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Equity Valuation of EDP Renováveis, S.A: A Critical Assessment of the Strategic Update 2021-2025

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Department of Finance

October 2022

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Abstract

This dissertation valuates EDP Renováveis (EDPR), a subsidiary company from Energias de Portugal (EDP), a vertically integrated energy company, listed on *PSI-20*.

Created in 2007 to maintain and operate the growing renewable energy assets of EDP, EDPR has been the driving force behind the group´s strategic objective of decarbonising the business and being entirely carbon neutral by 2030.

A rigorous and well-designed valuation of EDPR is becoming increasingly prominent since EDPR is at the international forefront of the energy transition, has been exhibiting an outstanding financial and operational development over the last years, and can provide price stability to the actual disturbance on global energy prices, mostly caused by the Russia´s aggression against Ukraine, as well as promote global energy independence.

Incorporating the assumptions implied in the Strategic Update 2021-2025 issued by the entity, the value of the evaluation points to an enterprise value of €28,629.47, with a price per share of €28,71.

The evaluation by multiples has served in the background as a complement to the finding provided by the DCF valuation, by concluding that the investor expectations are increasing, to what concerns the growth of EDPR in the renewable energy market.

To finalize, combining both the technical analysis undertaken, and the beliefs regarding the renewable energy industry in the upcoming years, it is possible to state that EDPR represents a decent mid/long term investment opportunity and thus, the purchase of the stock is recommended.

Resumo

Esta dissertação tem por base avaliar financeiramente a EDP Renováveis (EDPR), uma empresa subsidiária da Energias de Portugal (EDP), uma empresa de energia verticalmente integrada, cotada no PSI-20.

Criada em 2007 para manter e operar os crescentes ativos de energia renovável da EDP, a EDPR tem sido a força motriz por detrás do objetivo estratégico do grupo de descarbonizar o negócio e ser totalmente neutro em carbono até 2030.

Uma avaliação rigorosa e bem concebida da EDPR está a tornar-se cada vez mais proeminente, uma vez que a EDPR está na vanguarda internacional da transição energética, tem demonstrado um desenvolvimento financeiro e operacional notável ao longo dos últimos anos, e pode proporcionar estabilidade de preços à perturbação atual dos preços globais da energia, causada principalmente pela agressão da Rússia contra a Ucrânia, bem como promover a independência energética global.

Incorporando os pressupostos implícitos na Atualização Estratégica 2021-2025 emitida pela entidade, o valor da avaliação aponta para um valor de empresa de €28,629.47, com um preço por ação de €28,71.

A avaliação por múltiplos serviu, no pano de fundo, como complemento ao *finding* fornecido pela avaliação do DCF, concluindo que as expectativas dos investidores estão a aumentar, no que diz respeito ao crescimento da EDPR no mercado das energias renováveis.

Para finalizar, combinando tanto a análise técnica realizada, como as crenças relativas à indústria das energias renováveis nos próximos anos, é possível afirmar que a EDPR representa uma oportunidade de investimento decente a médio/longo prazo, pelo que se recomenda a compra das ações.

Acknowledgements

Now, that my path at Iscte-iul is coming to an end, I truly believe that my choice for the master's in finance, at this institution, was the right one. I strongly believe that all the knowledge about the several financial fields that I absorbed in this master program will provide a milestone in my career.

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 Pedro Manuel de Sousa Leite Inácio for his very valuable advice and help during this dissertation, to my friends and family, in particular to my parents that have created all the conditions for me to accomplish this goal of mine.

To all of you I express my gratitude.

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List of Abbreviations

ACER – Agency for the Cooperation of Energy Regulators

APV - Adjusted Present Value

CF – Cash Flow

COP – Conference of Parties

DTA – Decision Tree Analysis

DCF – Discounted Cash Flow

EBITDA – Earnings Before Interest, Taxes, Depreciation, and Amortization

EVA – Economic Value Added

EDPR – EDP Renováveis, S.A.

EDP – Energias de Portugal, S.A.

EU – European Union

EV – Enterprise Value

FCF – Free Cash Flow

MVA – Market Value Added

MW- Megawatt

NOPLAT – Net Operating Profits

PVGO – Present Value of Growth Opportunities

ROV – Real-Option Valuation

RE – Renewable Energy

R&D – Research and Development

SDG – Sustainable Development Goal

UN – United Nations

WACC – Weighted Average Cost of Capital

1. Introduction:

In the constantly evolving and fasted-paced finance industry, the contribution of a corporate financier´s work towards the valuation of firms becomes an essential tool for the proper functioning of financial markets.

In line with Goedhart, M. et al (2012), because value is the defining dimension of measurement in a market economy, it becomes imperative to return to the fundamentals of valuation, namely to the scope of equity valuation, when investors are formulating investment decisions. A rigorous and well-designed valuation is becoming increasingly prominent, especially in the aftermath of the COVID-19 pandemic and during Russia´s aggression against Ukraine.

Reflected on increased short-term market volatility, this conflict has introduced new uncertainty to a stock market that had already a problematic start to 2022, with the S&P 500 reaching its most dramatic one-day drop, since May 2020. Weighting adversely on global economic conditions throughout 2022, this war has led to a disturbance on global energy and food prices, mounting sanctions on behalf of the US and its allies and a spike of inflation worldwide, ultimately scaling up financial stability risks worldwide.

To conduct a reliable valuation to EDP Renewables, in the next section of this dissertation, the applicable existing literature was reviewed with the objective of, not only determining the most appropriate valuation methods to value this firm, but also to highlight their pros and cons in the context of equity valuation.

The body of this dissertation provide a contextualization of the firm in terms of business description, industry overview and competitive positioning. Envisioned from the perspective of McLeavey, D. et al (2002) and defined by five-steps, to ascertain the quality of the industry and company analysis, EDPR´s valuation process will comprehend an understanding of the business, the forecasting of the future performance, the selection of the appropriate valuation models, the conversion of the forecasts to the valuation and, finally, making the investment decision or recommendation.

Relying on EDPR´s economic and key financial data, such as, the current financial statements, the history of the firm, its competitors or peer group and its business strategy for 2021-2025, the valuation section will serve to return a global value for the company (according with each different model) and thus, a final stock price. The models implemented were the DCF (throughout FCFF and FCFE) and Relative Valuation (throughout Multiples). The main reason behind the selection of the former, concerns the purpose of securing more robustness and assurance regarding the quality of the valuation itself.

The final step concerns an exercise of risk management to scrutinise deviations from the final stock price obtained, with the conduction of a sensitivity analysis to submit the DCF model to different scenarios, namely to what regards the implied discount factors.

2. Literature Review

2.1 Introduction:

The literature review represents the departure point of the journey to be undertaken, within this dissertation. This section analyses the applicable existing literature, synthesizing and interpreting basilar definitions and concepts. Besides this, it also enumerates the advantages and disadvantages of the different existing valuation methods, selecting the most appropriate approach to be implemented in this dissertation, given EDPR´s micro and macro context.

As stated by Pearl, J. et al (2009) since the aftermath of the subprime mortgage crisis and ensuing credit crunch, the world of finance has returned to the fundamentals of valuation, however, because there is no absolute method to determine the fair value of a company, in which the market should converge, researchers developed different valuation methods.

In the view of Young et al. (1999), the only conditions that must be guarantee for a proper valuation exercise are the consistency between data and the assumptions made in the forecasts and the existence of comparability among different valuation methods. If these conditions are secured, it is up to everyone to determine which valuation method is preferable, given its company-specific characteristics.

*

"A fool is someone who knows the price of everything and the value of nothing"

(Oscar Wilde)

2.2 Discounted Cash Flow Method:

Considered as the foundation on which all other valuation approaches are built, in conformity with Goedhart, M. et al (2012), it remains a preferred amongst academics due to its property of relying merely on the in and out cash flow of the firm. Based on the present value rule, according with Damodaran (2002), this approach states the value of any asset is the present value of the expected future cash flows on it, as can be withdrawn from the formula:

$$Value = \frac{\sum CF_t}{(1+r)^t} \quad (1)$$

where n, CF_t and r represent life of the asset, cash flow in period t and the discount rate implied, respectively.

Pursuantly with Damodaran (2002), through DCF it is possible to estimate the intrinsic value of an asset based on its fundamentals, as intrinsic value is defined as the value that would be attached to the firm by an unbiased analyst, who not only estimates the expected cash flows for the firm correctly, but also attaches the right discount rate to value these cash flows.

Requiring the estimation of the present and future cash flows and discount rates, within this approach, the most recurrent perspectives in the finance industry are DCF models based on either the Free Cash Flow to the Firm (FCFF), or on the Free Cash Flow to Equity (FCFE) approach. Within the Free Cash Flow Method (FCFF), the firm is valued as a whole and all the claimholders, such as shareholders, bondholders and preferred shareholders are taken into consideration. On the other hand, common equity can be valued directly using the FCFE or indirectly, by first computing the value of the firm using the FCFF model and then subtracting the value of non-common stock capital, usually debt, from FCFF to arrive at the equity value.

Depending on which method used, it is necessary to use different discount rates to reflect the risk of the whole business as it is the case of the FCFF method or, only reflect the risk of equity, as it is the case regarding the FCFE method.

In the figure below it is possible to discern the major frameworks for a DCF-based valuation, all of which gave different measures, discount factors and assessments.

Model	*Measure*	*Discount factor*	*Assessment*
Enterprise Discounted Cash Flow	*Free cash flow*	*Weighted average cost of capital*	*Works best for projects, business units, and companies that manage their capital structure to a target level*
Dicounted Economic Profit	*Economic Profit*	*Weighted average cost of capital*	*Explicity highlights when a company creates value*
Adjusted Present Value	*Free cash flow*	*Unlevered cost of equity*	*Highlights changing capital strucutre more easliy than WACC - based models*
Capital Cash Flow	*Capital cash flow*	*Unlevered cost of equity*	*Compresses free cash flow and the interest tax shield in one number, making it difficult to compare operating performance among companies and over time*
Equity Cash Flow	*Cash flow to equity*	*Levered cost of equity*	*Difficult to implement correctly because capital strucutre is embedded within the cash flow. It is best used when valuing financial institutions.*

Figure 1: Frameworks for DCF-Based Valuation, Literature Review

The first one, the FCFF method, is the expected CF from operations, after taxes and before interest payments plus company investments. It also reflects all the CF´s available for all the financial parties.

$$Firm\ value = \frac{\sum FCFF_t}{(1+WACC)^t} \quad (2)$$

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

$$Equity\ Value = \frac{\sum FCFE_t}{(1+r_e)^t} \quad (3)$$

, where:

$$FCFE = FCFF - Interest * (1-t) + \Delta Net\ Debt \quad (4)$$

and:

$$FCFF = NOPLAT + Depreciation\ Expenses - CAPEX - \Delta WC \quad (5)$$

Pursuantly with Damodaran (2012), the main benefit of using the FCFF valuation approach concerns the fact that debt-related cash flows do not have to be considered explicitly, whereas they do have to be taken into consideration when estimating FCFE.

This is particularly important, especially when the leverage of the firm is expected to change significantly over time. The rationale implied is, when leverage is changing, estimating new debt issues or repayments can become confusing and lead to errors. On the other hand, the firm valuation does require information about debt ratios and interest rates, to estimate the WACC.

To conclude, there are some limitations concerning the use of a DCF – based valuation, among which, the fact that it is a mechanical valuation tool and thus, requires more information than other valuation models. Moreover, small changes in input variables can generate large impacts in the value of the firm and inputs can be easily manipulated.

2.2.1 Enterprise Value:

The enterprise value can be defined as the total company value (the market value of debt, common equity, and preferred equity) minus the value of cash and investments. Future FCFFs need to be discounted at the WACC minus the expected growth rate (if the FCFF is growing in perpetuity at a constant growth rate, denoted by "g").

$$Enterprise\ value = \frac{FCFF_t}{WACC-g} \quad (6)$$

2.2.2 Terminal Value:

In agreement with McLeavey, D. et al (2002) the accurate estimation of V_n, the terminal value of the stock, is an important part of a DCF-based valuation. Since it is not possible to estimate CF´s on a permanently basis, generally it is imputed a closure in discounted cash flow valuation by stopping the estimation of CF´s sometime in the future. Later, it is just computing the terminal value that reflects the value of the firm at a given point.

Aligned with Damodaran (2002), there are three ways to estimate the terminal value of a firm either throughout the liquidation value, the multiple approach, or the stable growth model.

Using the liquidation approach, a liquidation of the firm asset's is assumed on the terminal year and then an estimation is performed to determine what others would pay for the assets that the firm has accumulated at that point.

In the multiples approach, the value of a firm is estimated by applying a multiple to the firm´s earnings or revenues in that year. Characterized by its simplicity, the multiple is estimated by looking at how comparable firms in the business are priced at the present day by the market. This may become problematic as, to determine the terminal value in a defined period, a relative valuation is performed, rather than a discounted cash flow valuation. Also highlight, that if the multiple is estimated using fundamentals, it converges to the stable growth model.

Thirdly, the assumptions supporting the stable growth model are that the firm has a finite life, and its business will be liquidated at the end. A perpetual reinvestment of a percentage of the CF´s into new assets is assumed, enlarging its life cycle, by opposite with the liquidation approach.

Still on this approach, in accordance with Damodaran (2002), the perpetual growth rate places a limitation. "The fact that a stable growth rate is constant forever, puts strong constraints on how high it can be. Since no firm can grow forever at a rate higher than the growth rate of the economy in which it operates, the constant growth rate cannot be greater than the overall growth rate of the economy."

Being the liquidation approach and the stable growth model the most appropriate ways to compute the terminal value, its calculation will depend on whether one is valuing the firm or the equity, as follows:

$$Terminal\ Value\ of\ Firm_n = \frac{FCFF_{n+1}}{WACC_{n+1} - g_n} \tag{7}$$

$$Terminal\ Value\ of\ Equity_n = \frac{FCFE_{n+1}}{Cost\ of\ Equity_{n+1} - g_n} \tag{8}$$

Lastly, one factor of criticism of the frameworks for a DCF-based valuation is the role played by the terminal value. In line with Damodaran (2002), critics of the approach argue that too great a proportion of the discounted cash flow value comes from the terminal value and that it is easy to manipulate the terminal value to yield a number that one may desire.

2.3 Returns Based Approach:

The present value models introduced so far do not indicate directly to investors the company´s performance. The economic concept of residual income, on the other hand, explicitly deducts the estimated cost of equity capital, the finance concept that measures shareholders opportunity costs, from net income and so, has been found to be more useful than some other major present value models of equity value in explaining stock prices.

2.3.1 Economic Value Added (EVA):

One example of several commercial implementations of the residual income is the concept of economic value added (EVA).

The economic value added (EVA) is a measure of the dollar surplus value created by an investment and, it is computed as the product of the capital invested and the excess return produced on that investment.

In line with Damodaran (2002), by comparing the return of an investment with its real costs, shareholder´s interests tend to be more addressed due to the computation of the value created with the new investment that, if positive, represents a good indicator a future payback.

Having three basic inputs, the return on capital earned on investments, the cost of capital for those investments, and the capital invested in them, the computation of EVA is defined as follows:

$$EVA = (ROIC - WACC) * Capital\ Invested \quad (9)$$

As can be withdrawn, the calculation of EVA is done through the difference between the return of the invested capital (ROIC) minus the cost of capital (WACC), multiplied by the invested capital. Thus, if ROIC is higher/lower than WACC, there is creation/destruction of economic value for the investor, generating a positive/negative EVA. In addition, EVA sends a clear message to managers as "(…) invest if, and only if, the increase in profits is enough to cover the cost of capital." (Allen et al, 2013:274).

Being the estimation of the capital invested and the cost of capital (WACC) crucial for the computation of EVA, Damodaran (2002) tells us that, firstly, for the invested capital it is best to estimate the market value of these assets (to what regards the best potential buyers) and cumulate this market value. Secondly, for the cost of capital, it should be estimated based on market values of debt and equity in the firm, rather than book value.

Damodaran (2002) also associates the enterprise value of the firm with the EVA model. According with the author, because EVA is a simple extension of the net present value rule, the value of a firm can be rewritten as follows:

$$Firm\ value = IC_{assets\ in\ place} + \sum_{t=1}^{t=\infty} \frac{EVA_{t,assets\ in\ place}}{(1+WACC)^t} + \sum_{t=1}^{t=\infty} \frac{EVA_{t,future\ projects}}{(1+WACC)^t} \quad (10)$$

, where the firm value comes from the invested capital (IC) in assets plus the present value of these same assets plus the value added by the future projects.

Wood, Nicholas (2012) has identified that EVA, like other financial performance measures, such as return on investment or divisional net income, is inadequate both for assessing a company´s progress in achieving its strategic goals and, in measuring divisional performance. It was also found the inappropriateness of EVA to certain industries, such as, high growth tech companies (technology and biotechnology sectors). Among other things, highlight: the strong positive correlation between EVA and share price movements, the failure of EVA to account for inflation and, its constant deviation from the generally accepted accounting practices (GAAP).

2.3.2 Market Value Added (MVA):

In line with McLeavey, D. et al (2002), over time, a firm must generate EVA to increase its market value. A related concept is market value added (MVA), defined as:

$$MVA = Market\ value\ of\ the\ company - Total\ capital \quad (11)$$

, where:

$$MVA = \sum_{t=1}^{t=\infty} \frac{EVA_{t,assets\ in\ place}}{(1+WACC)^t} + \sum_{t=1}^{t=\infty} \frac{EVA_{t,future\ projects}}{(1+WACC)^t} \quad (12)$$

As it can be perceived, a company that generates positive EVA should have a market value in excess of the accounting book value of its capital, meaning the summation of the capital returned will be greater than the cost of invested capital, during the period analysed.

2.4 Relative Valuation:

Since the value of most assets is derived from how similar assets are priced in the market, it becomes imperative to consider relative valuation.

Complementing the discounted cash flow valuation, in the logic of Goedhart, M. et al (2012), a thorough multiples analysis can be beneficial to the former, to the extent that, it checks the plausibility of cash flow forecasts, explains the mismatches between the firm´s performance and those of its rivals and, supports decision making by providing insights about which companies the market believes are better positioned for value creation.

By producing an immediate output and being of straightforward application, according to Lie et al (2002), relative valuation works as a facilitator for understanding other valuations. Finally, Damodaran (2002) tells us that, while most relative valuations are based on the pricing of comparable assets at the same time, there are some based on fundamentals.

Aligned with Goedhart, to carry out a useful analysis of comparable multiples, is necessary to keep in mind three requirements of using the right multiple, calculate it in a consistent manner and, finally, using the right peer group.

The first condition relates, for instance, to the fact that besides the price-to-earnings (P/E) ratio being commonly used for comparing valuation across companies, it is distorted by capital structure and nonoperating gains and losses, motivating the need of other multiple.

For the second condition, it is necessary to base the numerator (value) and denominator (earnings) on the same underlying assets. For example, if excess cash is excluded from value, it is also necessary to exclude interest income from earnings. Finally, the third condition states that it is necessary to define a set of industry peers and search for similar outlooks for long-term growth and return on invested capital (ROIC).

2.4.1 Peer Group:

As underlined previously, for a rigorous relative valuation, it is necessary to select a well-defined peer group. The rationale implied, according with Damodaran (2002) is one that, by examining the firm´s competitors or peer group, it is possible to establish a comparison between them, by ensuring that all share similar characteristics in terms of risk, growth, and cash flows. For Koller et al. (2005), the peer group must also share, in the long run, a similar growth level and return on invested capital (ROIC).

Aligned with Goedhart, M. et al (2012) to define the correct peer group and increase the accuracy of the valuation, it is necessary to select firms which, within the same industry, share similar underlying characteristics. These concern, at micro level, the production methodology,

the distribution channels and research and development, while at macro level, a relatable macro-economic environment.

After an appropriate peer group is defined, differences in multiples will be explained by differences in companies' performances or an earnings estimate that is based on unrepresentative performance.

The main downside of the selection of a peer group, relies on both the concern regarding conceptual definition, as well as the difficulty of finding comparable firms, as each company is unique.

2.4.2 Multiples:

Among the most used valuation tools are price multiples. According with Goedhart, M. et al (2012), price multiples are ratios of a stock´s market price to measure the value per share.

As valuation indicators (measures or indicators of value), price multiples have the appealing qualities of simplicity in use and ease in communication. Summarizing in a single number the valuation relationship between a stock's price and a familiar quantity such as earnings, sales, or book value per share, valuation using multiples can be accessed from two perspectives.

First, one may use the method of comparables, which involves comparing a stock´s multiple to a standard of comparison, where the law of one price must be met, that is, similar stocks should sell at similar prices.

On the other hand, we can use the method based on forecasted fundamentals, which involves forecasting the stock´s fundamentals, rather than making comparisons with other stocks. Thus, the price multiple of an asset should be related to the prospective cash flows from holding it.

The major concern in this valuation method is understanding which multiple should be used and the choice of the ideal company, to enable the comparison.

In line with Goedhart, the most common multiples analysed are:

$$PER = \frac{Current\ Market\ Price}{Earnings\ per\ Share} \tag{13}$$

$$Enterprise\ Value\ Multiples = \frac{EV}{EBITDA\ or\ Sales\ or\ EBIT\ or\ Capital} \tag{14}$$

$$Price\ to\ Cash\ Flow = \frac{Share\ Price}{Cash\ Flow\ per\ Share} \tag{15}$$

Notwithstanding the advantages of this approach, particularly to what regards both the requirement of fewer assumptions than DCF computation, the consequent simplicity implied and its easy understandability by all investors, it also has some drawbacks. These, relate for instance, with the misuse and manipulation, especially when performed by a biased optic or with the misstatements that the market can produce when valuing these firms, providing either an overvaluation or undervaluation.

Despite these limitations, Fernandez (2002) shows that multiples are particularly useful in a second phase of the valuation process as they enable to quantify, as well as identify differences with the comparable firms. Baker and Ruback (1999) even reinforce that, if a truly comparable publicly traded firm were available, the basis of substitutability could be determined and the multiple could be estimated reliably, the method of multiples would be preferable to DCF due to its implicit proprieties.

2.5 Option Pricing Theory:

Since the enterprise DCF approach does not consider the value of managerial flexibility, in the light of Goedhart, M. et al (2012), for situations where management is required to respond flexibly to a certain event, a contingent claim valuation becomes essential.

The purpose of conducting of such approach relies on the premise that "(…) the value of an asset may be greater than the present value of expected cash flows (…)" (Damodaran, 2002:20), if contingent on the occurrence or not, of certain scenario. Highlight that, the valuation of this flexibility mostly concerns decisions regarding for instance: the production, capacity investment, marketing, R&D, among others.

Related with the former, the two contingent valuation approaches within this methodology are the real-option valuation (ROV) and decision tree analysis (DTA), being the most common models the Black-Scholes Model and the Binomial Model, respectively.

In a first instance, the Black-Scholes model can be defined as follows:

$$d_1 = \frac{\ln\left(\frac{S}{K}\right) + \left(r + \frac{\sigma^2}{2}\right) * t}{\sigma\sqrt{t}}, where\ d_2 = d_1 - \sigma\sqrt{t} \quad (16)$$

At this step, the variables can be defined: S is the current value of the underlying asset; K is the strike price of the option; t is the option expiration life; r the risk-free interest rate; and, finally, σ^2 is the variance of the underlying asset.

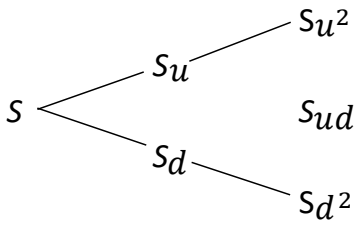


Figure 2: Binomial Model, Literature Review

, where: S is the current stock price. S moves up to Su with probability p and down with probability $1-p$.

Based on formal option-pricing models, the sophisticated ROV approach is not always the most appropriate when valuing flexibility. As a matter of fact, in line with Goedhart, M. et al (2012), the DTA methodology is proven to be more reliable than ROV when no trustworthy estimates on the value and variance of the cash flows underlying the investment decision can be withdrawn.

In concurrence with the above, albeit the DTA approach is one of simpler understanding and ROV is conceptually superior, the latter, will not be the "one size fits all" method as it still depends on having knowledge of the underlying assets, and thus, should be complemented with a DCF analysis. Lastly, stress that, compliant with Damodaran (2002), the product of the ROV approach has much more estimation error associated to it than other standards methods.

2.6 The cost of capital:

In line with Damodaran (2002), the $CF´s$ to the firm are discounted at the weighted average cost of capital to obtain the firm´s value, which, when reduced by the market value of outstanding debt, yields the value of equity. Otherwise, it is possible to use the cost of equity for projects only equity financed.

2.7 Weighted average cost of capital (WACC):

In the reasoning of the Pearl, J. et al (2009) WACC is a broadly accepted standard as a discount rate, to calculate the present value of a company´s projected FCF and TV.

It is also perceived as the opportunity cost of capital or what an investor would expect to earn in an alternative investment, with a similar risk profile. Companies with diverse business or market segments may have different costs of capital for their various businesses. In these instances, it is advisable to conduct a DCF using a sum of parts approach, in which a separate DCF analysis is performed for each distinct business segments, each with its own WACC.

The formula of WACC is the following:

$$WACC = \left(r_d * (1-t)\right) * \frac{D}{D+E} + r_e * \frac{E}{D+E} \quad (17)$$

, where: r_d is the cost of debt, r_e is the cost of equity, D is the market value of debt, E is the market of value of equity and t is the marginal tax rate.

It can be rewritten as follows:

	Debt		*Equity*
WACC=	*After-tax Cost of Debt * % of Debt in the Capital Structure*	*+*	*After-tax Cost of Debt * % of Debt in the Capital Structure*

Figure 3: WACC´s computation, Literature Review

Being the interest expense a tax-deductible component, the WACC will usually be lower than the expected return on a company assets.

Despite the simplicity of this method, in line with Luehrman (1997), WACC has never been that good at handling financial side effects as it only addresses tax effects only – and not very convincingly, except for simple capital structures.

2.8 Cost of equity:

In line with Pearl, J. et al (2009) the cost of equity is the required annual rate of return that investors expect to receive. Unlike the cost of debt, which can be deduced from a company´s outstanding maturities, a company´s cost of equity is not readily observable in the market.

To calculate the expected return on a company´s equity, a formula known as the capital asset pricing model (CAPM), further discussed in more detail. Hence:

$$Cost\ of\ Equity\ (r_e) = r_f + B_L * (r_m - r_f) \quad (18)$$

, where: r_f is the risk-free rate, B_L is the levered beta, r_m is the expected return on market and $(r_m - r_f)$ is the market risk premium.

2.9 Cost of debt:

In line with Pearl, J. et al (2009), a company´s cost of debt reflects its credit profile at the target capital structure which is based on a multitude of factors. Assuming the company is currently at its target capital structure, the cost of debt is generally derived from the blended yield on its outstanding debt instruments, which can include a mix of public and private debt.

In accordance with Damodaran (2002), the cost has the risk-free component plus the premium demanded by the investors to invest in a specific company:

$$k_d = R_f + Premium \quad (19)$$

Highlight that, 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 recent borrowing company's rates.

2.10 Capital Asset Pricing Model (CAPM):

The Capital Asset Pricing model (CAPM) postulates that the expected return on any security equals the risk-free rate plus the security´s beta times the risk-premium, as follows:

$$E(R_i) = r_f + B_i * [E(R_m) - r_f] \quad (20)$$

, where: $E(R_i)$ is the expected return of security i, r_f is the risk-free rate, B_i is the stock´s sensitivity to the market and $E(R_m)$ is the expected return of the market.

In line with Goedhart, M.et al (2012), defining the stock´s risks as its sensitivity to the stock market, the CAPM adjusts for company-specific risk using beta, which measures a stock´s co-movement with the market and represents to which a stock may diversify the investor´s portfolio.

According with Damodaran (2002), The CAPM assumes that there are no transaction costs, all assets are traded, and investments are infinitely divisible (i.e., an investor can buy any fraction of a unit of the asset). Besides this, it also assumes that everyone has access to the same information and therefore, investors cannot find under or overvalued assets in marketplace. By making these assumptions, it allows investors to keep diversifying with no additional cost.

3. The framework of EDPR

3.1 The Company

3.1.1 Company Description

Subsidiary of the Portuguese holding company Energias de Portugal (EDP), EDP Renováveis, S.A. (EDPR) is a world leader in the renewable energy sector, being currently, the third largest renewable energy company and the second largest wind energy operator in the world.

Created in 2007 to maintain and operate the growing renewable energy assets of the parent company Energias de Portugal (EDP), EDPR has been the driving force behind the group´s strategic objective of decarbonising the business and being entirely carbon neutral by 2030.

Listed on *Euronext Lisbon*, its internationalisation is affirmed by the worldwide development, construction and operation of wind farms and solar power plants.

With its headquarters in Madrid, Spain, the company operates in twenty-six markets and has subsidiaries across all regions on the globe, being EDPR Europe and EDPR North America the most representative.

Governed by the values of humanization, sustainability, and innovation, EDPR´s vision relies on leading the energy transition, by ensuring that its commitments (comprising the dimensions of sustainability, people, clients, and results) are integrated in the process of delivering superior value.

By assuming the social and environmental responsibilities that arise from its activity, the firm also thrives to fulfil the shareholder´s commitments, by ensuring outstanding standards of financial key performance indicators (KPI´s). Related with the former, the firm also endeavours to place its clients and its people at the very core, by displaying superb records in terms of customer-focused and process-focused KPI´s.

3.1.2 Business Description

As previously stated, the entity´s business is based on four fundamental phases: development, construction, operation and, finally, dismantling or repowering.

Regarding the first development phase, six conditions must be met to advance to the next stage of construction. At this point, specialists must search for sites with top-class wind conditions or irradiance resource, analyse the grid connection feasibility and install meteorogical equipment to collect and study the wind profile and the solar radiance. If the results obtained are positive, EDPR engages with local public authorities to secure the environmental construction, licenses, and other permits. Assuming the respective are complied with, the firm selects the best fit of

equipment model based on the site characteristics, to later, secure long-term contracts for energy sales to guarantee stable and predictable cash flows. Finally, it is necessary to find the appropriate financing for the project.

Secondly, in the construction phase, EDPR must ensure two conditions before moving on to the operation stage. Thus, at this juncture the firm must source for major equipment and construction contracts globally to, later, build access roads, prepare foundations, and assemble wind turbines or solar panels.

Thirdly, the Operation phase, denoted by the start of operations and the delivery of clean energy is also the stage where the company must meet three requirements. The first one, is keeping the availability figures at the highest level possible and minimise failure rates. The second is monitoring real-time operational data, while analysing performance and identifying opportunities for improvement. The final condition that EDPR must guarantee is mitigate market exposure and manage energy sales.

Finally, the fourth stage related with the dismantling or repowering is denoted by conditions related with either the end of life, or with efficiency. Regarding the dismantling, once wind farms or solar plants reach the end of their useful life (typically thirty to thirty-five years), both wind turbines and solar panels need to be assessed and replaced. On the other side, if repowering is the case, the firm typically increases power generated by reducing the overall number of wind turbines and replacing them with more efficient ones.

Further at this stage, the firm engages on a land restoration and treatment of waste generated strategy, to maximise the environmental positive impacts of wind and solar energy from a life cycle approach, when dismantling/repowering a site at the end of its useful life. Thereby, not only, EDPR commits to clean up and rehabilitate the sites, to return to the original state, but also, to recycle the waste produced, namely, turbines.

3.1.3 EDPR Main events in 2021

Notwithstanding the fact that EDPR publishes in its media numerous events that ultimately have repercussions on the entity´s share value, only the most significant will be detailed below. Thus, for the first semester of 2021, highlight: the agreement to acquire 85% of a distributed solar platform in the US; the presentation of EDPR´s strategic update 2021-2025 and the conclusion of a capital increase of around €1,5bn in EDPR. During the second semester of 2021 stress out: the announcement of an upsize to 80% stake of the 405 MW Asset rotation deal in the US, and the establishment of growth platform in APAC region through the Sunseap agreement.

3.1.4 2021 in review

Below, in agreement with EDPR`s 2021 Annual Report, the key operational, ESG and financial metrics are displayed.

2021 Key Metrics	
Operational	
Metric	Amount
Installed capacity	13.6 GW
Generation	30 TWh
New Additions	2584 MW
Technical Availability	96,5%
Load Factor	29%
Emissions avoided	18.3 mt CO2

2021 Key Metrics	
ESG	
Metric	Amount
Employees	2150
Total waste recovered	80%
Independent menbers of BoD committees	100%
Employees trained in digitalization	83%
Capacity certified: ISSO 14001 & ISSO 45001	100%
Social Investment and A2E	€7 m

Figure 4: EDPR´s Key Operational and ESG Metrics in 2021

2021 Key Metrics		
Financial		
Metric	Amount	YoY (%)
EBITDA	€1760 m	6,35%
CAPEX	€2522 m	20,09%
Net Income	€655 m	17,80%
Operating CF	€1171 m	3%
Net Debt	€2.9 Bn	-14,70%
Core OPEX/average MW	€43 k/MW	5%

Figure 5: EDPR´s Key Financial Metrics in 2021

3.1.5 Share Performance

At the present, EDPR has an estimate of 960,6 million shares listed and admitted to trading in NYSE Euronext Lisbon, following the successful share capital increase concluded on April.

On 31st December of 2021, EDPR had a market capitalization of €21B (above the €19.9B at previous year-end), equivalent to €21.90 per share. In accordance with EDPR`s 2021 Annual Report, considering the dividend paid on April 16th of €0.08 per share, in 2021, the total shareholder return was (-3%).

In addition, from 2018 to 2021, the performance of EDPR is detailed below.

EDPR in Capital Markets	2021	2020	2019	2018
Closing Price (€) (adjusted for dividends and splits)	21,9	22,8	10,42	7,78
Market Capitalisation (€ M)	21 036	19 889	9 089	6 782
Share Price Performance	-4%	119%	34%	12%
PSI 20	14%	-6%	10%	-12%
Dow Jones Eurostoxx Utilities	4%	10%	22%	0%

Figure 6: EDPR´s performance in Capital Markets between 2018 and 2021

3.1.6 Governance Model

EDPR is a Spanish company listed on a regulated stock exchange in Portugal. Therefore, although the regulation of its corporate organisation is subject to the Spanish law, the firm also tries to comply, in the extent possible, with the Portuguese recommendations contained on the corporate governance code of the "*Instituto Português de Corporate Governance*" (IPCG).

Considering the surrounding regulatory framework, the governance model of the firm was designed to ensure a transparent separation of duties and a rigorous management, while providing a specialisation in the supervision functions.

Below, as of December 31st, 2021, both the name and position of the governance members are described.

BoD	
Name	*Position*
António Gomes Mota	*Chairperson and Independent Director*
Miguel Stilwell d´ Andrade	*Executive Vice-Chairman and re-elected as CEO*
Rui Teixeira	*Re-elected as Executive Director and CFO*
Vera Pinto Pereira and Ana Paulo Marques	*Re-elected as Dominical Directors*
Miguel Setas	*Appointed as Dominical Director*
Manuel Menéndez	*Re-elected as External Director*
Acácio Piloto, Allan j. Karz and Joan Avalyn Dempsey	*Re-elected as Independent Directors*
José Félix Morgado, Rosa García	*Independent Directors*
Executive Directors	
Name	*Position*
Miguel Stilwell d´Andrade (CEO)	*Executive Directos / Joint Directors*
Rui Teixeira (CFO)	
Delegated Comitees of the BoD	
Name	*Position*
Acácio Piloto (Chairperson)	*Audit, Control, and Related Party Transactions Comittee*
Rosa García	
José Félix Morgado	
António Gomes Mota (Chairperson)	*Appointements, Remunerations and Coroporate Governance Comittee*
Rosa García	
José Félix Morgado	
Management Team	
Name (Position)	
Miguel Stilwell d´Andrade (CEO)	
Rui Teixeira (CFO)	
Duarte Bello (COO Europe & LatAm)	
Sandhya Ganapathy (COO North America)	
Pedro Vasconcelos (COO APAC)	
Bautista Rodríguez (CTO & Business Offshore)	

Figure 7: EDPR´s Governance Members as of December 31st, 2021

Characterized by a solid ESG foundation, EDPR´s governance is based on a board composed of 12 members with a varied professional track record, and diverse in nationalities, with 50% of independent Directors (including the Chairman) and 33% women representation.

3.2 Macroeconomic Framework

This chapter aims to provide the reader with macroeconomic and financial illustrative data about the past, current, and forecasted periods. Relying in general economic and financial indicators, the purpose is to present the macro environment, where EDPR operates.

As can be seen in the annex 1, the global economy entered 2022 in a weaker position than previously expected in 2021, as the new omicron COVID-19 variant spread, and countries had to reimpose mobility restrictions. With implications on rising energy prices and supply disruptions, these factors resulted in higher and more broad-based inflation, mainly in the US and on many emerging markets. Also limiting worldwide growth prospects, emphasize the retrenchment of China´s real estate sector.

Already in 2022, on 24th February, the war in Ukraine has triggered not only a humanitarian crisis, but also arising economic damages that have ultimately, contributed to a more significant slowdown in global growth and higher-than-expected inflation, with fuel and food prices exhibiting a rapid increase, hitting vulnerable populations in low-income countries hardest.

As a result, global output contracted in the second quarter of this year. Several shocks have hit a world economy already weakened by the pandemic: higher-than-expected inflation worldwide, especially in the United States and on major European economies; triggering tighter financial conditions; a worse-than-anticipated slowdown in China, reflecting COVID-19 outbreaks and lockdowns; and further negative spillovers from the war in Ukraine.

The baseline forecast is for growth worldwide to slow from 6.1 percent last year to 3.2 percent in 2022. In terms of major economies, highlight: in the US, lower growth earlier this year, as well as reduced household purchasing power, and tighter monetary policy drove a downwards revision of 1.4 pp; in China, further lockdowns and the deepening real estate crisis have led growth to be revised down by 1.1 pp; and, in Europe, significant downgrades reflect spillovers from the war in Ukraine and tighter monetary police.

To what regards global inflation, it has been revised up, mainly due to the rise in food and energy prices as well lingering supply. However, in 2023, it is expected a disinflationary monetary policy, with global output growing by just 2.9%.

In general, the risks to the outlook are overwhelmingly pessimist. A plausible alternative scenario in which further risks materialize, inflation rises further, and global growth declines to about 2.6 % and 2.0% in 2022 and 2023, respectively, would put growth in the bottom 10% of outcomes since 1970.

With increasing prices continuing to squeeze living standards worldwide, tighter monetary policy will inevitably have real economic costs. Targeted fiscal support can help cushion the impact on the most vulnerable, but with government budgets already stretched by the

pandemic and the need for a disinflationary overall macroeconomic basis, such policies will need to be offset by increased taxes or lower government spending.

Tighter monetary conditions will also affect financial stability, requiring judicious use of macroprudential tools and making reforms to debt resolution framework more necessary. Policies to address specific impacts on energy and food prices should focus on those most affected without distorting prices. Finally, mitigating climate change continues to require urgent multilateral to limit emissions and raise investments to hasten the green transition.

3.3 Industry Framework

Despite some challenges still exist, the year of 2022 promises new growth paths for the renewable energy industry.

In 2021, the renewable energy industry remained remarkably resilient as rapid technologies improvements and decreasing costs of renewable energy resources, along with the increased competitiveness of battery storage, have made renewables one of the most competitive energy sources. Despite suffering from supply chain constraints, increased shipping costs, and rising prices for key commodities, capacity installations remained at an all-time high, with wind and solar capacity additions of 13.8 GW in the first eight months of 2021 were up 28% over the same period in 2020.

Renewable energy growth is poised to accelerate in 2022, as concern for climate change and support from environmental, social and governance (ESG) considerations grow and demand for cleaner energy sources from most market segments accelerates. At the same time, the Biden administration´s vision to fully decarbonize the US economy is helping spur activity in the renewable sector that will likely drive further growth.

The five trends expected to move to the forefront in 2022, opening avenues in the renewable energy growth story are the following:

Firstly, the appearance of new technologies. Renewable energy industry stakeholders are considering investing in new technologies, to integrate variable renewables such as wind and solar into the electric grid. Private investments, and pilot projects, combined with federal research support can help expedite the commercialization of emerging technologies such as green hydrogen, advanced batteries, and other forms of long-duration storage.

These technologies can provide zero-carbon electricity and longer-term seasonal electricity storage, ease grid congestion, among others.

Secondly, the appearance of new business models. After an 85% cost decline over the past decade, solar photovoltaic (PV) systems are among the most cost-competitive energy resources in the market.

Thirdly, the infrastructure development is becoming a key priority, especially for offshore wind. Transmission development, which is key for connecting new, often remotely located renewable energy capacity to electricity consuming center, is expected to be an important part of the renewable energy industry´s agenda, since about 844 GW of proposed capacity (90% of which is renewables or energy storage) is stuck in transmission interconnection queues.

Fourthly, supply chains strategies continue to evolve. The renewable energy industry is likely to continue to evolve supply chains, as profits have suffered recently amid logistics-related costs pressures and US-China trade tensions.

Finally, the circular economy is critical for the sustainable growth in the renewable energy industry. In 2022, end-of-life (EoL) management strategies for renewable energy industry products and materials can contribute to increase sustainability credentials and provide additional financial value.

3.4 Strategic Approach

3.4.1 The road to the 1.5 Celsius degrees

The United Nations Conference of Parties met in Glasgow from October 31st to November 12th for its 26th annual summit (*COP 26*). The product of this agreement resulted in the *Glasgow Climate Pact*, that, if implemented, would make substantial progress to limit the temperature increase to 1.5Cº, defined on the Paris Agreement.

Assuming special importance nowadays, when numerous regions around the globe experienced record temperatures with deadly heat, large wildfires with catastrophic consequences, and extreme rainfall that triggered deadly floods, the German reinsurance *Munich Re* published a report which concluded that, solely in 2021, the cost of climate disasters amounted to $280 B.

Despite this, the implementation of national net zero emissions commitments can play a crucial role in achieving the Paris Agreement 1.5ºC target. As a result, an increasingly number of countries are announcing pledges to achieve net-zero carbon emissions over the coming decades, including for instance, the European Union, the US, and Brazil in 2050, China in 2060 and India in 2070.

Regarding the EU, the *European Green Deal*, and the *Fit for 55*, both articulated by the European Comission, have been the driving force behind the implementation of the Paris Agreement 1.5ºC

target in 2050. For the accomplishment of this target *Wind Europe* supported a 40% RE target and calculated that the EU will need around 433-452 GW of wind power capacity by 2030.

3.4.2 Renewable Energy is the future

In line with the International Energy Agency (IEA), 2021 registered a global record for renewable energy growth. With 290 GW of additional capacity added, solar remained the major contributor with around 160 GW, more than half of all additions.

Wind and solar PV capacity are also on track to overtake natural gas in 2023, and coal in 2024, becoming the largest source of electricity generation worldwide in 2025. According to the different analysts, in 2025, the share of renewables in power generation will range between 38% and 54% (comparing to 29% in 2020).

These projections are supported by RE cost competitiveness (onshore and PV are already the cheapest technologies), technologies improvements, economies of scale, competitive supply chains, among others. Recent developments are also expected to accelerate renewables´ growth, such as: the green hydrogen momentum and the increasing capacity of battery storage.

3.4.3 Renewables and its evolution worldwide in 2021

The core business of EDPR covers the following areas of electrical production: onshore, offshore, and solar.

Firstly, regarding the onshore projects, EDPR is the world's third largest producer of wind energy, counting on more than 270 wind farms at 25 international locations. Onshore wind farms are infrastructures that produce energy through wind generated at onshore locations.

The firm develops, builds, and operates onshore wind farms that can transform the kinetic energy of wind into electricity. Later, it distributes the electricity generated to the distribution grid. Being, currently one of the cheapest renewable energy sources, this type of energy has dominated the traditional market.

Secondly, in terms of offshore wind farms, developing projects in the US, UK, France, Portugal, Poland, and South Korea, EDPR is currently a world leader in offshore wind energy technology. A floating wind farm is a collection of wind turbines that are installed on structures at sea, allowing them to harness wind resources and generate electricity in places where the water is too deep for fixed foundation turbines.

In 2021, EDPR´s global wind additions (with respect to onshore and offshore) remained vigorous, with around 81-93 GW of new capacity added. Despite of the slightly drop from the record-

breaking installations observed in 2020 (93 GW), the figures were considerably above the average of the last five years.

Thirdly, being solar energy one of the cleanest and most abundant renewable energy source available, EDPR has been making efforts to increase the growth of its solar PV technology. The US is the main market for this growth, where the technology is primarily driven by the Investment Tax Credit scheme.

Related with the former, 2021 is on course to break a global record for solar PV growth. According to the International Energy Agency (IEA), nearly 160 GW of new solar facilities have been connected, despite upward commodity prices and supply chain disruptions.

3.4.4 Regulatory framework

The *Renewable Energy Directive* is the legal framework for the development of RE across all sectors of the EU´s economy. Its sets a common target, currently at 32%, for RE in the EU´s energy consumption by 2030. To support this achievement, the directive establishes common principles and rules to remove barriers, stimulate investments and drive cost reductions in RE techniques, while empowering society to participate in the clean energy transformation.

In July 2021, the European Comission proposed a revision of the directive with an increased 40% target, as part of the package to deliver on the European Green Deal. Within *Repower EU* plan (elaborated in response to the hardships and global energy market disruption caused by Russia´s invasion of Ukraine, published on 18 May 2022) the Comission proposed to further increase this target to 45% by 2030, as can be withdrawn by the figure below.

Besides of introducing new measures to complement the already existing building blocks established by the 2009 and 2018 directives, the proposed revision of the directive, alongside with the rest of legislation proposed after, presents a roadmap to make the EU´s economy more sustainable.

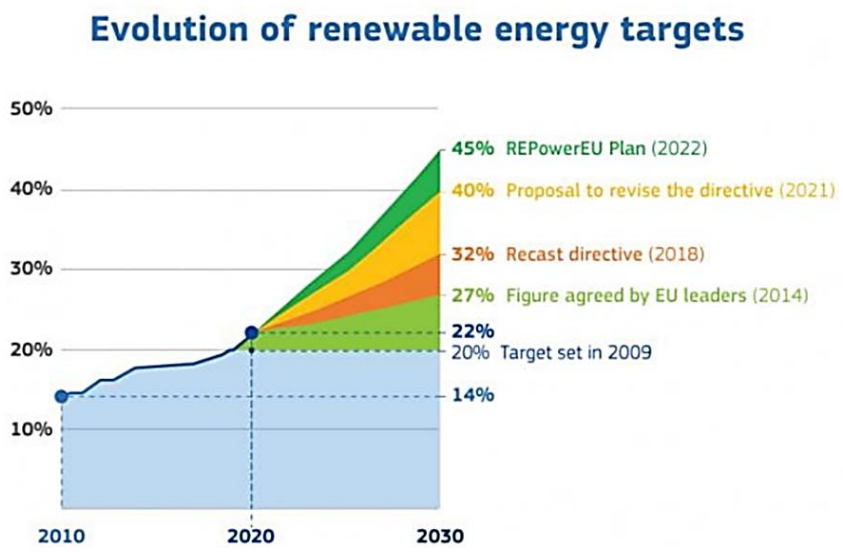


Figure 8: Evolution of renewable energy targets. Source: European Comission

Covering all sectors of the economy, the current *Renewable Energy Directive 2018/2001/EU* entered into force in December 2018, as part of the package *of Clean Energy for all Europeans*. The directive established a new binding renewable energy target for the EU for 2030 of at least 32%, with a clause for a possible upwards revision by 2023. To assist EU countries, deliver on this target, the directive introduced new measures for various sectors of the economy, particularly on heating, cooling and transport, where progress has been historically slower.

Even though the *Renewable Energy Directive* is the legal framework for the development of renewable energy and is currently aligned with the EU´s increased climate ambition, there are also country-specific regulatory frameworks which have not yet been addressed, such as:

- Portugal: Wind farms commissioned before 2006 are subject to a Feed-in-tariff (FiT) whose value is correlated with production and indexed to CPI.
- France: Older wind farms receive feed-in tariffs for 15 years, with values depending on their load factors achieved. Also emphasize, the approval of the *Law for Energy and Climate* committing the country to carbon neutrality before 2050 and anticipating the reduction in fossil fuel consumption by 40% before 2030.
- UK: Since 2013, renewables are supported through a 15-year Contracts-for-difference, awarded through auctions, that have progressively replaced the former Green Certificate scheme.
- USA: Sales can be fixed under Power Purchase Agreements (PPA), typically with 15 to 25 years, hedges, or subject to spot market prices. Green certificates (Renewable Energy Credits) are subject to each state regulation and tax incentives. Highlight that, the major

key changes were produced by the shift in US Presidency and Senate, which reduced support for fossil interests and improved support for renewables.

3.4.5 Strategy

To meet the requirements of an electrified world, it is necessary to ensure a clean, affordable, and reliable energy sector at the center of the economy.

Based on a strategy centred on three pillars: growth, value, and excellence, the main strategic objectives of EDPR´s business plan through the 2021-2025 period is to attain the following targets, developed in the figure below.

Strategic objectives of EDPR´s Business Plan (2021-2025)		
Metric	*Purpose*	*Target*
Capacity Build-Out (MW)	*New capacity being technology & geographical diversified*	*20GW (>2x from 2020)*
Asset Rotation	*Less capital intensive, generating extra value without increasing capital employed*	*€8 bn (Proceeds)*
Ebitda	*Excel at Operational Results, from capacity additions, operating efficiency and sell-down strategy*	*´+7% (CAGR 2020-2025)*
Net Profit	*Unlocking bottom-line growth, from recurrent capital gains, controlled cost of debt and solid balance sheet*	*´+8% (CAGR 2020-2025)*
Core Opex/MW	*Promote excellence in operations, maintaining cost control through excellence and quality teams*	*´-2% (CAGR 2020-2025)*

Figure 9: Strategic objectives of EDPR´s Business Plan (2021-2025)

3.4.5.1 Growth

With new projects having long-term PPAs or CfDs secured through long-term contracts, EDPR plans to double its installed capacity and add 20 GW for the 2021-2025 period and diversify its portfolio even more in geographical and technological terms.

The geographical distribution of the 20 GW will translate to 45% in North America, 35% in Europe, 15% in Latin America and 5% in other geographies, such as Asia-Pacific, while the technological distribution, will result in 45% additions on wind onshore, 40% in solar PV, 7% in solar DG, 5% in wind offshore and 3% in storage.

In this perspective, being the US, Canada, and Mexico EDPR´s main growth market driven essentially by PPAs secured, these locations will account for 45% of the total 20 GW targeted capacity addition., where 36% of such target is already secured. In Europe, the main objective of the firm is to focus on low-risk regulatory frameworks and plans to add 6.7 GW, of which, has already secured 3 GW related to wind onshore and solar PV. To what concerns Latin America,

the firm´s main concern is to secure projects with long-term PPAs for the region, to represent 15% of the total capacity to be added in the 2021-2025 period.

New geographies will represent 5% of EDPR 2021-2025 growth. The firm managed to secure 50% of such target with the agreement to acquire Sunseap, a solar focused platform based in Singapore.

Finally, to what concerns investing in offshore wind technology, in 2019, a Joint Venture was announced by EDPR and ENGIE. Both firms will combine their offshore wind assets and project pipeline.

3.4.5.2 Value

EDPR´s ongoing Asset rotation model has been a fundamental point in EDPR´s strategy.

Relying on a combination of the cash generated from operating assets and the firm´s strategy off selling majority stakes in projects in operation or under development, alongside with the US Tax Equity structure to finance the profitable growth of the business, this model has been allowing the firm to generate cash flows upfront, while recycling capital to reinvest in other projects and create value by reinvesting the proceeds in accretive growth.

It also provides the option to operate and maintain services, while making visible the value creation on reported financial statements, with capital gains being booked in the income statement. The figure below illustrates the details of this strategy, implicit on EDPR´s Business Plan (2021-2025).

EDPR´s Asset Rotation Model (2021 - 2025)	
Metric	*Amount*
Gross Investments	*€19 bn*
Asset rotation proceeds	*€8 bn*
Net investments	*11 bn*

Figure 10: Projected Results of EDPR´s Asset Rotation Model

3.4.5.3 Excellence

Contributing to the consolidation of EDPR´s performance, the firm has been assuming strong commitment towards its ESG targets, mainly through the development of competitive projects, the construction on time and on budget, and the excellence in asset management.

Characterized by its unique operation and management (O&M) strategy, EDPR leverages on its local development knowledge and multi-partnership to develop competitive projects. In turn, this allows the firm to increase its internalization post-warranty, resulting in service price reductions. During the 2021-2025 Business Plan, the firm is committed to reduce its Core Opex/avg. MW by -2% CAGR.

Detailed below, are the ESG targets implied in the entity´s 2021-2025 Business Plan.

EDPR´s ESG target´s throughout the value chain	
Metric	Amount
Biodiversity high risk facilities with action plans	100%
Social & Acess to Energy (A2E) investment	€35m
Waste recovered along the whole value chain	>85%
Sustainable purchases	>75%
Health & Safety accidents mindset	Zero
Facilities certified by ISSO 14001 & ISSO 45001	100%

Figure 11: EDPR´s ESG targets implied in the 2021-2025 Business Plan

3.4.6 Risk Management

Risk management at EDPR is focused on covering all risks that may affect its activity and performance. Below, classified in five categories, each risk is categorized in risk group and some examples of mitigations strategies are presented.

Risk map at EDP Renewables (Reviewed policies or procedures in 2021)		
Risk Categories	Risk Groups	Mitigation Strategies
Market Risk *: Resulting from movements in market prices. Market risks are changes in energy prices, energy production risk, interest rates, foreign exchange rates and other commodity prices.*	*Energy price and production risks; Commodity price risk; Liquidity and Inflation risk; and Exchange rate and Interest rate risk.*	*Hedge of market exposures through long term PPA´s or short- and medium-term financial contracts; Natural FX hedging (with debt and revenues in the same currency); Execution of interest rate and inflation hedging.*
Counterparty Risk: *Resulting from either a counterparty to a transaction defaulting before final settlement, or not complying with its contract obligation.*	*Counterparty credit risk; Counterparty operational risk.*	*Counterparty exposure limits by counterparty and at EDPR level; Collateral requirement if limits are exceeded; Monitoring of compliance with internal policy.*
Operation Risk: *Risk of loss resulting from inadequate or failed internal processes, people, and systems or from external events. These may include an increase in equipment default rates, increasing O&M, or natural disasters.*	*Development risk; Legal claims and execution risk; Personnel and operation risk; and Process and information technologies risk.*	*Supervision of suppliers by EPDR´s engineering team; Flexible COD in PPAs to avoid penalties; Monitor recurrent operational risks during construction and; Attractive remuneration packages.*
Business Risk: *Resulting from potential losses in the Company´s earnings due to adverse changes in business margins. Can result, from a serious increase in equipment prices or changes in the regulatory environment.*	*Regulatory risk; Equipment price and supply risk.*	*Selection of energy markets based on country risk and energy market fundamentals; Diversification in markets and remuneration schemes; Diversification in technologies; and Follow-up of regulation changes.*
Strategic Risk: *Resulting from macroeconomic, political, social, or environmental situation in countries where EDPR is present.*	*Competitive landscape risk; Technology disruptions risk; Reputational risk; and Meteorogical changes risk.*	*Careful selection of countries; Worst case profitability analysis of every new investment considering all risk factors; Profitability resilience metrics;*

Figure 12: EDPR´s Risk Map (Reviewed Policies or Procedures in 2021)

3.4.6.1 Risk analysis highlights during the 2021 fiscal year

Both the increase in energy and commodity prices were two risk factors in 2021, that require additional analysis to assess whether EDPR has a balanced market position.

Firstly, regarding the rise in energy prices, EDPR had no benefit for the general increase in energy prices during 2021, as merchant energy was already sold at fixed prices. Therefore, given 2021

market evolution, EDPR reassessed the optimal hedged position to account for this asymmetry and adjusted the position within 2021 and in future years.

Secondly, to what regards the increase in commodity prices, metals and fuel prices significantly increased during 2021, implying an unexpected increase in CAPEX. Despite of most of the projects approved at EDPR have a PPA at a fixed price and had already the CAPEX secured, EDPR Global Risk defined the methodology for a potential execution of a commodity price hedge in those projects, where CAPEX is not secured at the time of PPA signing.

Regarding the above, in 2021, EDPR also tested the possibility of using weather derivatives to hedge volatility of wind production at a portfolio level, to hedge production volumes.

3.4.6.2 EDPR ESG Risks

The commitment to foster a sustainable development has been one of the core values of EDPR´s strategic agenda. Defined by a business model operated with the highest ESG standards, EDPR has identified five potential risk factors, which may compromise the former. Among which, highlight the following: environmental risk, human resources risk, health and safety risk, human rights risk and, finally, corruption and fraud risk.

Firstly, regarding the environmental risk, EDPR seeks to prevent and compensate potential impacts of its activities through a set of commitments that ensure the implementation of an effective Environmental Management System (EMS), following the reference provided by the international standards ISO 14001:2015 and ISO 45001:2018.

Secondly, to what concerns the human resources risk, for EPDR it is a top priority to promote fair labour practices, by integrating the human capital aspects in decision-making and optimising employment policies and labour practices.

Thirdly, regarding the commitments towards health and safety risks, the firm addresses it through the Health & Safety Management System, following the reference provided by the international standards ISO 14001:2015 and ISO 45001:2018.

Fourthly to what concerns the human rights risk, EDPR has committed, through its Code of Ethics, to respect and undertake to promote Human Rights internally, in its suppliers, customers and local communities, following the Universal Declaration of Human Rights.

Finally, the corruption and fraud risk are mainly dealt with, throughout the implementation of the Code of Ethics, the Integrity Policy, and the Global Compliance Program.

To conclude, the quantification of the financial impact on the company´s performance of these five ESG risk factors is included within the Operational Risk analysis and the firm frequently evaluates its economic impact, following the guidelines of Basel III.

Including the mitigation of each individual operational risk, the firm´s analysis considers the present and future relevance of these risks, as well as historical data of their impact, withheld of department heads.

During 2021, the economic valuation of Operational Risk at EDPR was reassessed and none of the five ESG risk factors had a material financial impact on the Company´s performance.

3.4.6.3 Emerging Risks at EDPR

The two main emerging risks that EDPR faces are the changes in weather resources patterns at a global level caused by climate change, and the adjustment of the wholesale market design in Europe and North America to current market conditions.

To what concerns the first risk, academic papers have been published regarding how weather patterns have changed in recent years due to global warming. In generic terms, this implies that some regions will have weaker resources in the future, leading to drops in expected energy production, while some others will be experiencing an increase in energy production.

To mitigate this wind and solar energy production risk, the firm only considers the stressed scenario changes in forecasted energy production, when evaluating a new investment. In addition, the geographical diversification of EDPR portfolio also mitigates this potential risk.

On a second note, there is uncertainty around the evolution of the wholesale market design in different geographies, given the current market conditions.

Examples of the challenges imposed are, for instance: the marginal remuneration system is not adjusted to the current context of growing of fixed cost technologies; there are a growing number of technologies with zero marginal cost, which will obviously reduce prices, at the expense of increased price´s volatility; and the intermittency in generation creates and will continue to create uncertainty in electricity generation.

The adoption of distributed generation in combination with Solar PV, storage, or batteries, might also lead to changes in terms of reduction of demand for centralized generation. This relates with the increase in household self-consumption, which leads to a decrease in prices and changes the dynamics of energy flows in the grid.

To conclude, the former points presented enhance the current uncertainty around the returns of the generation. Moreover, this implies that the volatility in the market is not suitable nor compatible for long-term investments necessary to the modernization, decarbonization and security of energy supply.

3.5 Major Players in the RE industry

Name	Country	Last in €	weight
BALLARD PWR SYS	CA	7,83	0,97%
BORALEX INC.A	CA	34,9	2,11%
CANADIAN SOLAR INC.	CA	35,145	0,94%
CERES POWER HLDGS LS-10	GB	6,885	0,46%
CHIN.LONGYUAN PWR G.H YC1	CN	1,5695	3,97%
DAQO NEW ENERGY CRP.ADR 5	KY	64,8	3,01%
EDP RENOVAVEIS EO 5	ES	24,83	3,43%
ENCAVIS AG INH. O. N	DE	21,01	1,39%
ENPHASE ENERGY INC.DL-, 01	US	267,95	10%
FIRST SOLAR INC. D-4, 001	US	87,83	3,94%
FUELCELL ENERGY DL-, 0001	US	3,693	0,82%
INNERGEX RENEWABLE ENERGY	CA	14,62	1,28%
ITM POWER PLC LS-, 05	GB	2,586	0,58%
JINKOSOLAR ADR/4 DL-00002	KY	62,35	2,11%
NEOEN S.A.EO 2	FR	42,33	1,02%
NORDEX SE O.N	DE	9,634	0,57%
ORMAT TECHNOLOG. DL-, 001	US	82,06	1,38%
ORSTED A/S DK 10	DK	114,18	10%
PLUG POWER INC. DL-, 01	US	21,015	5,45%
SCATEC ASA NK -, 02	NO	10,92	0,57%
SIEMENS GAMESA R.E.EO-, 17	ES	17,77	2,65%
SOLAREDGE TECHN. DL-,0001	US	336,95	9,36%
SUNNOVA ENERGY INT.-, 0001	US	21,995	1,18%
SUNPOWER CORP. DL -, 01	US	19,342	0,61%
SUNRUN INC. DL-, 0001	US	28,5	2,98%
TESLA INC. DL -, 001	US	823,1	10%
VERBUND AD INH.A	AT	109,5	4,03%
VESTAS WIND SYS.DK -, 20	DK	24,8	10%
XINJIANG GOLDW.SC. + T.H	CN	1,7075	0,92%
XINYI SOLAR HLDGS	KY	1,59	4,27%

Figure 13: Renewable Energy Industrial Index (RENIXX) by market capitalization (01/07/2022)

The above table displays the RENIXX (Renewable Energy industrial Index). It is the world´s first global stock index for the renewable-energy industry, and was designed by IWR, a renewable energy institute in 2005-2006. The global RENIXX World Stock Index is composed of 30 joint-stock companies, with the highest market capitalization from the renewable energy industry, where one can observe the clear dominance of Canada.

3.6 Financial Capital

3.6.1 Operational Performance

Since 2008, EDPR has more than tripled its capacity, resulting in a total installed capacity of 13,580 MW (EBITDA + Equity MW). As of the end of 2021, EDPR had 5,727 MW installed in Europe, 7,030 MW in North America, 795 MW in Latin America and 28 MW in APAC.

The year of 2021 was also characterized by installations concentrated in North America, as well as the entry in Vietnam, that marked EDPR entry in the APAC region. In this region, a total of 2,854 MW was added, without including the 401 MW of solar installed capacity that Sunseap had in operation.

In this vein, EDPR added 1,769 MW of wind onshore, corresponding to 682 MW in Europe, 932 MW in North America and 156 MW in Brazil, Latin America. In terms of solar, 272 MW were added in the US, 204 MW in Brazil, and 28 MW in Vietnam. Regarding the offshore technology, EDPR added 311 MW of wind capacity through Ocean Winds, in Europe.

Describing the above:

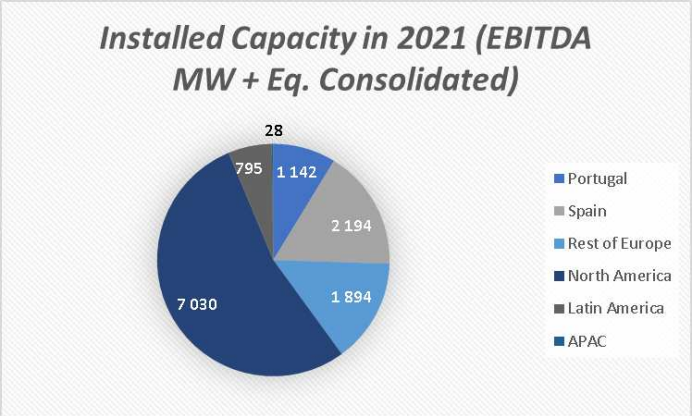


Figure 14: Installed Capacity in 2021 (EBITDA MW + Eq. Consolidated)

Pursuing its Asset rotation strategy, solely in the US and in Portugal, EDPR successfully concluded several Asset rotations deals, among which: a 100% stake in a 302 MW wind project, an 80% stake in a 405 MW wind portfolio, an 80% stake in a 200 MWac solar project. and an 100% stake in a 211 MW wind portfolio.

In the area of electricity generated, EDPR produced 30.3 TWh (+6% YoY) of clean energy in 2021, more than offsetting the execution implied in the firm´s asset rotation strategy, as can be withdrawn from the figure below.

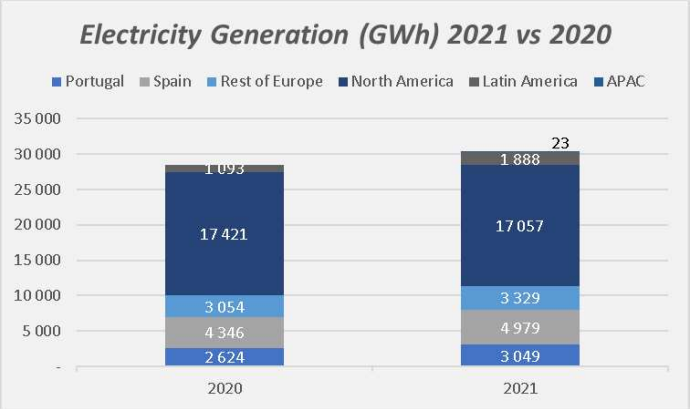


Figure 15: Comparison of Electricity Generation (GWh) between 2021 and 2020

3.6.2 Financial Performance

Firstly, concerning the Income Statement, in 2021, Revenues totalled €1,758 million (+2% YoY), supported by, not only a higher average selling price of electricity, but also a larger installed capacity. Other operating income amounted to €636 million (+27.5% YoY), related to sell-down transactions closed by the end of the year and with offshore transactions, namely the stakes sold to the Offshore JV with Engie. Operating Costs (Opex) totalled €675 million (+19% YoY), EBITDA summed €1,760 million (+6.35% YoY) and EBIT amounted to €1,151 million (+9.29% YoY). On the other hand, Net Financial Expenses decreased to €249 million (-13% YoY), impacted by forex. At the bottom line, Net Profit summed €655 million (+17.8% YoY), mainly driven by the successful execution of sell-down strategies and non-controlling interests (in 2021 totalled €154 million, increasing by €27 million YoY), because of better performance.

Secondly, to what concerns the Balance Sheet, in 2021, total equity reached a value of €10.2 billion, of which €1,710 million are attributable to reserves and retained earnings. Equity attributable to EDPR shareholders increased €100 million YoY, mainly explained by the capital increase of €1,488 million and the increase in both Net Profit and exchange rate effects.

Total liabilities amounted to €11.9 billion (+ €2,318 million YoY), explained by the increase in Institutional partnerships, financial, deferred tax liabilities, rents due from lease contracts, provisions, and other liabilities. Liabilities were also mainly composed of financial debt, liabilities related to institutional partnerships in the US and accounts payable.

As total assets summed €22 billion in December 2021, the equity ratio of EDPR reached 46%. Assets were 66% composed of PP&E representing €14.6 billion (+€1,071 million versus 2020). In detail, it included +€2.5 billion of Capex investments, -€0.6 billion of depreciation charges along with positive exchange differences of +0.7 billion, and -€1.6 billion coming from sale and others.

Finally, to what regards the Cash flow statement and Net debt, in 2021, the firm generated Operating Cash-flow of €1,171 million (+29%YoY), explained by better top line performance. Net

Debt totalled €2,935 million (-17.3% YoY) reflecting the assets cash generated, the capital increase, other investments in the period, and forex translation.

3.7 EDP Green Finance Framework

Green bonds are debt instruments which, like traditional bonds, grant the holder a credit right vis-à-vis the issuing entity. The particularity of this type of bond, is that the subscribed capital must be invested in projects or assets related to sustainable development. Typical projects financed with green bonds include renewable energy, clean energy, energy efficiency, water efficiency, sustainability, circular economy, biodiversity, pollution control, among others.

The advantage of suing green bonds is that the premium to be paid is lower compared to normal bonds. The term "greenium" (a combination of green and premium) is coined to justify the raising of funds through financial securities with better conditions, that is more attractive rates, when compared to a traditional operation, as can be observed from the figure below.

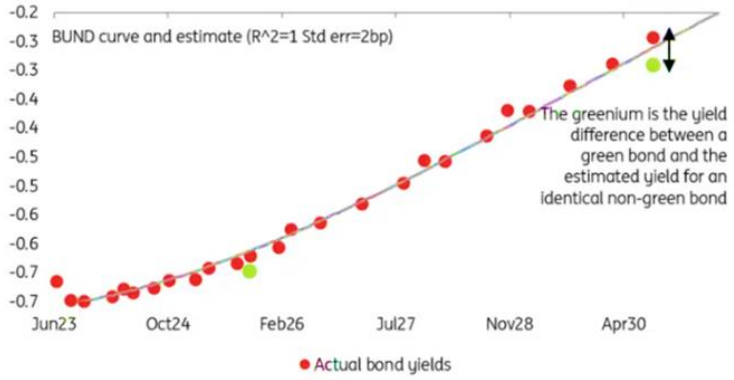


Figure 16: Green Bond Curve. Source: Refinitiv, ING

Emphasize that, the absolute value of the greenium will depend on the state of the market at any given time. With the world´s states stepping up efforts to reduce carbon emissions, the green bond market has started to grow exponentially. This rapid growth materialised in October 2021, when the EU issued around €12 billion in *NextGenerationEU* green bonds, the largest ever green bond issue.

Driven by this competition of political determination and investor appetite, the green bond market is expanding rapidly, and annual issuance could reach $1 trillion by 2023, according to the Climate Bonds Initiative

Created by the international Capital Markets Association (ICMA), the "Green Bond Principles" (GBP), are voluntary guidelines, guiding in the design of green bond issue. According with the GBP, an issue is classified as a green bond, only if, the following assumptions are met: the use of funds, the project assessment and selection, capital management and reporting.

Regarding the use of funds, the fundamental pillar that characterises green bonds is the use of capital in projects with clear environmental objectives, which must be detailed by the issuer in the documentation relating to the issue and, whenever possible quantified. In addition to the GBP, there is the European parliament and Council Regulation (EU) 2020/852 for the promotion of sustainable investment to identify economic activities that could be considerable sustainable.
In second place, in the project assessment and selection phase, the issuer should include in the issuance documentation, information on the environmental objectives that the project proposes to achieve, and the procedure adopted to determine the eligibility of projects. Within this phase, is recommended that, in addition to the evaluation of the project by the issuer itself, this evaluation should also be carried out by external entities that confirm that the bonds to be issued are in line with the GBP (second party opinion).
In third place, within the capital management, amounts should be identified and used for the projects the issuer proposes to undertake and monitored and adjusted against the allocations made within those projects. It is also recommended that the issuer uses auditors or other third parties to verify the control and allocation of funds.
In fourth place, within the reporting, it is proposed that issuers produce annual reports which include a list of the projects to which the proceeds of the issue have been allocated, with a brief description of the projects and relevant amounts, as well as reference to the expected impact of the allocation of funds.
EDP, the major shareholder, has developed the EDP Green Finance Framework under which it may issue green bonds as well as loans, and use the proceeds to finance wind and solar power projects within countries that the EDPR operates in.
The EDP Green Finance Framework outlines a process by which proceeds will be tracked, allocated and managed, and the commitments that have been made for reporting on the allocation and impact of the use of proceeds. Well-positioned to issue green bonds and originate loans, the EDP Green Finance Framework is robust, transparent, and operates in alignment with the four core components of the Green Bond Principles 2021 and Green Loans Principles 2021, namely: 1) use of proceeds; 2) process for project evaluation and selection; 3) management of proceeds and, finally 4) reporting.
Example of this relies, for example, on EDP´s issuance of 7.5 – year €1.35 billion green bonds. Lisbon, March 14th, 2022: EDP Finance BV has set the price of an issue of debt securities ("notes") in the amount of €1,250,000,000 with maturity in September 2029 with a coupon of 1.875%, corresponding to a yield of 1.897%. The notes will be issued under the Programme for the issuance of debt instruments (MTN) of EDP and EDP Finance BV and will be admitted to trading on Euronext Dublin. This issue is intended to finance or refinance, in whole or in part, the EDP

group´s portfolio of eligible green projects, consisting of renewable projects – wind and solar – from EDPR, as defined in EDP´s Green Bond Framework, available on the company´s website.

4. Valuation

4.1 Introduction

Following the selection of the most suitable models available in the literature and an explanation about the macro and microenvironment that the company faces, it is time to gather all the information and incorporate it in a technical financial model to achieve the final purpose – a price per share and an investment recommendation.

The models further presented will incorporate both the quantitative and qualitative assumptions implied in EDPR´s Strategic Update for 2021-2025, regarding on the future performance of the company for the next five years. To tackle one of Damodaran´s recurrent concerns, because this dissertation had the benefit of management guidance, this valuation exercise will involve more science than art.

Initially, the DCF method will be performed as it is product, an estimate of intrinsic value, continues to be largely accepted and recognized method within the finance industry. In second place, relative valuation will also carry out, to access how EDPR positions itself within the peer group selected, the companies present in the 30th RENIXX Index.

Finally, the historical financial information of EDPR between 2013 and 2021 will serve as the base years, 2022 to 2026 will be the forecast, and 2026 is the basis for the continuation value.

4.2 Revenues

The revenue build has been estimated based on the Electricity Generated (GWh) times the Average Selling Price (€/GWh), and the Income from institutional partnerships (€M).

Although this approach of revenue estimation may seem simplistic, as it does not include the forecast of other economic concepts, such as: Other Operating Income (mainly related to the Asset rotation transactions closed), it was considered the most consistent, as the nature of these accounts is not reflected on EDPR´s Key financial data and tends to be not very significant.

For power generation, essentially deriving from EDPR´s total additions, the Strategic Update of the firm highlights an accelerated and selective growth, with an estimate of 20,000 GWh (EBITDA + Equity GW) additions to be added between 2021 and 2025, of which: 3,500 GWh will be added in 2021; 3,500 GWh (2022); 3,500 GWh (2023); 4,600 GWh (2024) and, finally 4,600 GWh (2025).

To what concerns the additions per market, in line with EDPR´s Strategic Update, the firm will focus its growth on core low-risk geographies across the world, with North America (+8,800

GWh) concentrating 45% additions; an estimate of 35% towards Europe (+6,700 GWh); around 15% directed to Latin America (+2,900 GWh) and around 5% to APAC (+1,400 GWh).

Regarding to the additions per technology, between 2021 and 2025 are planned additions of: +9,000GWh to wind onshore; +8,000 GWh to Solar PV; +1,000 GWh to wind offshore; +1,000 GWh to Solar DG and +400GWh to storage.

Only emphasize that due to rounding-off values implicit in the strategic plan itself, some differences were registered, namely in the reconciliation of additions per market and technology.

Analogously, as these strategic plans are usually quite ambitious and tend to have a very strategic nature, a set of scenarios were established, to incorporate externalities (the slowdown of energy transition, the implications of war in Ukraine, among others) that may affect EDPR´s total additions. Thus, according with the entity´s business plan:

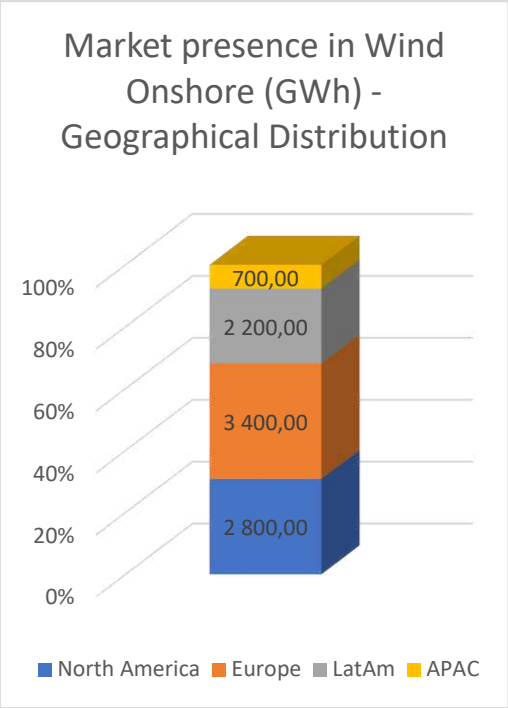
- Gold Standard Scenario: 100% of total gross additions are secured (including the 30% already secured, 15% expected to be secured in the short term and the 55% to be secured in the long term).
- Realistic Scenario: Only 81% of the total gross additions are secured (including the 30% already secured, 15% expected to be secured in the short term. Only 36% is secured in the long term).
- Conservative Scenario: Only 39% of the total gross additions are secured (including the 30% already secured. Only 9% under active negotiation in the short term are secured).

As can be withdrawn from the visualization of annex 2, the electricity generated by EDDPR during the forecasted period can be summarized as follows:

Electricity Generated (GWh)	*2022E*	*2023E*	*2024E*	*2025E*	*2026E*
EUROPE					
Realistic Scenario	*12 317,10*	*13 277,75*	*14 238,40*	*15 510,90*	*16 783,40*
ΔYoY (%)	*7,80%*	*7,24%*	*8,94%*	*8,20%*	*NA*
NORTH AMERICA					
Realistic Scenario	*18 321,75*	*19 586,97*	*20 852,19*	*22 518,36*	*24 184,53*
ΔYoY (%)	*6,91%*	*6,46%*	*7,99%*	*7,40%*	*NA*
LATIN AMERICA					
Realistic Scenario	*2 303,94*	*2 720,28*	*3 136,62*	*3 686,61*	*4 236,60*
ΔYoY (%)	*18,07%*	*15,31%*	*17,53%*	*14,92%*	*NA*
APAC					
Realistic Scenario	*231,78*	*440,76*	*649,74*	*903,27*	*1 156,80*
ΔYoY (%)	*90,16%*	*47,41%*	*39,02%*	*28,07%*	*NA*

Figure 17: Electricity Generated (GWh) - Assumptions (2022-2026)

Offering a different value proposition, the Gold Standard Scenario of EDPR´s Strategic Update sets up its presence across the major technologies (wind onshore and solar PV) as follows:



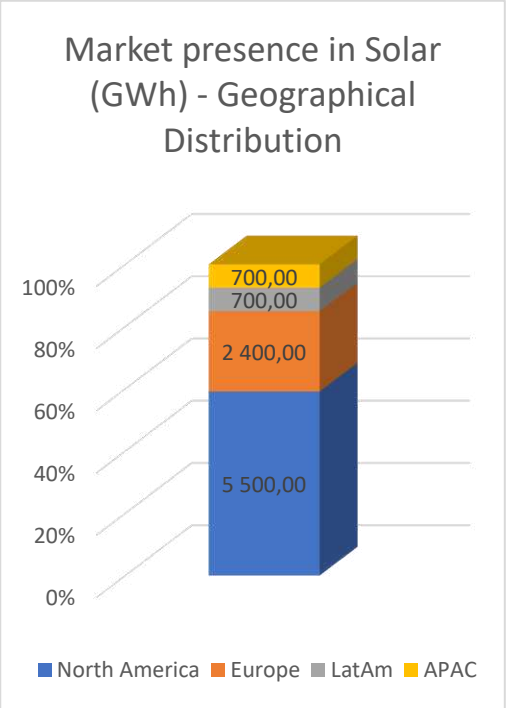


Figure 18 and 19: EDPR´s market presence (GWh) in Wind Onshore and Solar PV – Assumptions (2022 – 2026)

Secondly, to what concerns the Average Selling Price (€/GWh) several adjustments were realized, before proceeding to the forecasting exercise among which:

- The conversion of the data available from MWh to GWh (1 MWh equals 0,001 GWh).
- Currency conversion to EUR, to establish a means of comparison between regions. The APAC region was not subject to analysis since no data is available.
- The establishment of a representativity index. For currency conversion purposes, the countries where the most significant projects are being carried out were considered. Thus, in North America and Latin America, USA and Brazil were the ones considered, respectively.

As for the evolution of electricity prices, according with the report "Energy Outlook 2022", the evolution of electricity price will depend essentially on the scenario established for the 2050´s Global Energy System, being the three possible scenarios: Accelerated, Net Zero and New Momentum.

In line with the US Energy Information Administration, there are several conditionings that can influence the price of electricity and thus each scenario, namely variations in electricity demand, availability of generation sources, fuel costs, power plant availability, wheatear conditions, among others. Considering this, differentials in inflation and interest rates, current account deficits, public debt, among others, can also and undermine this forecasting exercise, as they directly affect the exchange rate of each region.

In a simplified manner, in line with report Energy Outlook 2022, the evolution of the price of electricity within the forecasted period will be considered the same across every region. Thus, for the Net Zero scenario, the assumptions, already considering the first consequences of the war in Ukraine in Europe´s energy system, are: ΔYoY (2021): 0,60%; ΔYoY (2022): 1,87%; ΔYoY (2023): 2,48%; ΔYoY (2024): 0,55%; ΔYoY (2025): 0,30%, and, finally, ΔYoY (2026): - 0,21%, which, as can be observed in annex 3, translate into:

Average Selling Price (€/GWh)	2022E	2023E	2024E	2025E	2026E
EUROPE					
Realistic Scenario	0,0815	0,0830	0,0850	0,0855	0,0858
ΔYoY (%)	1,87%	2,48%	0,55%	0,30%	-0,21%
NORTH AMERICA					
Realistic Scenario	0,0390	0,0397	0,0407	0,0409	0,0411
ΔYoY (%)	1,87%	2,48%	0,55%	0,30%	-0,21%
LATIN AMERICA					
Realistic Scenario	0,0391	0,0399	0,0408	0,0411	0,0412
ΔYoY (%)	1,87%	2,48%	0,55%	0,30%	-0,21%

Figure 20: EDPR Average Selling Price (€/GWh) – Assumptions (2022-2026)

Regarding the investment project appraisal investment, for the evolution of electricity price and the Income from Institutional Partnerships, in the context of risk and uncertainty, the Gold Standard Scenario is +0,5 pp and the Conservative Scenario -0,5pp, against the ΔYoY variations implied in the Realistic Scenario, for the period between 2022 and 2026.

To conclude the revenue build, with respect to the Income from Institutional Partnerships (exclusive of North America) its estimation was based on the compound annual growth rate (CGAR) obtained between 2013 and 2021. Thus, a value of 4,45% was obtained for the Realistic Scenario, Gold Standard Scenario (4,95%) and the Conservative Scenario (3,95%), as per annex 4.

Income from Institutional Partnerships (€m)	2022E	2023E	2024 E	2025E	2026E
NORTH AMERICA					
Realistic Scenario	185,0821	193,3149	201,9139	210,8953	220,2763
ΔYoY (%)	4,45%	4,45%	4,45%	4,45%	NA

Figure 21: EDPR Income from Institutional Partnerships (€m) – Assumptions (2022-2026)

Consequently, in line with annex 5, the total revenues of EDPR for the forecasted period, are defined as:

Revenues (€m)	2022E	2023E	2024 E	2025E	2026E
ALL REGIONS					
Realistic Scenario	1 993,29	2 181,92	2 390,07	2 610,71	2 827,51
ΔYoY (%)	9,46%	9,54%	9,23%	8,30%	NA

Figure 22: EDPR Total Revenues (€m) – Assumptions (2022 – 2026)

4.3 EBITDA

For public companies, if available, both EBITDA and EBIT projections for the future are typically sourced from consensus estimates, as these projections inherently capture both gross profit performance and SG&A expenses. Another common approach for projecting EBITDA and EBIT values for outer years is to hold their margins constant at the level represented by the last year. Although this simplifies the forecast exercise, this is not the most suitable scenario, as increasing/decreasing levels of profitability may be modelled throughout the projection period. Despite this, due to the lack of information (particularly forecasting the operating costs or other operating income), the margin for EBITDA (2021) was used as assumption as can be seen in annex 6.

EBITDA (€m)	2021A	2022E	2023E	2024E	2025E	2026E
ALL REGIONS						
EBITDA/Revenues	***100%***	*100%*	*100%*	*100%*	*100%*	*100%*
Revenues - Realistic Scenario (RB)	***1 757,66***	1 993,29	2 181,92	2 390,07	2 610,71	2 827,51
EBITDA	***1 760,04***	1 993,29	2 181,92	2 390,07	2 610,71	2 827,51

Figure 23: EDPR EBITDA Margins (%) – Assumptions (2022-2026)

4.4 Provisions

Present in the liabilities section, provisions represent funds put aside by EDPR to cover anticipated losses in the future. Considering the past residual value of this account, the rationale used to produce a reliable forecast of this heading was based on the CAGR obtained between 2013 and 2021 of each region. No data is available for the APAC region.

As can be withdrawn form annex 7, because of its nature the Gold Standard and Conservative Scenarios are a 5% decrease and increase respectively, relatively to the Realistic Scenario, which is based on CAGR (2013-2021).

Provisions (€m)	*2022E*	*2023E*	*2024E*	*2025E*	*2026E*
EUROPE					
Realistic Scenario	*-1,0375*	*0,3850*	*-1,3454*	*0,4992*	*-1,7448*
ΔYoY (%)	*-137,10%*	*-449,51%*	*-137,10%*	*-449,51%*	*NA*
NORTH AMERICA					
Realistic Scenario	*-0,7802*	*-0,7493*	*-0,7196*	*-0,6911*	*-0,6638*
ΔYoY (%)	*-3,96%*	*-3,96%*	*-3,96%*	*-3,96%*	*NA*
LATIN AMERICA					
Realistic Scenario	*0,0036*	*0,0040*	*0,0045*	*0,0051*	*0,0057*
ΔYoY (%)	*12,46%*	*12,46%*	*12,46%*	*12,46%*	*NA*

Figure 24: EDPR Provisions (€m) – Assumptions (2022-2026)

4.5 Depreciations and Amortizations (D&A)

Depreciation is a non-cash expense that approximates the reduction of book value of EDPR´s long-term fixed assets or property, plant, and equipment (PP&E) over an estimated useful life and reduces reported earnings. Amortization, like depreciation, is a non-cash expense that reduces the value of EDPR´s definitive life intangible assets and reduces reported earnings.

For DCF modelling purposes, depreciation is often projected as a percentage of revenues or CAPEX, based on historical levels, as it is directly related to a company´s capital spending, which in turn, tend to support top line growth.

Thus, for the purpose of D&A forecast, it is necessary to first consider a projection of the Fixed Asset Items (FAI). A margin relative to revenues was established for each year between 2013 and 2021, arriving at an average rate of 850%, which served as assumption for the FAI for 2022. For the remaining periods, the forecast exercise consisted in multiplying the FAI (2022) with the CAGR (2013-2021): (0,76%), as can be seen in annex 8.

Fixed Asset Business (€m)	2022E	2023E	2024E	2025E	2026E
ALL REGIONS					
Realistic Scenario - Fixed Asset Business	*16 942,94*	*17 071,32*	*17 200,66*	*17 330,99*	*17 462,31*
ΔYoY (%)	0,76%	0,76%	0,76%	0,76%	NA

Figure 25: EDPR Fixed Asset Business (€m) – Assumptions (2022-2026)

Subsequently, obtainable from dividing the FAI by Total Revenues using EDPR`s historical key financial data from 2013 to 2021, a lifespan of 25 years was established as assumption for the computation of D&A from 2022 to 2026. Thus:

D&A (€m)	2022E	2023E	2024E	2025E	2026E
ALL REGIONS					
Realistic Scenario - D&A	*677,72*	*682,85*	*688,03*	*693,24*	*698,49*

Figure 26: EDPR´s D&A (€m) – Assumptions (2022-2026)

Emphasize that, no sensitivity analysis was conducted on this step, as it would lead to incongruent results later in the valuation process.

4.6 Government Grants

Government grants are grants that compensate the Group for expenses incurred and are recognized in profit or loss on a systematic basis in the same period in which expenses are recognized. Amortisation of deferred income (government grants) refers to grants for fixed assets received mainly by EDPR subgroup under the American Recovery and Reinvestment Act, promoted by the US that are amortized through the recognition of revenue in the income statement over the useful life of the related assets.

Because this heading is not significant and is of highly variable nature, for the forecasting purposes the premise will be the CAGR (2013-2021) obtained within each region. No data is

available for the APAC region. The Gold Standard and Conservative Scenarios are a 5% increase and decrease respectively, relatively to the Realistic Scenario, which is based on CAGR (2013-2021), as can be verified in annex 9.

Amortisation of deferred income - Government Grants (€m)	2022E	2023E	2024E	2025E	2026E
EUROPE					
Realistic Scenario	-1,0375	-1,3454	-1,7448	-2,2627	-2,9344
ΔYoY (%)	29,68%	29,68%	29,68%	29,68%	NA
NORTH AMERICA					
Realistic Scenario	16,0218	15,9469	15,8723	15,7981	15,7242
ΔYoY (%)	-0,47%	-0,47%	-0,47%	-0,47%	NA
LATIN AMERICA					
Realistic Scenario	0,0000	0,0000	0,0000	0,0000	0,0000
ΔYoY (%)	20,57%	20,57%	20,57%	20,57%	NA

Figure 27: EDPR´s Government Grants (€m) – Assumptions (2022-2026)

4.7 Income Taxes

As can be withdrawn from the Note 15 of EDPR Annual Report 2021, the difference between the theoretical and effective income tax expense, results from the application of law provisions in the determination of the tax base. Excluding the effects of the ordinary contribution to the energy sector, this calculated rate will show the benefits that arise from the application of law provisions in the determination of the tax base, relatively to the theoretical tax rate of 25%, applicable in Spain where EDPR is headquartered.

As can be concluded from the annex 10, the forecast exercise for EDPR`s Income Tax was also based on the CAGR (2013-2021), as it is not feasible nor rigorous to estimate each subheading arising from the application of law provision in the determination of the tax base.

Income tax (€m)	2022E	2023E	2024E	2025E	2026E
ALL REGIONS					
Income tax (€m) - Realistic Scenario	-98,90	-105,16	-111,82	-118,91	-126,44
ΔYoY (%)	6,33%	6,33%	6,33%	6,33%	NA

Figure 28: EDPR´s Income Tax (€m) – Assumptions (2022-2026)

4.8 Capital Expenditures (Capex)

Capex (short for capital expenditures) are costs related to funds used by EDPR to acquire or upgrade physical assets such as property, industrial buildings, equipment, and technology. These are for instance: costs related with the construction, maintenance and upgrade of wind farms or solar power plants. Included in the cash flow statement section, the economic concept of Capex can also be derived from the Income Statement or Balance Sheet.

The assumed Capex formula from the income statement and balance sheet is:

$$Capex = PP\&E\ (current\ period) - PP\&E\ (prior\ period) + D\&A\ (current\ period) \quad (21)$$

Producing a "net" capital expenditure number, this formula is derived from the logic that the current PP&E on the balance sheet is equal to prior period PP&E plus capital expenditures less depreciation, as can be retrieved from annex 11.

Capex & Cash Flow (€m)	2022E	2023E	2024E	2025E	2026E
ALL REGIONS					
Realistic Scenario - Fixed Asset Business (CY)	16 942,94	17 071,32	17 200,66	17 330,99	17 462,31
Realistic Scenario - Fixed Asset Business (PY)	16 815,53	16 942,94	17 071,32	17 200,66	17 330,99
Realistic Scenario - D&A (CY)	677,72	682,85	688,03	693,24	698,49
Capex (€m)	805,13	811,23	817,37	823,57	829,81

Figure 29: EDPR Capex (€m) – Assumptions (2022-2026)

4.9 Working Capital

Also known as Net Working Capital (NWC), it is typically defined as non-cash current assets (such as: accounts receivable, customer´s unpaid bills, inventories of raw materials, among others) less non-interest-bearing current liabilities (such as: accounts payables, debts, among others).

Being a measure of EDPR´s liquidity, operational efficiency, and short-term financial health, it serves as a measure of how much EDPR needs to fund its operation on an ongoing basis. Although a positive NWC translates that a company can fully cover its short-term liabilities in the next twelve months, this financial concept requires a holistic and unbiased view in its analysis as, an excess amount of it may indicate that the company is not managing its assets in an efficient manner.

For the projection exercise, a consistent and swift shortcut for projecting the ΔYoY changes in NWC involves projecting the NWC as a percentage of sales at a designated historical level and, then calculating the ΔYoY accordingly. Consequently, the assumption for the NWC was based on the historical NWC per Revenues, from 2016 to 2021, which returned an average rate of: (-49,83%), as can be seen from annex 12.

Working Capital (€m)	2016A - 2021A	2022E	2023E	2024E	2025E	2026E
ALL REGIONS						
NWC /Revenues	**-49,83%**	-49,83%	-49,83%	-49,83%	-49,83%	-49,83%
Revenues - Realistic Scenario (RB)		1 993,29	2 181,92	2 390,07	2 610,71	2 827,51
NWC		-993,16	-1 087,15	-1 190,85	-1 300,79	-1 408,81

Figure 30: EDPR Net Working Capital (€m) – Assumptions (2022-2026)

As a result, the changes in NWC are defined as follows:

Changes in NWC (€m)	2022E	2023E	2024E	2025E	2026E
ALL REGIONS					
ΔNWC (€m) - Realistic Scenario	-795,43	-93,99	-103,71	-109,93	-108,02
ΔYoY (%)	-88,18%	10,34%	6,01%	-1,74%	NA

Figure 31: EDPR Changes in Net Working Capital (€m) – Assumptions (2022-2026)

4.10 Capital Asset Pricing Model (CAPM)

The CAPM describes the relationship between systematic risk and the expected return for assets, particularly stocks. It has been widely used within the finance industry for both pricing and generating expected returns for securities (given their risk and cost of capital).

For the calculation of CAPM, as can be retrieved from annex 13, using the daily data since the time EDPR trades in the stock market (28/02/2014 to 31/12/2021), both the prices and index data, daily returns, and excess returns were computed for: EDPR´s share price, Euronext 100 quote, and the yield of a German 10Y treasury bond. Subsequently, a regression was carried out which returned the following statistics and coefficients:

Regression Statistics	
ALL REGIONS	
Multiple R	*0,9982*
R Squared	*0,9965*
Adjusted R Squared	*0,9965*
Standard Error	*0,0179*
Observations	*2260*

Figure 32: EDPR CAPM´s Regression Statistics – Assumptions (2022-2026)

Where it follows:

ANOVA

	gl	*SQ*	*MQ*	*F*	*Significance F*
Regression	1	203	203	635227	0
Residual	2258	1	0		
Total	2259	204			

	Coefficientes	*Standard Error*	*t Stat*	*P- value*	*Lower 95%*	*Upper 95%*
Intercept	0,0005607	0,0003761	1,4910129	0,0136098	-0,0001767	0,0012981
Variable X 1	0,9994384	0,0012540	797,0112200	0,0000000	0,9969793	1,0018975

Figure 33: EDPR CAPM´s Regression Coefficients – Assumptions (2022-2026)

Thereafter, for the computation of the market return E (r_m), to incorporate the risk premium of each region where EDPR operates, the following formula has been assumed:

$$E(r_m) = E(r_m)_{EUA} + (CRP_{EU} * Revenues_{2021-EU}) + (CRP_{Brazil} * Revenues_{2021-Brl}) \quad (22)$$

, where it follows: $E(r_m)$ is the market rate of return; CRP is each country risk premium and $Revenues$ is the region revenues obtained in 2021.

Again, the calculation is based on a representative index. No data is available for the APAC region. Both the CRP values and $E(r_m)_{EUA}$ were retrieved from Damodaran platform.

Thus:

Capital Asset Pricing Model: CAPM	
ALL REGIONS	
Market rate of return: E(rm)	*5,2728%*
Beta Unlevered: B_u	*0,9994*
Risk-free rate: r_f	*-0,2100*
CAPM	*5,2581%*

Figure 34: EDPR CAPM´s Calculation – Assumptions (2022-2026)

4.11 Weighted Average Cost of Capital (WACC)

The WACC represents EDPR´s average after-tax cost of capital from all sources, including common stock, preferred stock, and other forms of debt.

Since several calculations have been already carried out, there is no need to recalculate again all the parameters that enter equation.

The first step is to compute the debt-to-equity (D/E) ratio. This ratio, which returned a value of (72%) is used to evaluate EDPR´s financial leverage and was calculated by dividing EDPR´s total liabilities by the shareholders equity (based on the average of the last five years).

The second step is to compute the ratio target debt per assets value (D/V), which returned a value of (47,083%). It was computed by dividing the equity value by the assets value of EDPR (based on the average of the last five years).

Thus, in line with annex 14:

Equity Beta Calculation	
ALL REGIONS	
1. Beta Unlevered	*0,9994*
2. D/E target ratio	*72%*
3. Corporate tax rate (Tc)	*25,00%*
4. Levered Beta = [Ba+(Ba-0)(D/E)*(1-Tc)]*	*1,5391*

Figure 35: EDPR Levered Beta Calculation – Assumptions (2022-2026)

Again, β_u was based on the previous regression analysis; the (D/E) ratio was based on the average of the past five years (to keep a policy of a constant ratio); and finally, the corporate tax rate applied is the Spanish: (25%).

Where it follows:

Weighted Average Cost of Capital: WACC	
ALL REGIONS	
1. Risk free interest rate	*0,000%*
2. Market risk premium	*5,273%*
3. Average equity beta	*1,5391*
*4. Equity cost of capital (1+2*3)*	*8,116%*
5. After taxes cost of debt	*3,480%*
6. Target Debt/Assets value (D/V)	*47,083%*
7. Target Equity/ Assets value (E/V)	*52,917%*
*WACC (4*7+5*6)*	*5,933%*

Figure 36: EDPR WACC Calculation – Assumptions (2022-2026)

Again, the r_f is based on the yield of a 10Y German bond and the (D/V) ratio was based on the average of the past five years (to keep a policy of a constant ratio).

4.12 Terminal Value

The terminal value (TV) is the value of EDPR´s share beyond the forecasted period when future cash flows can be estimated. This financial concept assumes that EDPR´s business will grow at a set growth rate forever after the forecast period, and often comprises a large percentage of the total assessed value.

In this valuation exercise, the terminal value is the value of the period after the time horizon, in this case 2006. To compute the Perpetual Cash Flow, the following formula was assumed:

$$Noplat_{2026} * (1 - g) - Invested\ Capital_{2026} * g \quad (23)$$

Where it follows: $Noplat_{2026}$ is the Net Operating Profit Less Adjusted Taxes (2026); g is the perpetual growth rate of the FCF defined, and the $Invested\ Capital_{2026}$ is the total amount of money raised by EDPR by issuing securities to equity shareholders and debt to debtholders in 2026.

The first step is to compute the adjusted taxes scheme for the forecasting period. After performing this procedure, the second step is to perform the calculation of NOPLAT.

Due to the non-existence of assumptions for the heading *Interest Expense, net,* the value of 2021 was used as assumption for the remaining periods to be estimated.

Therefore:

Adjusted Taxes Calculation (€m)	2022E	2023E	2024E	2025E	2026E
			ALL REGIONS		
Operating Income (EBIT)	*1279,45*	*1429,97*	*1599,99*	*1792,26*	*1820,00*
Less: Interest Expense, net	***-88,52***	*-88,52*	*-88,52*	*-88,52*	*-88,52*
Earnings Before Taxes (EBT)	*1190,93*	*1341,45*	*1511,47*	*1703,74*	*1731,48*
Income Tax Provision	*297,73*	*335,36*	*377,87*	*425,94*	*432,87*
% Tax Rate (25%)			***25,00%***		
Plus: Interest Tax Shield	*22,13*	*22,13*	*22,13*	*22,13*	*22,13*
Adjusted Taxes	*319,86*	*357,49*	*400,00*	*448,07*	*455,00*

Figure 37: EDPR Adjusted Taxes Calculation – Assumptions (2022-2026)

Where the outcome is:

NOPLAT (€m)	2022E	2023E	2024E	2025E	2026E
			ALL REGIONS		
Operating Income (EBIT)	*1 279,45*	*1 429,97*	*1 599,99*	*1 792,26*	*1 820,00*
Less: Adjusted Taxes	*-319,86*	*-357,49*	*-400,00*	*-448,07*	*-455,00*
Plus: Change in Deferred Taxes	***5***	*5*	*5*	*5*	*5*
NOPLAT	*964,58*	*1077,48*	*1204,99*	*1349,20*	*1370,00*

Figure 38: EDPR NOPLAT Computation – Assumptions (2022-2026)

Again, because of the absence of assumptions for the heading *Change in Deferred Taxes,* the value of 2021 was used as assumption for the remaining periods to be estimated.

Once these two steps have been completed, it is then possible to compute the terminal value as follows:

Terminal Value (€m)	2022E	2023E	2024E	2025E	2026E
			ALL REGIONS		
Fixed Asset Business	*16 942,94*	*17 071,32*	*17 200,66*	*17 330,99*	*17 462,31*
Net WC	*-795,43*	*-93,99*	*-103,71*	*-109,93*	*-108,02*
Invested Capital	*16147,51*	*16977,33*	*17096,96*	*17221,06*	*17354,29*
1.Perpetual CF			*1034,33*		
2.WACC			*5,93%*		
3. Perpetual growth rate of FCF (g)			*2,10%*		
Terminal Value (1(1+3))/(2-3)*			*27 551,23*		

Figure 39: EDPR Terminal Value Computation - Assumptions (2022-2026)

Emphasize that, the Invested Capital was computed with the formula previously presented, and the projection of (2,10%) for the perpetual growth rate of the FCF (g) was considered adequate in the current environment, given the continuous price increase.

4.13 Discounted Cash Flow Model (DCF)

Having the assumptions established, the forecasts executed, and the tax rates computed the following process is to estimate the value of EDPR`s share based on the expected future cash flows.

DCF (€m)	2022E	2023E	20242E	2025E	2026E
			ALL REGIONS		
NOPLAT	*964,58*	*1 077,48*	*1 204,99*	*1 349,20*	*1 370,00*
Depreciation Expenses	*677,72*	*682,85*	*688,03*	*693,24*	*698,49*
CAPEX	*805,13*	*811,23*	*817,37*	*823,57*	*829,81*
Change in WC	*-795,43*	*-93,99*	*-103,71*	*-109,93*	*-108,02*
Free Cash Flowto the Firm (FCFF)	***1 632,60***	***1 043,09***	***1 179,35***	***1 328,80***	***1 346,71***

Figure 40: EDPR DCF Computation - Assumptions (2022-2026)

Where it follows:

Equity Share Value (€m)	2022E	2023E	2024E	2025E	2026E
			ALL REGIONS		
WACC			*5,93%*		
Discount Factor	*97,16%*	*91,72%*	*86,58%*	*81,73%*	*77,15%*
Perpetual growth rate of FCF (g)			*2,10%*		
Discounted CF´s	*1 586,22*	*956,70*	*1 021,09*	*1 086,05*	*23 979,41*
Enterprise value			***28 629,47***		
Non-operating Assets			*1 881,00*		
Firm Value			*30 510,47*		
Debt			*2 935,00*		
Equity			*27 575,47*		
Number of shares			*960,50*		
Share value			***28,71***		

Figure 41: EDPR Equity Share Value Calculation – Assumptions (2022-2026)

In this logic, the non-operating assets of EDPR are assets not essential to its ongoing operations, however they still provide a return on investment. Examples of the former are for instance: deferred tax assets, cash and cash equivalents, collateral deposits, assets held for sale, among others, which had a value of €1,881m, on the 31st of December 2021.

This heading, added up to the Enterprise value (computed throughout the DCF exercise) returned a Firm Value of €30,510.47m. The remaining items, such as: Debt and the Number of Shares were retrieved from the 2021 EDPR Annual Report.

The amount of Equity if found by establishing the difference between the Firm Value and Debt. According to this analysis, the intrinsic value of EDPR is by establishing the difference between Firm Value and Debt.

To finalise, according with this analysis, the intrinsic value of EDPR is €28,71 per share and the market price on the 31st of December was €21,50, thus the conclusion is a BUY recommendation.

4.14 Sensitivity Analysis:

A sensitivity analysis combines different combinations of variables to quantify the overall impact of changes in EDPR´s share price.

Being an important resource for investors, this exercise provides numerical awareness of not great amplitude variations that can largely affect EDPR´s share price.

Thus, a sensitivity analysis has been carried out considering changes in the value of the Perpetual growth rate of FCF (g) and WACC. Subjectively, a change in WACC of 0,5% has been assumed, whereas for the Perpetual growth rate of FCF (g), a variation of 0,2% has been considered, as follows:

Perpetual growth rate of FCF (g)	*WACC*			
	5,43%	***5,93%***	***6,43%***	***6,93%***
1,90%	*31,56*	*27,65*	*24,60*	*22,15*
2,10%	*32,50*	***28,71***	*25,00*	*22,41*
2,30%	*33,55*	*28,94*	*25,44*	*22,69*
2,50%	*34,75*	*29,69*	*25,91*	*22,99*

Figure 42: EDPR Sensitivity Analysis – Assumptions (2022-2026)

As can be perceived, an increasing WACC generates a decrease in EDPR´s share value, while an increasing Perpetual growth rate of FCF (g) has the opposite effect.

To conclude, the WACC and the Perpetual growth rate of FCF (g) have an inverse and direct relationship with EDPR´s share value, respectively.

4.15 Relative Valuation – Multiples:

Acting as a complement to the DCF valuation, to perform the relative valuation, the peer group used were companies present in the 30th RENIXX Index. The multiples chosen were the EV/Revenues, EV/EBITDA, Price/Sales (ttm) and the Price/Book Value (mrq).

Highlight that, the interpretation of multiples is all relative and subjective, requiring a more in-depth analysis, before assuming whether EDPR is undervalued, valued properly, or overvalued, relatively to its peers.

Thus, as can be observed below:

	EV/Revenue	*EV/EBITDA*	*Price/Sales (ttm)*	*Price/Book (mrq)*
Arithmetic mean (30th RENIXX Index)	*12,30*	*-13,55*	*11,63*	*6,65*
Harmonic mean (30th RENIXX Index)	*9,90*	*-23,67*	*8,98*	*14,69*

Figure 43: 30th RENIXX Index Stats – Assumptions (2022-2026)

Name	Ticker	EV/Revenue	EV/EBITDA	Price/Sales (ttm)	Price/Book (mrq)	Market Cap (intraday) - Billion	Weight
BALLARD PWR SYS	NASDAQ: BLDP	11,23	-7,9	20,81	1,76	2,15	0,12%
BORALEX INC.A	TSE: BLX	10,19	14,78	6,49	2,81	4,76	0,26%
CANADIAN SOLAR INC.	NASDAQ: CSIQ	0,19	20,78	0,48	1,55	2,18	0,12%
CERES POWER HLDGS LS-10	LON: CWR	29	-51,8	35,42	4,03	1,13	0,06%
CHIN.LONGYUAN PWR G.H YC1	HKG: 0916	6,56	13,01	2,35	1,3	161,4	8,91%
DAQO NEW ENERGY CRP.ADR 5	NYSE: DQ	1,37	2,01	1,41	1,19	4,83	0,27%
EDP RENOVAVEIS EO 5	ELI: EDPR	13,16	13,91	10,34	2,62	22,85	1,26%
ENCAVIS AG INH. O. N	ETR: ECV	8,19	9,62	8,42	3,33	3,32	0,18%
ENPHASE ENERGY INC.DL-, 01	NASDAQ: ENPH	21,8	123,6	22,94	83,32	37,8	2,09%
FIRST SOLAR INC. D-4, 001	NASDAQ: FSLR	4,84	21,24	5,51	2,31	13,6	0,75%
FUELCELL ENERGY DL-, 0001	NASDAQ: FCEL	13,64	-14,2	15,99	2,2	1,52	0,08%
INNERGEX RENEWABLE ENERGY	TSE: INE	12,07	17,97	4,81	3,38	4,03	0,22%
ITM POWER PLC LS-, 05	LON: ITM	108,12	-32,43	113	5,76	1,05	0,06%
JINKOSOLAR ADR/4 DL-00002	NYSE: JKS	0,15	7,43	0,34	1,35	2,85	0,16%
NEOEN S.A.EO 2	EPA: NEOEN	18,37	26,67	11,39	2,76	4,29	0,24%
NORDEX SE O.N	ETR: NDX1	0,4	-10,66	0,34	2,61	2,08	0,11%
ORMAT TECHNOLOG. DL-, 001	NYSE: ORA	10,32	18,1	7,79	2,96	5,43	0,30%
ORSTED A/S DK 10	CPH: ORSTED	3,95	12,34	3,57	4,14	305,09	16,83%
PLUG POWER INC. DL-, 01	NASDAQ: PLUG	21,24	-22,2	24,97	3,45	14,99	0,83%
SCATEC ASA NK -, 02	FRA: 66	1,13	1,31	5,28	2,06	1,71	0,09%
SIEMENS GAMESA R.E.EO-, 17	BME: SGRE	1,52	-23,75	1,31	3,56	12,21	0,67%
SOLAREDGE TECHN. DL-,0001	NASDAQ: SEDG	5,97	63,38	6,16	7,33	14,86	0,82%
SUNNOVA ENERGY INT.-, 0001	NYSE: NOVA	19,74	60,34	8,26	2,23	2,9	0,16%
SUNPOWER CORP. DL -, 01	NASDAQ: SPWR	2,55	-54,72	2,49	9,62	3,98	0,22%
SUNRUN INC. DL-, 0001	NASDAQ: RUN	7,22	-137,3	3,35	1,05	6,66	0,37%
TESLA INC. DL -, 001	NASDAQ: TSLA	12,42	58,23	13,81	23,28	846,69	46,72%
VERBUND AD INH.A	VIE: VER	5,71	17,83	3,79	6,71	44,59	2,46%
VESTAS WIND SYS.DK -, 20	CPH: VWS	11,9	-567,28	1,57	6,82	184,91	10,20%
XINJIANG GOLDW.SC. + T.H	CXGH.MU	0,24	1,49	0,9	1,15	7,64	0,42%
XINYI SOLAR HLDGS	HKG: 0968	5,75	11,71	5,69	3	90,93	5,02%

Figure 44: EDPR Multiples Comparisons (30th RENIXX Index) – Assumptions (2022-2026)

Firstly, regarding the EV/Revenue multiple. It is a ratio that compares the total valuation of a firm´s operations (EV) to the amount of sales generated in a specific period (Revenues), being more applicable for early-stage companies with high growth. EDPR shows an outperformance relative to the average comparable companies in this index, regarding both the arithmetic and harmonic mean. This implies that the market believes that EDPR can generate revenue more efficiently in the future and is willing to pay a premium for each euro of sales.

Secondly, the EV/EBITDA multiple. It compares the total value of a company's operations (EV) relative to its earnings before interest, taxes, depreciation, and amortization (EBITDA). Frequently used to compare different companies in the same or similar sector, in this vein EDPR shows an outperformance relative to the average comparable companies in this index, regarding both the arithmetic and harmonic mean. This might imply that EDPR is potentially overvalued, with the reverse being true for a low EV/EBITDA multiple.

Thirdly, the Price-to-Sales Ratio measures the value of a company in relation to the total amount of annual sales it has recently generated. Often referred as the sales multiples, it is a valuation

multiple based on the market value that investors place on the revenue belonging to a company. In this aspect, EDPR exhibits a similar performance relative to the average comparable companies in this index, regarding both the arithmetic and harmonic mean. A similar price-to-sales ratio could mean that the shares of EPDR are not currently under or overvalued.

Fourthly, The Price-to-Book ratio (P/B ratio) measures the market capitalization of a company relative to its book value of equity. Widely used among the value investing crowd, the P/B ratio can be used to identify undervalued stocks in the market. Generally, more accurate for mature companies, in this regard, EDPR shows an underperformance relative to the average comparable companies in this index, regarding both the arithmetic and harmonic mean. This might imply, that EDPR´s share might be undervalued, as the lower a company's Price/Book ratio is, the better a value it generates.

After the four valuation multiples were analysed, one might conclude that the investor expectations are increasing, to what concerns the growth of EDPR in the renewable energy market.

5. Conclusion

The purpose of this dissertation was to perform a well-conducted equity valuation analysis to EDPR considering the entity´s Business Plan 2021-2025, to determine the intrinsic value of the share, and formulate an investment recommendation.

Through a quantitative multi-faceted analysis of both the macroeconomic and industry framework, and the historical operational and financial performance, it was possible to develop a robust valuation model, which product indicates a BUY recommendation.

Regarding a more holistic approach, several subjects were addressed, namely EDPR main events and key metrics in 2021, the governance model, the evolution of renewables in 2021, and the regulatory framework. Adding to the assessment of the firm´s strategy implied in the Strategic Update (2021-2025), an exercise of risk management was also conducted, as well as an analytical review of EDP Green Finance Framework.

To this extent, for the conduction of a reliable valuation exercise, this dissertation has largely covered all the vetted aspect of EDPR, as well as of the renewable energy market. The valuation methods employed were the traditional theoretical models, that is, the DCF model and the valuation using multiples, to include absolute and relative valuation, respectively.

The general convictions regarding the renewable energy industry are optimistic and a company, such as EDPR, with a management board and portfolio of high-end, will be expected to spearhead this new path of sustainable development and consolidate its position as a top market player in the renewable energy industry.

To finalize, combining both the technical analysis undertaken, and the beliefs regarding the renewable energy industry in the upcoming years, it is possible to conclude that EDPR represents a decent mid/long term investment opportunity.

6. Annexes

6.1 Annex 1

Figure 1. Global Inflation Forecasts: Serial Upside Surprises
(Percent)

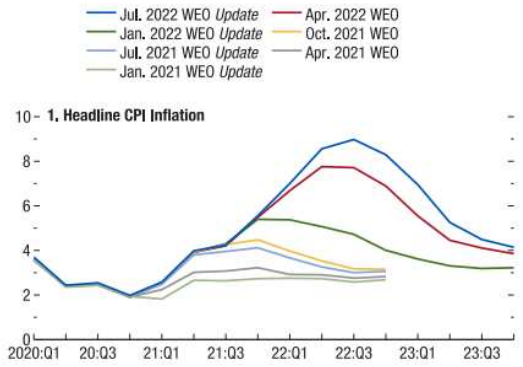
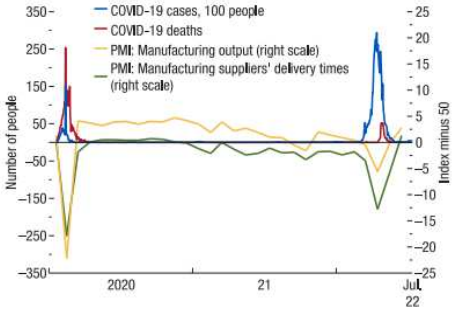


Figure 3. China: COVID-19 Outbreaks and Supply Chain Disruptions



Sources: National Bureau of Statistics of China; National Health Commission of China; and IMF staff calculations.
Note: PMI = purchasing managers' index.

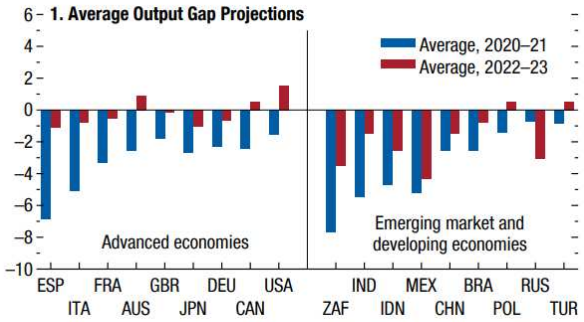
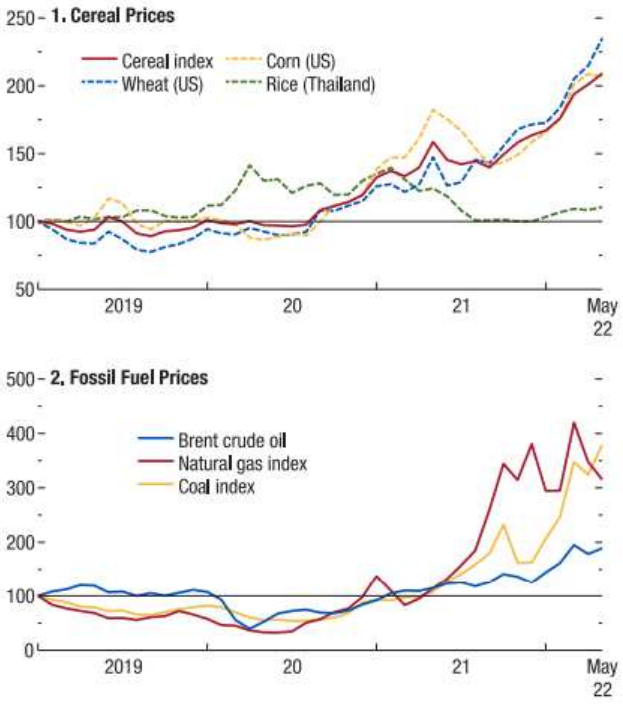
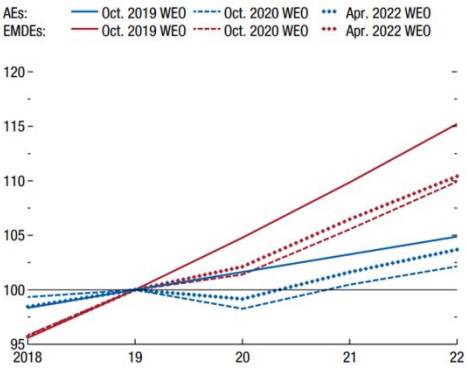


Figure 4. Higher Food and Energy Prices
(Index, January 2019 = 100)



Sources: IMF, Primary Commodity Price System; and IMF staff calculations.
Note: Cereal index comprises barley, maize (corn), oats, rice, sorghum, and wheat; natural gas index comprises European, Japanese, and US natural gas price indices; coal index comprises Australian and South African coal.

Figure 1.18. Potential GDP
(Index, 2019 = 100)



Source: IMF staff calculations.
Note: Potential real GDP projections indexed to 2019 values. Each line reflects a different vintage of *World Economic Outlook* (WEO) projections. AEs = advanced economies; EMDEs = emerging market and developing economies.

Annex 2

	2013A	2014A	2015A	2016A	2017A	2018A	2019A	2020A	2021A	2022E (1)	2023E (2)	20242E (3)	2025E (4)	2026E (5)
Eletricity Generated (GWh)														
EUROPE														
Realistic case - Scenario										12 317	13 278	14 238	15 511	16 783
ΔYoY (%)	NA									7,80%	7,24%	8,94%	8,20%	
Gold Standard - Scenario	9 187	9 323	10 062	11 230	11 669	11 480	11 791	10 024	11 356	12 542	13 728	14 914	16 485	18 056
ΔYoY (%)	1,48%	7,93%	11,61%	3,91%	-1,62%	2,71%	-14,98%	13,29%	10,44%	9,46%	8,64%	10,53%	9,53%	
Conservative case - Scenario										11 819	12 282	12 744	13 357	13 969
ΔYoY (%)	NA									3,91%	3,77%	4,81%	4,59%	
NORTH AMERICA														
Realistic case - Scenario										18 322	19 587	20 852	22 518	24 185
ΔYoY (%)	NA									6,91%	6,46%	7,99%	7,40%	
Gold Standard - Scenario	9 769	10 204	11 103	12 576	15 091	15 644	16 492	17 421	17 057	18 619	20 181	21 743	23 800	25 857
ΔYoY (%)	4,45%	8,82%	13,26%	20,00%	3,67%	5,42%	5,63%	-2,09%	9,16%	8,39%	7,74%	9,46%	8,64%	
Conservative case - Scenario										17 666	18 275	18 884	19 686	20 489
ΔYoY (%)	NA									3,45%	3,33%	4,25%	4,08%	
LATIN AMERICA														
Realistic case - Scenario										2 304	2 720	3 137	3 687	4 237
ΔYoY (%)	NA									18,07%	15,31%	17,53%	14,92%	
Gold Standard - Scenario	230	236	222	666	861	1 235	1 757	1 093	1 888	2 402	2 916	3 430	4 109	4 788
ΔYoY (%)	2,67%	-5,76%	199,60%	29,28%	43,39%	42,29%	-37,82%	72,76%	27,23%	21,40%	17,63%	19,80%	16,53%	
Conservative case - Scenario										2 088	2 602	3 116	3 694	4 373
ΔYoY (%)	NA									24,62%	19,75%	18,56%	18,38%	
APAC														
Realistic case - Scenario										232	441	650	903	1 157
ΔYoY (%)	NA									90,16%	47,41%	39,02%	28,07%	
Gold Standard - Scenario	-	-	-	-	-	-	-	-	23	281	539	797	1 110	1 423
ΔYoY (%)	NA								1131,58%	91,88%	47,88%	39,28%	28,20%	
Conservative case - Scenario										123	224	325	447	569
ΔYoY (%)	NA									81,53%	44,91%	37,60%	27,33%	
Summation - Realistic case - Scenario	19 187	19 763	21 388	24 473	27 621	28 359	30 041	28 537	30 323	33 175	36 026	38 877	42 619	46 361
Growth rate (N/(N-1)) - Realistic case - Scenario		8,22%	14,42%	12,86%	2,67%	5,93%	-5,00%	6,26%	9,40%	8,59%	7,91%	9,63%	8,78%	
Average Growth rate (2013A:2021A)		7,474%												

Annex 3

	2013A	2014A	2015A	2016A	2017A	2018A	2019A	2020A	2021A	2022E (1)	2023E (2)	20242E (3)	2025E (4)	2026E (5)
Average Selling Price (I/GWh)														
EUROPE (€/GWh)														
Strong case										0,083	0,084	0,084	0,086	0,086
ΔYoY (%)	NA									2,37%	2,98%	1,05%	0,80%	0,29%
Base case	0,089	0,080	0,083	0,081	0,081	0,077	0,077	0,081	0,081	0,081	0,083	0,085	0,086	0,086
ΔYoY (%)	-10,08%	3,41%	-1,84%	-0,55%	-4,48%	-0,13%	4,27%	0,48%	0,60%	1,87%	2,48%	0,55%	0,30%	-0,21%
Conservative case										0,082	0,083	0,083	0,085	0,085
ΔYoY (%)	NA									1,37%	1,98%	0,05%	-0,20%	-0,71%
NORTH AMERICA ($/GWh)														
Strong case										0,040	0,040	0,040	0,041	0,041
ΔYoY (%)	NA									2,37%	2,98%	1,05%	0,80%	0,29%
Base case	0,048	0,051	0,051	0,046	0,046	0,045	0,045	0,044	0,044					
Usd/Eur - Base case	0,035	0,042	0,047	0,044	0,039	0,040	0,040	0,036	0,039	0,03901	0,03973	0,041	0,041	0,041
ΔYoY (%)	19,22%	11,65%	-5,89%	-11,46%	1,84%	2,06%	-11,56%	8,49%	0,60%	1,87%	2,48%	0,55%	0,30%	-0,21%
Conservative case										0,039	0,040	0,040	0,041	0,041
ΔYoY (%)	NA									1,37%	1,98%	0,05%	-0,20%	-0,71%
LATIN AMERICA (R$/MWh)														
Strong case										0,040	0,040	0,040	0,041	0,041
ΔYoY (%)	NA									2,37%	2,98%	1,05%	0,80%	0,29%
Base case	0,309	0,346	0,370	0,216	0,289	0,195	0,205	0,218	0,246					
Brl/Eur - Base case	0,095	0,107	0,085	0,063	0,073	0,044	0,046	0,034	0,039	0,039	0,040	0,041	0,041	0,041
ΔYoY (%)	13,00%	-20,16%	-26,56%	16,29%	-39,73%	3,59%	-25,32%	14,29%	0,60%	1,87%	2,48%	0,55%	0,30%	-0,21%
Conservative case										0,039	0,040	0,040	0,041	0,041
ΔYoY (%)	NA									1,37%	1,98%	0,05%	-0,20%	-0,71%
Summation	0,2190	0,2291	0,2151	0,1881	0,1929	0,1610	0,1633	0,1504	0,1586	0,1596	0,1626	0,1666	0,1675	0,1680
Growth rate (N/(N-1))	4,590%	-6,099%	-12,538%	2,520%	-16,543%	1,425%	-7,906%	5,512%	0,600%	1,870%	2,480%	0,550%	0,300%	NA
Average Growth rate (2013A:2021A)	-1,937%													

6.3 Annex 3

6.4 Annex 4

Annex 4

Income from institutional partnerships (£m)	2013A	2014A	2015A	2016A	2017A	2018A	2019A	2020A	2021A	2022E	2023E	2024E	2025E	2026E
Strong case										185,968	195,170	204,827	214,963	225,599
Base case	125,100	123,580	197,440	197,540	225,570	185,170	181,570	201,780	177,200	185,082	193,315	201,914	210,895	220,276
Conservative case										184,196	191,469	199,028	206,886	215,054

6.5 Annex 5

Annex 5										1	2	3	4	5
	2013A	2014A	2015A	2016A	2017A	2018A	2019A	2020A	2021A	2022E	2023E	2024E	2025E	2026E
Electricity sales and other (€m)														
EUROPE														
Strong case										1 039,759	1 151,729	1 250,736	1 413,261	1 548,579
Base case	820	748	835	915	945	888	911	808	920	1 003,423	1 101,911	1 210,939	1 326,418	1 439,541
Conservative case										970,214	1 020,336	1 058,150	1 133,686	1 186,118
NORTH AMERICA														
Strong case										738,996	810,602	873,001	976,869	1 061,738
Base case	342	426	518	489	587	619	666	623	661	714,643	778,280	849,101	921,990	993,181
Conservative case										694,328	726,929	750,725	800,022	832,925
LATIN AMERICA														
Strong case										95,613	117,468	138,123	169,153	197,189
Base case	22	25	19	42	63	54	80	37	73	90,139	108,418	128,111	151,403	174,512
Conservative case										82,318	103,818	124,254	150,592	178,334
Subtotal	1184,282	1199,974	1372,293	1445,709	1595,007	1562,202	1657,875	1467,629	1654,380	1808,205	1988,608	2188,151	2399,811	2607,234
	2013A	2014A	2015A	2016A	2017A	2018A	2019A	2020A	2021A	2022E	2023E	2024E	2025E	2026E
Annex 4														
Income from institutional partnerships (€m)														
Strong case										185,968	195,170	204,827	214,963	225,599
Base case	125,100	123,580	197,440	197,540	225,570	185,170	181,570	201,780	177,200	185,082	193,315	201,914	210,895	220,276
Conservative case										184,196	191,469	199,028	206,886	215,054
Subtotal	125,100	123,580	197,440	197,540	225,570	185,170	181,570	201,780	177,200	185,082	193,315	201,914	210,895	220,276
Revenue (€m) - Base Case	1309,382	1323,554	1569,733	1643,249	1820,577	1747,372	1839,445	1669,409	1831,580	1993,287	2181,923	2390,065	2610,706	2827,510

6.6 Annex 6

Annex 6										1	2	3	4	5
EBITDA margin	2013A	2014A	2015A	2016A	2017A	2018A	2019A	2020A	2021A	2022E	2023E	20242E	2025E	2026E
EBITDA / Revenues	70,00%	71,00%	74,00%	71,00%	75,00%	77,00%	90,00%	96,00%	100,00%					
Revenues (Revenue Build)										1993,29	2181,92	2390,07	2610,71	2827,51
EBITDA										1993,29	2181,92	2390,07	2610,71	2827,51

6.7 Annex 7

Annex 7

		2013A	2014A	2015A	2016A	2017A	2018A	2019A	2020A	2021A	Auxiliar - CAGR (13´-21´)	1 2022E	2 2023E	3 20242E	4 2025E	5 2026E
Provisions (€m)																
EUROPE (€m)																
Strong case												-0,997	-1,244	-1,551	-1,933	-2,411
ΔYoY (%)												24,68%	24,68%	24,68%	24,68%	NA
Base case		-0,100	-0,020	-0,020	-4,800	-0,180	-0,620	-1,230	-0,690	-0,800	29,684%	-1,037	0,385	-1,345	0,499	-1,745
ΔYoY (%)		-80,00%	0,00%	23900,00%	-96,25%	244,44%	98,39%	-43,90%	15,94%	29,68%		-137,10%	-449,51%	-137,10%	-449,51%	NA
Conservative case												-1,077	0,400	-1,397	0,518	-1,812
ΔYoY (%)												-137,10%	-449,51%	-137,10%	-449,51%	NA
NORTH AMERICA ($m)																
Strong case												-0,740	-0,673	-0,613	-0,558	-0,508
ΔYoY (%)												-8,96%	-8,96%	-8,96%	-8,96%	NA
Base case		-1,550	0,000	0,210	0,100	0,410	0,340	0,000	0,000	-0,920						
Usd/Eur - Base case		-1,122	0,000	0,192	0,095	0,343	0,297	0,000	0,000	-0,812	-3,960%	-0,780	-0,749	-0,720	-0,691	-0,664
ΔYoY (%)		-100,00%	-	-50,77%	263,09%	-13,44%	-100,00%	-	-	-3,96%		-3,96%	-3,96%	-3,96%	-3,96%	NA
Conservative case												-0,821	-0,040	-0,788	-0,757	-0,727
ΔYoY (%)												-95,13%	1870,19%	-3,96%	-3,96%	NA
LATIN AMERICA (R$m)																
Strong case												0,003	0,004	0,004	0,004	0,005
ΔYoY (%)												7,46%	7,46%	7,46%	7,46%	NA
Base case		-0,030	0,000	0,000	0,000	-0,010	0,000	-0,010	-0,010	0,020						
Brl/Eur - Base case	0,009189	-0,009189	0	0	0	-0,002527	0	-0,002219	-0,001564	0,003168	12,463%	0,004	0,004	0,005	0,005	0,006
ΔYoY (%)		-100,00%	-	-	-	-100,00%	-	-29,52%	-302,56%	3834,16%		12,46%	12,46%	12,46%	12,46%	NA
Conservative case												0,004	0,146	0,004	0,005	0,005
ΔYoY (%)												3834,16%	-97,14%	12,46%	12,46%	NA
EBITDA (€m)		(1,25)	(0,02)	0,17	(4,71)	0,15	(0,32)	(1,24)	(0,70)	(1,59)		(1,81)	(0,36)	(2,06)	(0,19)	(2,40)
Growth rate (N/(N-1))		-98,403%	-960,330%	-2834,672%	-103,259%	-310,525%	284,132%	-43,548%	127,480%	13,925%		-80,137%	471,843%	-90,933%	1186,085%	NA
Average Growth rate (2013A:2021A)		-203,195%														

6.8 Annex 8

Annex 8

	2013A	2014A	2015A	2016A	2017A	2018A	2019A	2020A	2021A	Average margin (2013-2021)	2022E	2023E	20242E	2025E	2026E
											1	2	3	4	5
D&A (€m)															
Consolidated BS (€m)															
Strong case - Fixed Asset Business											17241,933	18873,636	20674,064	22582,609	24457,965
ΔYoY (%)											9,46%	9,54%	9,23%	8,30%	NA
Property, plant and equipment, net	10 095	11012,98	12612,45	13437,37	13185,2	13921,79	13263,86	13491,72	14 562,30						
Right-of-use asset	-	0	0	0	0	0	615,96	674,05	668,79						
Intangible assets and goodwill, net	1 301	1405,42	1534,15	1595,68	1545,74	1577,21	1489,53	1536,89	1 584,44						
Base case - Fixed Asset Business	11 396,89	12 418,40	14 146,60	15 033,05	14 730,94	15 499,00	15 369,35	15 702,66	16 815,53		16 942,94	17 071,32	17 200,66	17 330,99	17 462,31
ΔYoY (%)	8,96%	13,92%	6,27%	-2,01%	5,21%	-0,84%	2,17%	7,09%	0,76%	0,76%	0,76%	0,76%	0,76%	0,76%	NA
Conservative case - Fixed Asset Business											16643,947	18219,059	19957,044	21799,397	23609,712
ΔYoY (%)											9,46%	9,54%	9,23%	8,30%	NA

6.9 Annex 9

Annex 9

													1	2	3	4	5
		2013A	2014A		2015A	2016A	2017A	2018A	2019A	2020A	2021A	Auxiliar - CAGR (13´-21´)	2022E	2023E	20242E	2025E	2026E
Amortization of deferred income - Government Grants (€m)																	
EUROPE (€m)																	
Strong case													-1,077	-1,451	-1,955	-2,632	-3,545
ΔYoY (%)													34,68%	34,68%	34,68%	34,68%	NA
Base case		-0,100	-0,020		-0,020	-4,800	-0,180	-0,620	-1,230	-0,690	-0,800	29,684%	-1,037	-1,345	-1,745	-2,263	-2,934
ΔYoY (%)		-80,00%	0,00%		23900,00%	-96,25%	244,44%	98,39%	-43,90%	15,94%	29,68%		29,68%	29,68%	29,68%	29,68%	NA
Conservative case													-0,997	0,370	-1,294	-1,678	-2,176
ΔYoY (%)													-137,10%	-449,51%	29,68%	29,68%	NA
NORTH AMERICA ($m)																	
Strong case													16,827	17,589	18,387	19,220	20,091
ΔYoY (%)													4,53%	4,53%	4,53%	4,53%	NA
Base case		23,1		23,1	23,1	23,1	18,2	18,2	18,2	18,2	18,2						
Usd/Eur - Base case		16,71	18,98		21,14	21,85	15,27	15,93	16,27	14,82	16,10	-0,468%	16,022	15,947	15,872	15,798	15,724
ΔYoY (%)		13,60%	-		3,39%	-30,14%	4,38%	2,13%	-	-	-0,47%		-0,47%	-0,47%	-0,47%	-0,47%	NA
Conservative case													15,217	-0,004	15,146	15,075	15,004
ΔYoY (%)													-100,03%	-342680,61%	-0,47%	-0,47%	NA
LATIN AMERICA (R$m)																	
Strong case													0,000	0,000	0,000	0,000	0,000
ΔYoY (%)													25,57%	25,57%	25,57%	25,57%	NA
Base case		0,0		0,0	0,0	0,1	0,1	0,1	0,1	-	0,0						
Brl/Eur - Base case	0,00	0,00		0,01	0,01	0,01	0,02	0,01	0,02	0,00	0,00	20,573%	0,000	0,000	0,000	0,000	0,000
ΔYoY (%)		30164,45%	-		-	-	-10,92%	-	-100,00%	#DIV/0!	1298686,21%		20,57%	20,57%	20,57%	20,57%	NA
Conservative case													0,000	0,238	0,000	0,000	0,000
ΔYoY (%)													1298686,21%	-99,99%	20,57%	20,57%	NA
Amprtization of deferred income - Government Grants (€m)		16,61	18,97		21,12	17,07	15,10	15,33	15,06	14,13	15,30		14,98	14,60	14,13	13,54	12,79
Growth rate (N/(N-1))		14,216%	11,329%		-19,201%	-11,521%	1,506%	-1,725%	-6,193%	8,252%	-2,045%		-2,555%	-3,246%	-4,192%	-5,508%	NA
Average Growth rate (2013A:2021A)		-1,740%															

6.10 Annex 10

											1	2	3	4	5
	2013A	2014A	2015A	2016A	2017A	2018A	2019A	2020A	2021A	Auxiliar - CAGR (13´-21´)	2022E	2023E	20242E	2025E	2026E
Income tax (€m)	-56,91	-16,4	-45,35	-37,57	-48,06	-63,44	-86,44	-86,08	-93,01	6,333%	-98,900	-105,163	-111,823	-118,905	-126,435
Growth rate (N/(N-1))	-71,183%	176,524%	-17,155%	27,921%	32,002%	36,255%	-0,416%	8,051%	6,333%		6,333%	6,333%	6,333%	6,333%	
Average Growth rate (2013A:2021A)	22,037%														

6.11 Annex 11

Annex 11

											1	2	3	4	5
Based on CAGR	2013A	2014A	2015A	2016A	2017A	2018A	2019A	2020A	2021A	Auxiliar - CAGR (13´-21´)	2022E	2023E	20242E	2025E	2026E
Capex & Cash Flow (€m)															
Fixed Asset (current year)											16 942,94	17 071,32	17 200,66	17 330,99	17 462,31
Fixed Asset (prior year)											16 815,53	16 942,94	17 071,32	17 200,66	17 330,99
D&A (current year)											677,72	682,85	688,03	693,24	698,49
CAPEX (€m)	626,84	732,36	902,65	1029,36	1051,1	1274,7	1109,46	2098,46	2522,08	19,008%	805,13	811,23	817,37	823,57	829,81
Revenues (€m)	1316,35	1276,71	1547,05	1650,76	1827,19	1696,69	1823,7	1730,76	1757,66		1993,287099	2181,923276	2390,065146	2610,706267	2827,510374

6.12 Annex 12

Annex 12

		2013A	2014A	2015A	2016A	2017A	2018A	2019A	2020A	2021A	Auxiliar - CAGR (13´-21´)	2022E	2023E	20242E	2025E	2026E
												1	2	3	4	5
Working Capital (€m)																
Consolidated BS (€m)																
Strong case -Working Capital												-205,048	-212,638	-220,508	-228,669	-237,133
ΔYoY (%)												3,70%	3,70%	3,70%	3,70%	NA
Current Assets		1 206	1 475	1 202	1 277	1 116	1 508	1 721	1 850	3 881						
Current Liabilitites		1 363	1 912	2 288	2 776	2 297	2 777	2 400	2 227	4 079						
Base case - Working Capital	627	-156,94	-437,37	-1085,63	-1498,81	-1180,64	-1268,69	-678,85	-377,03	-197,73	2,930%	-993,158	-1087,147	-1190,854	-1300,788	-1408,811
Base case - Revenues		1309,38	1323,55	1569,73	1643,25	1820,58	1747,37	1839,44	1669,41	1831,58		1993,287	2181,923	2390,065	2610,706	2827,510
% of Revenues		-11,99%	-33,05%	-69,16%	-91,21%	-64,85%	-72,61%	-36,91%	-22,58%	-10,80%	-1,299%	-49,825%	-49,825%	-49,825%	-49,825%	-49,825%
ΔYoY (%) - Working Capital		178,69%	148,22%	38,06%	-21,23%	7,46%	-46,49%	-44,46%	-47,56%	402,28%		9,46%	9,54%	9,23%	8,30%	NA
Conservative case - Working Capital												-185,275	-173,605	-162,670	-152,424	-142,823
ΔYoY (%)												-6,30%	-6,30%	-6,30%	-6,30%	NA

6.13 Annex 13

	Price and Index Data			Monthly returns (r)			Excess returns (er)	
Date	EDPR	uronext 10	rman 10Y	EDPR_r	ronext 10	rman 10Y	EDPR_er	uronext_e
28/02/2013	3,672038	703,59	1,46					
01/03/2013	3,634759	701,13	1,44	-1,02%	-0,35%	-1,37%	0,35%	1,02%
04/03/2013	3,644079	702,32	1,41	0,26%	0,17%	-2,08%	2,34%	2,25%
05/03/2013	3,657127	714,6	1,45	0,36%	1,75%	2,84%	-2,48%	-1,09%
06/03/2013	3,662719	713,35	1,47	0,15%	-0,17%	1,38%	-1,23%	-1,55%
07/03/2013	3,699066	715,9	1,46	0,99%	0,36%	-0,68%	1,67%	1,04%
08/03/2013	3,699998	723,79	1,49	0,03%	1,10%	2,05%	-2,03%	-0,95%
11/03/2013	3,681359	723,15	1,49	-0,50%	-0,09%	0,00%	-0,50%	-0,09%
12/03/2013	3,651535	722,95	1,48	-0,81%	-0,03%	-0,67%	-0,14%	0,64%
13/03/2013	3,678562	722,95	1,47	0,74%	0,00%	-0,68%	1,42%	0,68%
…	…	…	…	…	…	…	…	…
29/09/2021	21,01657	1277,87	-0,21	0,09%	-2,11%	5,00%	-4,91%	-7,11%
30/09/2021	21,3353	1282,07	-0,22	1,52%	0,33%	4,76%	-3,25%	-4,43%
01/10/2021	21,61419	1275,93	-0,23	1,31%	-0,48%	4,55%	-3,24%	-5,02%
04/10/2021	20,99664	1275,94	-0,21	-2,86%	0,00%	-8,70%	5,84%	8,70%
05/10/2021	20,75759	1266,67	-0,23	-1,14%	-0,73%	9,52%	-10,66%	-10,25%
25/10/2021	23,68597	1331,44	-0,1	-0,25%	0,79%	25,00%	-25,25%	-24,21%
26/10/2021	23,58636	1328,3	-0,14	-0,42%	-0,24%	40,00%	-40,42%	-40,24%
27/10/2021	23,92502	1336,35	-0,15	1,44%	0,61%	7,14%	-5,71%	-6,54%
28/10/2021	24,68201	1333,93	-0,17	3,16%	-0,18%	13,33%	-10,17%	-13,51%
29/10/2021	24,0047	1343,15	-0,1	-2,74%	0,69%	-41,18%	38,43%	41,87%
01/11/2021	24,60233	1343,09	-0,1	2,49%	0,00%	0,00%	2,49%	0,00%
02/11/2021	24,32344	1352,1	-0,14	-1,13%	0,67%	40,00%	-41,13%	-39,33%
03/11/2021	22,86921	1353,92	-0,19	-5,98%	0,13%	35,71%	-41,69%	-35,58%
04/11/2021	22,59032	1358,3	-0,18	-1,22%	0,32%	-5,26%	4,04%	5,59%
05/11/2021	22,05245	1366,11	-0,24	-2,38%	0,57%	33,33%	-35,71%	-32,76%
08/11/2021	22,45087	1373,1	-0,27	1,81%	0,51%	12,50%	-10,69%	-11,99%
09/11/2021	22,31142	1372,62	-0,26	-0,62%	-0,03%	-3,70%	3,08%	3,67%
30/11/2021	22,53055	1312,45	-0,36	0,71%	0,65%	12,50%	-11,79%	-11,85%
01/12/2021	22,45087	1299,21	-0,32	-0,35%	-1,01%	-11,11%	10,76%	10,10%
02/12/2021	21,61419	1326,74	-0,36	-3,73%	2,12%	12,50%	-16,23%	-10,38%
03/12/2021	21,27554	1307,8	-0,37	-1,57%	-1,43%	2,78%	-4,34%	-4,21%
06/12/2021	21,57435	1298,5	-0,38	1,40%	-0,71%	2,70%	-1,30%	-3,41%
07/12/2021	22,1919	1314,98	-0,37	2,86%	1,27%	-2,63%	5,49%	3,90%
08/12/2021	21,8134	1356,77	-0,38	-1,71%	3,18%	2,70%	-4,41%	0,48%
09/12/2021	22,0923	1345,27	-0,34	1,28%	-0,85%	-10,53%	11,80%	9,68%
10/12/2021	21,49467	1338,73	-0,34	-2,71%	-0,49%	0,00%	-2,71%	-0,49%
13/12/2021	21,69388	1333,19	-0,37	0,93%	-0,41%	8,82%	-7,90%	-9,24%
14/12/2021	20,81735	1322,64	-0,37	-4,04%	-0,79%	0,00%	-4,04%	-0,79%
15/12/2021	21,05641	1311,69	-0,37	1,15%	-0,83%	0,00%	1,15%	-0,83%
16/12/2021	21,3353	1314,7	-0,36	1,32%	0,23%	-2,70%	4,03%	2,93%
17/12/2021	21,51459	1326,28	-0,36	0,84%	0,88%	0,00%	0,84%	0,88%
20/12/2021	21,09625	1315,69	-0,39	-1,94%	-0,80%	8,33%	-10,28%	-9,13%
21/12/2021	21,55443	1302,63	-0,35	2,17%	-0,99%	-10,26%	12,43%	9,26%
22/12/2021	21,55443	1325,62	-0,29	0,00%	1,76%	-17,14%	17,14%	18,91%
23/12/2021	21,73372	1339,48	-0,27	0,83%	1,05%	-6,90%	7,73%	7,94%
24/12/2021	21,75364	1353,32	-0,25	0,09%	1,03%	-7,41%	7,50%	8,44%
27/12/2021	21,65403	1349,62	-0,23	-0,46%	-0,27%	-8,00%	7,54%	7,73%
28/12/2021	21,65403	1360	-0,23	0,00%	0,77%	0,00%	0,00%	0,77%
29/12/2021	21,47475	1365,65	-0,23	-0,83%	0,42%	0,00%	-0,83%	0,42%
30/12/2021	21,65403	1360,2	-0,21	0,83%	-0,40%	-8,70%	9,53%	8,30%

6.14 Annex 14

Annex 14

	2021A	Remarks
Equity beta calculation (€m)		
1. Beta	0,9994	Based on the regression analysis
2. D/E target ratio	0,7200	Average past 5 years
3. Corporate tax rate (Tc)	25%	Spanish tax rate
4. Levered beta = [Ba+(Ba-0)(D/E)*(1-Tc)]*	1,539	
WACC Calculation (€m)		
1. Risk free interest rate	0,00%	Yield of a 10y bund
2. Market risk premium	5,2728%	
3. Average equity beta	1,539	
*4. Equity cost of capital (1+2*3)*	8,1156%	
5. After taxes cost of debt	3,48%	
6. Target Debt/Assets value (D/V)	47,083%	Average past 5 years
7. Target Equity/ Assets value (D/V)	52,917%	
*WACC (4*7+5*6)*	**5,9330%**	

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