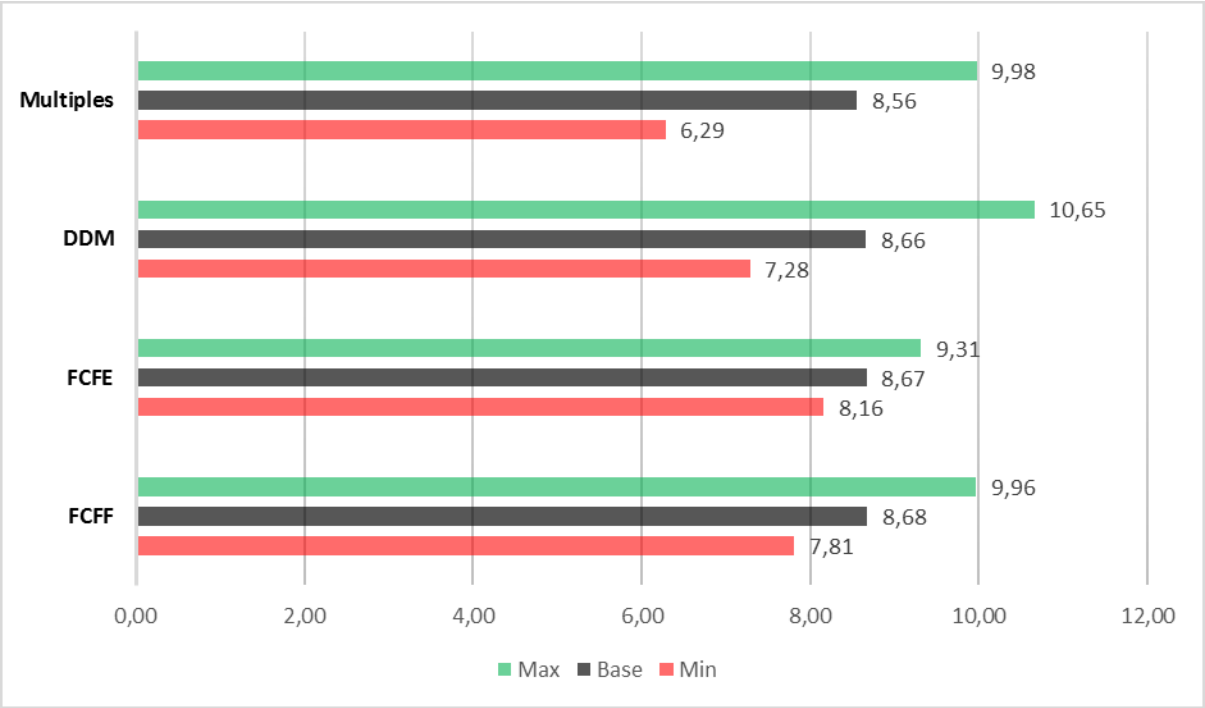
6.15. Valuation Resume

This section resumes all the share prices obtained among the different valuation methods used within this dissertation. The minimum/maximum price for each model is computed doing the average of the minimum/maximum prices present in the sensitivity analysis section tables - immediate left/right column from the base case (varies accordingly with the variable). For instance, for the FCFF the minimum price is the average of FCFF prices when the WACC increases 0.5 BPS (6.29€), when the EBITDA/revenues margin decreases 10 BPS (2.99€), when the Load factor decreases 1 BPS (8.97) and when the growth rate decreases 0.01 BPS (8.93); the final average is thus 6.79€.

Figure 56 - Average Price per share per method

Average Price per Share per method

	Min	Base	Max	
FCFF	7,81	8,68	9,96	
FCFE	8,16	8,67	9,31	
DDM	7,28	8,66	10,65	
Multiples	6,29	8,56	9,98	
				All Sample
Median	7,55	8,67	9,97	8,7
Mean	7,39	8,64	9,98	8,7
Low	6,29	8,56	9,31	6,3
25th percentile	6,54	8,58	9,47	7,9
75th percentile	8,07	8,68	10,48	9,8
High	8,16	8,68	10,65	10,7
Standart deviation	0,71	0,05	0,48	1,2
Skewness	-0,96	-1,92	0,07	-0,3



We observe consistency and coherency among the methods which allow us to conclude with a strong degree of certain a final fair price for EDPR of 8.6€ per share – our recommendation is therefore to buy the share, currently trades at 7.11€ *(24/10/2016)*.

6.16. Valuation Comparison

This chapter analyses how the main financial results reached in this dissertation deviate from two equity valuations from two main financial institutions, namely: Morgan Stanley UK and Haitong Bank. Our forecasts were however for a 10-year period and the benchmarks only used 5 years of forecast.

Figure 5733 - Valuation comparison

(m€)	**Thesis**				*01-11-2016*	**Morgan Stanley**				*26-07-2016*	**Haitong**				*27-07-2016*
Recomendation			**Buy**					**Buy**					**Buy**		
Fair Value			8,60 €					8,30 €					8,20 €		
BS	**2016**	**2017**	**2018**	**2019**	**2020**	**2016**	**2017**	**2018**	**2019**	**2020**	**2016**	**2017**	**2018**	**2019**	**2020**
Assets	15.456	16.114	16.466	16.730	17.186	17.118	17.272	17.467	18.265	18.503	16.179	16.743	17.284	17.477	17.476
Equity	7.590	7.733	7.828	7.891	8.018	8.216	8.370	8.566	9.363	9.602	8.169	8.511	8.845	9.210	9.412
Liabilities	7.866	8.381	8.638	8.839	9.167	8.902	8.902	8.901	8.902	8.901	8.010	8.232	8.439	8.267	8.064
IS	**2016**	**2017**	**2018**	**2019**	**2020**	**2016**	**2017**	**2018**	**2019**	**2020**	**2016**	**2017**	**2018**	**2019**	**2020**
EBITDA	1.427	1.329	1.352	1.367	1.398	1.208	1.365	1.454	1.509	1.611	1.237	1.304	1.366	1.469	1.566
NI	453	299	305	305	316	217	311	363	388	441	256	306	312	352	402
Capex & CF	**2016**	**2017**	**2018**	**2019**	**2020**	**2016**	**2017**	**2018**	**2019**	**2020**	**2016**	**2017**	**2018**	**2019**	**2020**
Capex	787	817	860	924	991	940	958	1.109	914	860	1.080	1.237	1.260	960	799
CFO	901	802	824	838	868	774	922	1.005	1.045	1.123	971	1.007	1.087	1.178	1.239
Net Debt	3.604	3.578	3.739	3.904	4.107	3.916	4.134	4.431	3.905	3.859	4.029	4.088	4.330	4.187	4.012
WACC	4,1%					5,5%					6,6%				
EV	11.263					13.377					13.295				
Equity Value	7.569					7.209					7.169				
Share Price	8,6					8,3					8,2				

In terms of recommendation the decision is homogeneous: buy the share. In terms of fair value, the prices differ but within a short range.

Respectively to the BS, all expect a similar assets growth, having MS the most positive forecasted. Relatively to right part we expected that the growth in assets is accompanied by a more aggressive growth in liabilities however the other two previsions give to equity a major role.

For the IS, the benchmarks forecasted a higher EBITDA but a lower NI comparing with the values of this dissertation.

Capex and Net debt assume similar figures however the Operational CF is lower according with own values.

The major difference is the WACC rate, we have a substantial lower rate – more than 10 BPS.

Resuming, both forecasted higher CF's but once our WACC is lower the final values for the price per share are very similar which enhances this dissertation in terms of relevance for investment research.

7. Conclusion

The final purpose of this dissertation was to do a proper equity valuation analysis to EDP Renewables, reach a final price per share and therefore formulate a price recommendation. The second one consisted in an increase of awareness and technical knowledge towards all the valuation models discussed and applied in this thesis.

About the second objective we can conclude that, although an exact match among the values from the different methodologies seems impossible, when using the right assumptions, when there is coherence, consistency and accuracy the heterogeneity of the final values is low and all prices reflect the same tendency and share price recommendation.

Due to a deep analysis of the macro and micro environment of EDP Renewables as to the company financial and operational data was possible to construct a solid model where all the approaches followed indicates us the same conclusion: a BUY recommendation towards EDPR share. Our valuation indicates a fair price per share of 8.6€, currently trades at 7.11€[15]. Our expectations are shared by analysis of some financial institutions, Morgan Stanley recommends a fair value of 8.3€ and Haitong Bank of 8.2€ per share.

Our beliefs about the renewable energy Industry are optimistic, as you can observe from graphical data presented across this dissertation. A company with the portfolio, with the know-how and with a very competent management board as EDPR has must take advantage of this new wave of renewable development and positioning itself in an even better position to solidify its state as top market player.

The strength of our technical analysis combined with our favorable beliefs about the renewables energy Industry future makes us state that EDPR has an undervalued price per share and constitutes a good mid/long term investment opportunity.

[15] *Price at 24/10/2016.*

8. Annexes

Installed Capacity (MW)	Source	2008	2009	2010	2011	2012	2013	2014	2015
Spain	EDPR	1.692	1.861	2.050	2.201	2.310	2.194	2.194	2.194
Portugal	"	553	680	838	939	1.005	1.074	1.157	1.247
RoE	"	232	277	551	838	951	1.353	1.413	1.523
North America	"	1.923	2.624	3.224	3.422	3.637	3.506	3.835	4.233
Brazil	"		14	14	84	84	84	84	84

Avg. Load Factor (%)	Source	2008	2009	2010	2011	2012	2013	2014	2015
Spain	EDPR	26%	26%	27%	25%	27%	29%	28%	26%
Portugal	"	27%	28%	29%	27%	27%	29%	30%	27%
RoE	"	23%	23%	24%	23%	24%	25%	24%	27%
North America	"	34%	32%	32%	33%	33%	32%	33%	32%
Brazil	"	0%	22%	26%	35%	31%	31%	32%	30%

Electrecity Output (GWh)	Source	2008	2009	2010	2011	2012	2013	2014	2015
Spain	EDPR	2.634	3.275	4.355	4.584	5.106	5.463	5.176	4.847
Portugal	"	1.028	1.275	1.472	1.391	1.444	1.593	1.652	1.991
RoE	"	238	426	804	1.326	1.727	2.132	2.495	3.225
North America	"	3.907	5.905	7.689	9.330	9.937	9.769	10.204	11.103
Brazil	"	0	26	31	170	231	230	236	222

Average Selling Price (€/MWh)	Source	2008	2009	2010	2011	2012	2013	2014	2015
Spain	EDPR	101	84	79	83	88	80	36	37
Portugal	"	94	94	94	99	102	99	98	95
RoE	"	71	90	94	96	107	105	96	86
North America	"	35	33	36	35	36	35	42	47
Brazil	"		105	105	115	106	95	108	86

Revenues (€m)	Source	2008	2009	2010	2011	2012	2013	2014	2015
Spain	EDPR	265	273	344	370	445	438	345	375
Portugal	"	98	123	140	139	149	160	166	190
RoE	"	17	39	78	126	183	217	234	272
North America	"	193	286	382	415	483	473	506	696
Brazil	"		2	3	19	25	24	25	21

EBITDA (€m)	Source	2008	2009	2010	2011	2012	2013	2014	2015
Spain	EDPR	230	225	275	286	347	302	227	249
Portugal	"	76	102	116	111	119	129	134	278
RoE	"	11	27	71	94	172	161	169	179
North America	"	138	214	288	270	318	330	359	462
Brazil	"		1	0	13	17	14	15	12

EBIT (€m)	Source	2008	2009	2010	2011	2012	2013	2014	2015
Spain	EDPR	166	118	131	153	166	160	93	117
Portugal	"	51	71	82	83	92	104	107	234
RoE	"	4	12	41	10	124	98	65	70
North America	"	51	57	76	74	98	129	157	195
Brazil	"		0	-2	9	10	8	9	7

Financial Data Highlights (€m)	2008	2009	2010	2011	2012	2013	2014	2015	1Q15	1H15	9M15	YE15	1Q16	1H16
Revenues	**581,4**	**724,7**	**947,7**	**1.068,8**	**1.285,2**	**1.316,4**	**1.276,7**	**1.547,1**	**417,9**	**772,9**	**1.078,9**	**1.547,1**	**507,9**	**888,9**
Operating Costs & Other Operating Income	(143,6)	(182,1)	(234,9)	(268,1)	(347,6)	(395,8)	(373,5)	(404,8)	(122,9)	(225,4)	(296,8)	(404,8)	(128,7)	(240,7)
EBITDA	**437,9**	**542,6**	**712,8**	**800,7**	**937,6**	**920,5**	**903,2**	**1.142,3**	**295,0**	**547,5**	**782,1**	**1.142,3**	**379,2**	**648,2**
EBITDA / Revenues	75%	75%	75%	75%	73%	70%	71%	74%	71%	71%	72%	74%	75%	73%
EBIT	231,6	230,8	289,9	347,5	450,1	473,0	422,4	577,8	171,4	292,3	374,1	577,8	231,8	353,7
Net Financial Expenses	(74,9)	(72,2)	(174,2)	(233,6)	(274,9)	(261,7)	(249,9)	(285,5)	(72,1)	(148,9)	(211,6)	(285,5)	(74,0)	(178,7)
Net Profit (Equity holders of EDPR)	**104,4**	**114,4**	**80,2**	**88,6**	**126,3**	**135,1**	**126,0**	**166,6**	**56,8**	**69,4**	**99,6**	**166,6**	**74,9**	**58,8**
Operating Cash-Flow	294	392	567	643	666	677	707	701	220	404	536	701	281	474
Capex	2.091	1.846	1.401	829	612	627	732	903	163	322	595	903	89	378
PP&E (net)	7.142	8.635	9.982	10.455	10.537	10.095	11.013	12.612	11.782	11.533	12.349	12.612	12.284	12.563
Equity	5.199	5.328	5.394	5.454	5.749	6.089	6.331	6.834	6.437	6.779	6.778	6.834	7.095	7.356
Net Debt	1.069	2.134	2.848	3.387	3.305	3.268	3.283	3.707	3.522	3.472	3.686	3.707	3.414	3.303
Institutional Partnership Liability	852	835	934	1.024	942	836	1.067	1.165	1.184	1.175	1.114	1.165	1.259	1.165

Operating Data Highlights	2008	2009	2010	2011	2012	2013	2014	2015	1Q15	1H15	9M15	YE15	1Q16	1H16
Installed Capacity (EBITDA MW + Eq. Consolidated)	**4.400**	**5.576**	**6.676**	**7.483**	**7.987**	**8.565**	**9.036**	**9.637**	**9.036**	**9.141**	**9.231**	**9.637**	**9.707**	**9.721**
Europe	2.477	2.938	3.439	3.977	4.266	4.796	4.938	5.141	4.938	4.944	5.034	5.141	5.091	5.105
North America	1.923	2.624	3.224	3.422	3.637	3.685	4.014	4.412	4.014	4.113	4.113	4.412	4.412	4.412
Brazil		14	14	84	84	84	84	84	84	84	84	84	204	204
Electricity Generated (GWh)	**7.807**	**10.907**	**14.352**	**16.800**	**18.445**	**19.187**	**19.763**	**21.388**	**5.786**	**10.842**	**14.994**	**21.388**	**7.535**	**13.314**
Europe	3.900	4.975	6.632	7.301	8.277	9.187	9.323	10.062	2.932	5.186	7.201	10.062	3.787	6.358
North America	3.907	5.905	7.689	9.330	9.937	9.769	10.204	11.103	2.808	5.562	7.638	11.103	3.694	6.750
Brazil		26	31	170	231	230	236	222	46	94	156	222	54	205
Load Factor (%)	**30%**	**29%**	**29%**	**29%**	**29%**	**30%**	**30%**	**29%**	**34%**	**31%**	**28%**	**29%**	**38%**	**33%**
Europe	26%	26%	27%	25%	26%	28%	27%	26%	33%	29%	26%	26%	35%	30%
North America	34%	32%	32%	33%	33%	32%	33%	32%	34%	33%	30%	32%	40%	37%
Brazil		22%	26%	35%	31%	31%	32%	30%	25%	26%	28%	30%	30%	29%
Average Selling Price (€/MWh)	**65,9**	**58,8**	**58,4**	**57,7**	**63,5**	**62,6**	**58,9**	**64,0**	**65,5**	**64,2**	**65,0**	**64,0**	**60,8**	**59,9**
Europe (€/MWh)	98,0	87,2	84,2	88,0	94,2	89,3	80,3	83,0	82,6	82,2	83,5	83,0	77,1	79,1
North America ($/MWh)	33,2	34,7	34,3	32,8	47,1	48,4	50,8	51,0	52,7	52,1	52,1	51,0	48,2	46,5
Brazil (R$/MWh)	0,0	0,0	109,4	119,7	286,4	309,2	346,4	370,4	369,7	368,6	370,6	370,4	362,7	265,1
Employees	**630**	**721**	**822**	**796**	**861**	**890**	**919**	**1.018**	**938**	**973**	**1.009**	**1.018**	**1.036**	**1.055**
Europe	324	365	398	393	393	467	434	445	441	446	448	445	454	459
North America	276	303	332	260	251	298	316	383	317	345	367	383	386	395
Brazil		8	17	16	21	23	26	32	24	25	32	32	34	33
Holding	30	45	75	127	196	102	143	158	156	157	162	158	162	168

Consolidated Income Statement (€m)

	2008	2009	2010	2011	2012	2013	2014	2015	1Q15	1H15	9M15	YE15	1Q16	1H16
Electricity sales and other	520,2	642,0	840,6	957,2	1.157,8	1.191,3	1.153,1	1.349,6	375,0	688,5	962,0	1.349,6	452,5	785,4
Income from institutional partnerships	61,2	82,7	107,0	111,6	127,4	125,1	123,6	197,4	42,9	84,4	116,9	197,4	55,5	103,5
Revenues	**581,4**	**724,7**	**947,7**	**1.068,8**	**1.285,2**	**1.316,4**	**1.276,7**	**1.547,1**	**417,9**	**772,9**	**1.078,9**	**1.547,1**	**507,9**	**888,9**
Other operating income	28,3	42,6	73,0	84,5	63,1	41,4	45,7	161,6	9,5	15,9	126,2	161,6	11,4	21,3
Operating costs	(171,8)	(224,7)	(307,9)	(352,6)	(410,7)	(437,2)	(419,2)	(566,3)	(132,4)	(241,3)	(423,0)	(566,3)	(140,1)	(261,9)
Supplies and services	(107,0)	(148,3)	(196,2)	(225,1)	(261,8)	(255,2)	(256,6)	(292,7)	(65,0)	(132,7)	(208,8)	(292,7)	(68,6)	(142,2)
Personnel costs	(38,1)	(42,6)	(54,9)	(60,8)	(62,7)	(66,5)	(66,1)	(84,3)	(17,2)	(39,1)	(60,6)	(84,3)	(23,7)	(45,3)
Other operating costs	(26,8)	(33,8)	(56,9)	(66,7)	(86,2)	(115,6)	(96,4)	(189,3)	(50,2)	(69,5)	(153,7)	(189,3)	(47,8)	(74,5)
EBITDA	**437,9**	**542,6**	**712,8**	**800,7**	**937,6**	**920,5**	**903,2**	**1.142,3**	**295,0**	**547,5**	**782,1**	**1.142,3**	**379,2**	**648,2**
EBITDA/Revenues	75,0%	75,0%	75,0%	75,0%	73,0%	70,0%	71,0%	74,0%	71,0%	71,0%	72,0%	74,0%	75,0%	73,0%
Provisions	0,8	0,2	0,2	0,3	-	(1,3)	(0,0)	0,2	-	0,1	0,2	0,2	-	(0,6)
Depreciation and amortisation	(207,8)	(314,4)	(434,4)	(468,5)	(502,7)	(464,7)	(499,8)	(587,5)	(129,2)	(266,7)	(425,2)	(587,5)	(153,1)	(304,9)
Amortisation of deferred income (government grants)	0,7	2,4	11,4	15,0	15,2	18,5	19,0	22,8	5,6	11,4	17,1	22,8	5,7	11,1
EBIT	**231,6**	**230,8**	**289,9**	**347,5**	**450,1**	**473,0**	**422,4**	**577,8**	**171,4**	**292,3**	**374,1**	**577,8**	**231,8**	**353,7**
Financial income/(expense)	(74,9)	(72,2)	(174,2)	(233,6)	(274,9)	(261,7)	(249,9)	(285,5)	(72,1)	(148,9)	(211,6)	(285,5)	(74,0)	(178,7)
Share of profit from associates	4,4	3,9	5,0	4,8	6,8	14,7	21,8	(1,5)	9,0	6,0	0,5	(1,5)	(7,2)	(3,1)
Pre-tax profit	**161,2**	**162,5**	**120,8**	**118,7**	**182,1**	**226,0**	**194,3**	**290,8**	**108,3**	**149,4**	**162,9**	**290,8**	**150,6**	**171,9**
Income taxes	(49,0)	(44,8)	(37,8)	(28,0)	(46,0)	(56,9)	(16,4)	(45,4)	(25,2)	(36,6)	(15,1)	(45,4)	(33,8)	(43,2)
Profit of the period	112,2	117,8	83,0	90,6	136,1	169,1	177,9	245,5	83,1	112,8	147,8	245,5	116,8	128,8
Equity holders of EDPR	**104,4**	**114,4**	**80,2**	**88,6**	**126,3**	**135,1**	**126,0**	**166,6**	**56,8**	**69,4**	**99,6**	**166,6**	**74,9**	**58,8**
Non-controlling interests	7,9	3,4	2,8	2,0	9,8	34,0	51,9	78,9	26,3	43,4	48,3	78,9	41,9	69,9

Consolidated Balance Sheet (€m)

Assets (€m)	2008	2009	2010	2011	2012	2013	2014	2015	1Q15	1H15	9M15	YE15	1Q16	1H16
Property, plant and equipment, net	7.053	8.635	9.982	10.455	10.537	10.095	11.013	12.612	11.782	11.533	12.349	12.612	12.284	12.563
Intangible assets and goodwill, net	1.395	1.336	1.367	1.334	1.327	1.301	1.405	1.534	1.505	1.481	1.507	1.534	1.502	1.533
Financial Investments, net	53	60	64	61	57	346	376	340	408	392	327	340	324	332
Deferred tax asset	22	28	39	56	89	109	46	47	47	45	58	47	45	52
Inventories	12	11	24	24	16	15	21	23	24	22	24	23	22	22
Accounts receivable - trade, net	83	106	144	146	180	202	146	222	186	170	178	222	257	220
Accounts receivable - other, net	512	637	757	750	800	655	859	338	733	746	358	338	353	380
Financial assets at fair value through profit and loss	36	37	36	0	0	0	-	-	-	-	-	-	-	-
Collateral deposits	-	-	-	-	49	78	81	73	80	61	66	73	75	55
Assets held for sale	1	-	-	-	-	-	-	110	-	-	40	110	-	-
Cash and cash equivalents	230	444	424	220	246	255	369	437	533	904	1.029	437	704	467
Total Assets	**9.397**	**11.294**	**12.835**	**13.045**	**13.302**	**13.058**	**14.316**	**15.736**	**15.298**	**15.354**	**15.935**	**15.736**	**15.566**	**15.623**

Equity (€m)	2008	2009	2010	2011	2012	2013	2014	2015	1Q15	1H15	9M15	YE15	1Q16	1H16
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	4.914
Reserves and retained earnings	89	192	274	325	384	623	742	891	913	887	891	891	1.053	1.117
Consolidated net profit attrib. to equity holders of the pare	104	114	80	89	126	135	126	167	57	69	100	167	75	59
Non-controlling interests	83	107	126	127	325	418	549	863	554	909	874	863	1.053	1.267
Total Equity	**5.190**	**5.328**	**5.394**	**5.454**	**5.749**	**6.089**	**6.331**	**6.834**	**6.437**	**6.779**	**6.778**	**6.834**	**7.095**	**7.356**

Liabilities (€m)	2008	2009	2010	2011	2012	2013	2014	2015	1Q15	1H15	9M15	YE15	1Q16	1H16
Financial Debt	1.462	2.673	3.534	3.826	3.874	3.666	3.902	4.220	4.135	4.439	4.783	4.220	4.196	3.826
Institutional Partnership	895	920	1.009	1.011	942	836	1.067	1.165	1.184	1.175	1.114	1.165	1.259	1.165
Provisions	51	67	54	58	64	65	99	121	107	107	115	121	123	127
Deferred Tax liability	303	343	372	381	381	367	270	316	300	265	298	317	345	354
Deferred revenues from institutional partnerships	202	434	635	773	738	672	735	791	806	774	774	791	740	768
Other liabilities	1.293	1.529	1.839	1.542	1.555	1.363	1.912	2.288	2.328	1.815	2.072	2.288	1.808	2.027
Total Liabilities	**4.206**	**5.966**	**7.442**	**7.591**	**7.553**	**6.969**	**7.986**	**8.902**	**8.861**	**8.575**	**9.157**	**8.902**	**8.472**	**8.267**
Total Equity and Liabilities	**9.397**	**11.294**	**12.835**	**13.045**	**13.302**	**13.058**	**14.316**	**15.736**	**15.298**	**15.354**	**15.935**	**15.736**	**15.566**	**15.623**

Asset Base

Installed Capacity (MW)	2008	2009	2010	2011	2012	2013	2014	2015	1Q15	1H15	9M15	YE15	1Q16	1H16
Spain	1.692	1.861	2.050	2.201	2.310	2.194	2.194	2.194	2.194	2.194	2.194	2.194	2.194	2.194
Portugal	553	595	599	613	615	619	624	1.247	624	630	1.243	1.247	1.247	1.249
France	185	220	284	306	314	322	340	364	340	340	340	364	364	376
Belgium	47	57	57	57	57	71	71	71	71	71	71	71	71	71
Poland		120	120	190	190	370	392	468	392	392	392	468	418	418
Romania			90	285	350	521	521	521	521	521	521	521	521	521
Italy	-	-	-	-	40	70	90	100	90	90	100	100	100	100
Europe	**2.477**	**2.853**	**3.200**	**3.652**	**3.876**	**4.167**	**4.231**	**4.965**	**4.231**	**4.237**	**4.860**	**4.965**	**4.915**	**4.929**
US	1.923	2.624	3.224	3.422	3.637	3.476	3.805	4.203	3.805	3.904	3.904	4.203	4.203	4.203
Canada	-	-	-	-	-	30	30	30	30	30	30	30	30	30
North America	**1.923**	**2.624**	**3.224**	**3.422**	**3.637**	**3.506**	**3.835**	**4.233**	**3.835**	**3.934**	**3.934**	**4.233**	**4.233**	**4.233**
Brazil		**14**	**14**	**84**	**84**	**84**	**84**	**84**	**84**	**84**	**84**	**84**	**204**	**204**
Total EBITDA MW	**4.400**	**5.491**	**6.437**	**7.157**	**7.597**	**7.756**	**8.149**	**9.281**	**8.149**	**8.254**	**8.878**	**9.281**	**9.351**	**9.365**
Equity Consolidated (MW)														
ENEOP - Eólicas de Portugal	-	85	239	326	390	455	533	-	533	533	-	-	-	-
Spain	-	-	-	-	-	174	174	177	174	174	174	177	177	177
United States	-	-	-	-	-	179	179	179	179	179	179	179	179	179
Total EBITDA MW + Equity Consolidated	**4.400**	**5.576**	**6.676**	**7.483**	**7.987**	**8.565**	**9.036**	**9.637**	**9.036**	**9.141**	**9.231**	**9.637**	**9.707**	**9.721**
Non-controlling Interests (MW)														
Spain	-	-	-	-	-	(224)	(224)	(71)	(224)	(221)	(102)	(71)	(60)	(60)
Portugal	-	-	-	-	-	(315)	(316)	(318)	(316)	(316)	(316)	(318)	(318)	(319)
Rest of Europe (RoE)	-	-	-	-	-	(108)	(277)	(271)	(277)	(277)	(277)	(271)	(232)	(232)
United States	-	-	-	-	-	(341)	(356)	(765)	(356)	(765)	(765)	(765)	(1.122)	(1.122)
Brazil	-	-	-	-	-	(38)	(38)	(41)	(38)	(53)	(53)	(41)	(100)	(100)
Total Non-controlling Interests (Net MW)	**-**	**-**	**-**	**-**	**-**	**(1.026)**	**(1.210)**	**(1.466)**	**(1.210)**	**(1.633)**	**(1.513)**	**(1.466)**	**(1.832)**	**(1.833)**

Property, Plant & Equipment - PP&E (€m)	2008	2009	2010	2011	2012	2013	2014	2015	1Q15	1H15	9M15	YE15	1Q16	1H16
Property, Plant & Equipment (net)	**7.053**	**8.635**	**9.982**	**10.455**	**10.537**	**10.095**	**11.013**	**12.612**	**11.782**	**11.533**	**12.349**	**12.612**	**12.284**	**12.563**
(-) PP&E assets under construction	(2.242)	(2.034)	(1.667)	(1.206)	(1.081)	(1.059)	(1.260)	(1.243)	(1.035)	(956)	(1.115)	(1.243)	(854)	(993)
(=) PP&E existing assets (net)	4.811	6.601	8.315	9.249	9.456	9.037	9.753	11.369	10.747	10.578	11.235	11.369	11.430	11.570
(+) Accumulated Depreciation	518	830	1.307	1.764	2.241	2.488	3.146	4.023	3.466	3.534	3.821	4.023	4.093	4.292
(-) Government Grants	(15)	(162)	(342)	(368)	(379)	(442)	(512)	(540)	(608)	(546)	(545)	(540)	(522)	(532)
(=) Invested capital on existing assets	**5.314**	**7.269**	**9.280**	**10.645**	**11.318**	**11.082**	**12.387**	**14.853**	**13.605**	**13.565**	**14.510**	**14.853**	**15.001**	**15.330**

Capex & Cash Flow (€m)

Capex (€m)	2008	2009	2010	2011	2012	2013	2014	2015	1Q15	1H15	9M15	YE15	1Q16	1H16
Spain	684	561	111	70	65	5	5	5	1	2	2	5	1	2
Portugal	85	102	8	11	9	10	8	16	5	7	10	16	5	23
RoE	124	351	420	287	349	372	151	163	14	32	65	163	14	28
Europe	**893**	**1014**	**539**	**368**	**423**	**387**	**164**	**184**	**20**	**41**	**77**	**184**	**20**	**53**
North America	**1.198**	**826**	**783**	**405**	**179**	**212**	**543**	**646**	**116**	**247**	**474**	**646**	**63**	**282**
Brazil		**2**	**72**	**62**	**9**	**25**	**25**	**73**	**26,6**	**33**	**44**	**73**	**6**	**43**
Other		4	7	(6)	1	3	0	0	0,0	0,0	0	0	0,0	0,0
Total Capex	**2091**	**1.846**	**1.401**	**829**	**612**	**627**	**732**	**903**	**163**	**322**	**595**	**903**	**89**	**378**
Cash-Flow (€m)	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**1Q15**	**1H15**	**9M15**	**YE15**	**1Q16**	**1H16**
EBITDA		**543**	**713**	**801**	**938**	**921**	**903**	**1.142**	**295**	**548**	**782**	**1.142**	**379**	**648**
Current income tax		(34)	(29)	(29)	(85)	(89)	(50)	(51)	(13)	(33)	(40)	(51)	(18)	(36)
Net interest costs		(87)	(167)	(189)	(205)	(199)	(207)	(188)	(53)	(97)	(141)	(188)	(47)	(92)
Share of profit from associates		4	5	5	7	15	22	(2)	9	6	0	(2)	(7)	(3)
FFO (Funds From operations)		**425**	**522**	**588**	**655**	**648**	**668**	**901**	**238**	**423**	**602**	**901**	**307**	**516**
Net interest costs		87	167	189	205	199	207	188	53	97	141	188	47	92
Income from group and associated companies		(4)	(5)	(5)	(7)	(15)	(22)	2	(9)	(6)	(0)	2	7	3
Non-cash items adjustments		(91)	(143)	(158)	(120)	(125)	(130)	(263)	(45)	(88)	(164)	(263)	(63)	(108)
Change in working capital		(25)	26	29	(66)	(30)	(16)	(127)	(17)	(22)	(43)	(127)	(18)	(30)
Operating Cash-Flow		**392**	**567**	**643**	**666**	**677**	**707**	**701**	**220**	**404**	**536**	**701**	**281**	**474**
Capex		(1.846)	(1.401)	(829)	(612)	(627)	(732)	(903)	(163)	(322)	(595)	(903)	(89)	(378)
Financial (investments) divestments		(117)	(79)	(237)	(22)	(47)	(19)	(157)	1	(28)	(67)	(157)	(0)	(11)
Changes in working capital related to PP&E suppliers		116	(20)	(23)	2	(180)	196	26	(47)	(345)	(127)	26	(310)	(387)
Cash Grant		156	169	3	5	91	22	1	-	-	-	1	0	0
Net Operating Cash-Flow		**(1.299)**	**(764)**	**(444)**	**39**	**(86)**	**173**	**(330)**	**11**	**(291)**	**(254)**	**(330)**	**(118)**	**(303)**
Sale of non-controling interests		-	-	4	176	402	215	395	-	395	395	395	279	829
Proceeds from institutional partnerships [2]							217	242	38	140	139	242	216	212
Payments to institutional partnerships		334	228	141	(15)	(36)	(70)	(174)	(56)	(103)	(142)	(174)	(51)	(99)
Net interest costs		(87)	(167)	(156)	(189)	(183)	(180)	(165)	(46)	(87)	(124)	(165)	(41)	(81)
Dividends net and other capital distributions		-	-	-	-	(58)	(79)	(115)	(12)	(91)	(102)	(115)	(18)	(110)
Forex & others		(12)	(35)	(161)	22	(21)	(291)	(277)	(175)	(153)	(315)	(277)	28	(45)
Decrease / (Increase) in Net Debt		**(1.064)**	**(737)**	**(616)**	**33**	**19**	**(14)**	**(425)**	**(239)**	**(190)**	**(404)**	**(425)**	**293**	**404**

Net Debt and Financials

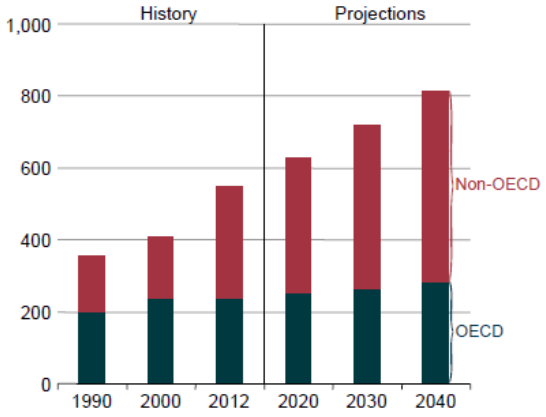
Net Debt (€m)	2008	2009	2010	2011	2012	2013	2014	2015	1Q15	1H15	9M15	YE15	1Q16	1H16
Bank Loans and Other	560	542	733	837	917	848	937	1.082	947	762	1.158	1.082	1.098	963
Loans with EDP Group related companies	902	2.132	2.800	2.989	2.957	2.818	2.965	3.138	3.188	3.677	3.625	3.138	3.098	2.864
Nominal Financial Debt + Accrued interests	**1.462**	**2.673**	**3.534**	**3.826**	**3.874**	**3.666**	**3.902**	**4.220**	**4.135**	**4.439**	**4.783**	**4.220**	**4.196**	**3.826**
Collateral deposits associated with Debt	-	-	-	-	49	78	81	73	80	61	66	73	75	55
Total Financial Debt	**-**	**-**	**-**	**-**	**3.825**	**3.588**	**3.821**	**4.147**	**4.055**	**4.378**	**4.718**	**4.147**	**4.121**	**3.771**
Cash and cash equivalents	230	444	424	220	246	255	369	437	533	904	1.029	437	704	467
Loans to EDP Group related companies and cash pooling	128	59	226	219	274	64	170	3	(0)	2	2	3	3	2
Financial assets held for trading	36	37	36	0	0	0	-	-	-	-	-	-	-	-
Cash & Equivalents	**393**	**540**	**685**	**439**	**520**	**319**	**538**	**439**	**533**	**906**	**1031**	**440**	**707**	**468**
Net Debt (€m)	**1.069**	**2.134**	**2.848**	**3.387**	**3.305**	**3.268**	**3.283**	**3.707**	**3.522**	**3.472**	**3.686**	**3.707**	**3.414**	**3.303**

Net Debt Breakdown by Assets (€m)	2008	2009	2010	2011	2012	2013	2014	2015	1Q15	1H15	9M15	YE15	1Q16	1H16
Net Debt related to assets in operation		1.666	2.435	3.169	3.023	3.028	3.168	3.658	3.276	2.928	3.217	3.658	3.030	2.707
Net Debt related to assets under construction & develop.		468	413	218	283	241	115	49	246	544	470	49	384	596

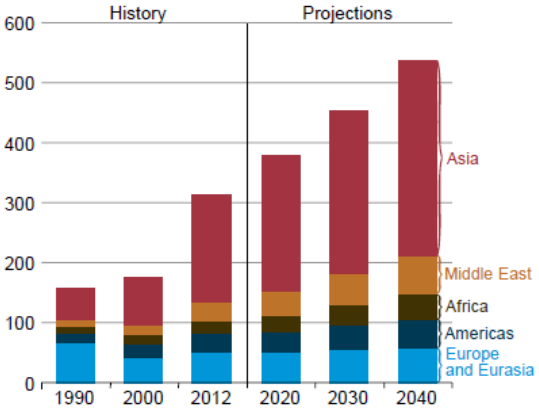
Institutional Partnership (€m)	2008	2009	2010	2011	2012	2013	2014	2015	1Q15	1H15	9M15	YE15	1Q16	1H16
Net Institutional Partnership Liability	852	835	934	1.011	942	836	1.067	1.165	1.184	1.175	1.114	1.165	1.259	1.165

Net Financial Expenses (€m)	2008	2009	2010	2011	2012	2013	2014	2015	1Q15	1H15	9M15	YE15	1Q16	1H16
Net interest costs	(48,6)	(87,3)	(166,9)	(189,5)	(205,0)	(198,6)	(205,2)	(189,5)	(52,9)	(97,5)	(141,4)	(189,5)	(47,2)	(92,4)
Institutional partnership costs	(43,6)	(54,2)	(64,8)	(62,4)	(66,7)	(60,8)	(56,6)	(79,0)	(19,5)	(38,1)	(58,1)	(79,0)	(23,9)	(46,4)
Capitalised costs	39,2	74,7	68,4	33,9	15,7	15,6	26,8	23,0	6,9	9,8	16,2	23,0	5,6	11,8
Forex differences & Forex Derivatives	22,3	(5,1)	(1,1)	(20,5)	5,6	(7,7)	(5,0)	(2,7)	1,9	(2,1)	(1,3)	(2,7)	1,9	0,1
Other	(44,1)	(0,3)	(9,8)	4,8	(24,5)	(10,2)	(9,9)	(37,3)	(8,5)	(21,0)	(27,1)	(37,3)	(10,3)	(51,9)
Net Financial Expenses	**(74,9)**	**(72,2)**	**(174,2)**	**(233,6)**	**(274,9)**	**(261,7)**	**(249,9)**	**(285,5)**	**(72,1)**	**(148,9)**	**(211,6)**	**(285,5)**	**(74,0)**	**(178,7)**

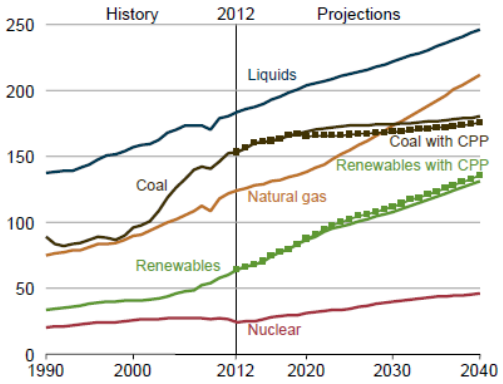
World energy consumption, 1990–2040 (quadrillion Btu)



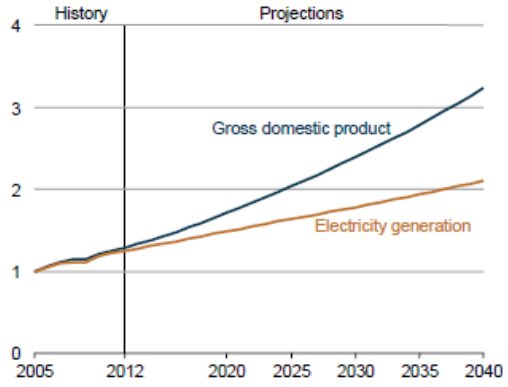
Non-OECD energy consumption by region, 1990–2040 (quadrillion Btu)



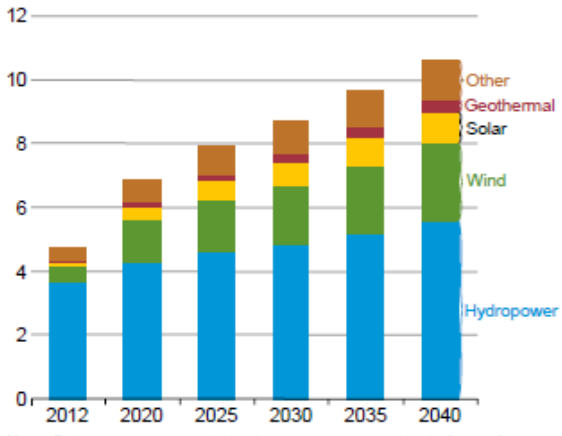
World energy consumption by energy source, 1990–2040 (quadrillion Btu)



Growth in world electricity generation and GDP, 2005–40 (index, 2005 = 1)

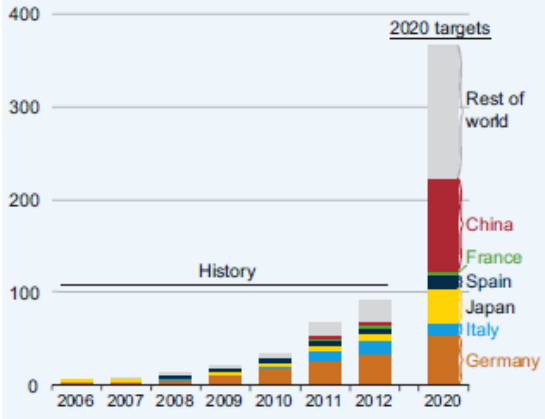


World net electricity generation from renewable power by fuel, 2012–40 (trillion kilowatthours)



Note: Other generation includes biomass, waste, and tide/wave/ocean.

World installed solar photovoltaic capacity by country, 2006–12, and projected total installed capacity in 2020 (gigawatts)



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