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Equity Valuation

Vestas Wind Systems A\S

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Abstract

The goal of this Thesis is to evaluate Vestas Wind Systems A\S. For this purpose, the current valuation methodologies were discussed. The conclusion was to use three valuation methodologies. Firstly, the Discounted Cash Flow methodology was performed due to its acceptability both among researchers and professionals. Three scenarios were created to account for the uncertainty tied with the cyclicality of the business, and probabilities were assigned based on the economical reasonability of each. A final price of kr. 300,51 was reached, implying that the firm is undervalued (market prices kr. 250).

Secondly the Economic Value Added approach was conducted, providing insight on the periods in which the company is able to generate economic profit. The three scenarios were also used. The final price of kr. 356,62 was reached yielding a buy opportunity.

Thirdly the multiples valuation was performed in order to better understand the industry and the company's peers. A forward looking enterprise value to EBIT multiple was used and a final price of kr. 302,01, also implying that the company is undervalued. In addition a Value at Risk analysis was performed to access the risk of our recommendation.

Finally our valuation target price (from 300 to 360) was compared with the valuation from Skandinaviska Enskilda Banken, and reached the conclusion that although results are similar, methods and business assumptions differs.

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Table of Contents

Index of Tables

Index of Figures

1. Introduction

The focus of this thesis is to find a suitable way to value a public listed company. For this purpose, an evaluation of Vestas Wind Systems A/S will be performed, focusing on different valuation method. This arises mainly for two reasons: to have a range of values that truthfully reflects the value of the company and to look at a firm´s value through different perspectives.

Firstly, a review of some of the most currently used valuation methods will be discussed, focusing on each advantages and disadvantages. This is important to understand how different valuation approaches look at the different parts of a company. The conclusion of this discussion is to use a DCF method, for its detail and acceptability, the EVA approach, to understand the ability of the company to generate economic profit, and the Multiples approach, due to its simplicity and popularity among professionals. In addition a VaR analysis will be performed to have a better estimate on the risk of the recommendation of this thesis.

Afterwards, the industry will be analysed, focusing on trends that are arising in the wind turbine manufacturing segment. This analysis will be followed by study on the company, its outlook and its peer group.

In the following chapter the valuation estimates will be detailed in order to better understand the results that will be shown in the next segment, the valuation results. The main conclusion from this segment is that all three methods imply that the company is undervalued in the market, yielding a buying opportunity. The different valuation methods also yield a more complete study on the company.

Finally, these studies results will be compared with a published report from the equity research team from Skandinaviska Enskilda Banken. The main take away from this analysis is that although valuation results are the same, estimates, assumptions and valuation methodologies differ among both studies.

In short this thesis will be an in depth study about the valuation of Vestas Wind Systems A/S, having to go through different valuation methodologies, estimates and assumptions to do so.

2. Literature Review

Finding the right model or approach to value a company has been the focus of both academics and professionals. This has proven an elusive task as different businesses have different realities and therefore different drivers of company values, which sprung a number of methodologies that focus on different aspects of the company.

Even though the importance of proper valuation of a firm has been driven by efforts of both investors and researchers there has been increasing literature focused on the importance of valuation for managers and the understanding of the business, as in Luerhman (1997). This study refers that it is has become more important for managers to be knowledgeable of different valuation methods, which is understandable since different methodologies of equity valuation provide different insights on the business, and the different parts that make up a firm.

This last idea, different methods yield a different understanding of the various slices of the company, is reinforced by Young et al (1999), where the author states that different approaches give knowledge about some aspects of the firm while ignoring other facets of the business. Additionally there is an emphasis on this paper that says that despite focusing on similar aspects, different methodologies should yield the same results as long as the underlying assumptions are consistent, and so comparison among them is feasible as well as interesting.

This segment will focus on the discussion of the current state of research on equity valuation, the different methodologies and their strengths and weaknesses. After this analysis we will be in a more capable state of choosing the best combination of methods to conduct the valuation of Vestas. It should be remembered that analysts value companies through different approaches and have different assumptions regarding the business, which is why it will be interesting to compare the different methods with which this thesis will conduct its analysis as opposed to the methods chosen by others.

2.1. Multiples Valuation

Multiples are a very popular valuation method due to their simplicity and straightforwardness. Nonetheless this approach is used less in a standalone basis and more to make sure other forecasted methods are more correct. This point is present in Goedhart et al (2005), where the authors conclude that even though "discounted-cash-flow analysis delivers the best results… a thorough analysis on multiples also merits a place in valuation"[1], and leads to a informative discussion on the differences in strategies between the company and its competitors. The same idea is stressed in Fernández (2001), which states that one should use multiples after

[1] Goedhart, Marc, Timothy Koller, and David Wessels. "The right role for multiples in valuation." McKinsey on Finance 15 (2005): 7-11.

performing another valuation method. All in all, literature is very consistent in terms of the role of multiples as a complementary valuation method.

This method, also called relative valuation, as the particularity of using market prices of similar assets that are priced in the market, and so, has the underlying assumption that the market is efficient. Due to this, and to the fact that the accounting values that are used in the multiples sometimes are built differently across companies, this valuation might be deceptive.

Some measures are necessary to make a consistent relative valuation. The first is to define the peer group, the group of companies that are similar to the one we are evaluating. This has been one of the most debated topics among researchers. In fact Cooper et al (2008) reported that a higher number of multiples yielded a more accurate estimate but in the same study found that a small peer group that had very similar companies, especially similar expected growth rates and similar average rates also had a good performance.

The choosing of comparable firms is challenging because after doing a short list of peers, normally through the main competitors that the company identifies or by statistical methods like a centroid analysis, it is necessary to understand why those companies have different multiples. Normally these differences are due to different ROIC or growth rates, since the higher these are the higher the multiple will be.

The second is to choose which multiple to use. Liu et al (2001) found that forward looking multiples are more accurate in valuing a company, which is understandable since in the expected future cash-flows "reflect future probability better than historical"[2]. One of the most used multiples among professionals is the P/E ratio, but this has received numerous critiques mainly because it does not take into account different capital structures and so companies with more leverage will be undervalued, in addition to being based on earnings and not accounting for nonoperating items. In Liu et al (2001) it is also reported that enterprise value multiples yield more precise pricing than the P/E, since the former minimize the problem of different capital structures. Still it is important to notice that even "enterprise-value to EBITA multiples still depend on ROIC and growth"[3].

Lastly, it is important to notice that even after having taken into account the two measures described above, one cannot forget that, as described in Damodaran (2005) it is important to adjust "for differences across assets when comparing standardized values"[4]. For example if the enterprise-value to EBITA multiple is chosen then it would be necessary to adjust for

[2] Liu, Jing, Doron Nissim, and Jacob Thomas. "Equity valuation using multiples." Journal of Accounting Research 40.1 (2002): 135-172.
[3] Goedhart, Marc, Timothy Koller, and David Wessels. "The right role for multiples in valuation." McKinsey on Finance 15 (2005): 7-11.
[4] Damodaran, Aswath. "Valuation approaches and metrics: A survey of the theory and evidence". Now Publishers Inc, 2005.

nonoperating items that are present both in enterprise-value and EBITA, like for example employee stock options, excess cash and nonoperating assets.

Despite being fairly simple to use and being very popular among researchers and professionals, it is still important to notice that these methods do not make us think about the prospects of the firm or the industry like other methods do, which can make us overlook growth perspectives or riskiness of the business. Relative valuation is therefore rarely used in a standalone basis, instead being bundled with other valuation methods that demand more assumptions.

2.1.1. Peer Group Selection

To select a good peer group is a very difficult task, and even the most experienced analysts have difficulty. After developing a short list based on the indications on the previous topic there are some statistical methods that are useful tools to help in this task, like for example a centroid analysis. This exercise groups the companies in different clusters in a way that minimizes the distance of the distance of the companies to the centroids of those clusters. This will group companies that have similar characteristics, or variables. In this way the tool allows us to make a thoughtful decision regarding which variables to use, like sales, level of debt or others.

Notwithstanding the use an established statistical tool, very popular for selecting the peer group of a company, we still need to screen the results given since the statistical method might include peer companies that should not be considered peer from an economic sense.

2.2. Cash Flows based Valuation Methods

The methods that will be detailed in this section have some assumptions in common. The models demand a discount factor that is the cost of capital, that we cannot estimate accurately without using an asset pricing model that will yield a discount factor based on the riskiness of the firm.

The most accepted, introduced by Sharpe (1964), is the capital asset pricing model (CAPM), a one-factor model that relates the return of the firm with the return of the market. There have been other alternatives or extensions such as the Fama and French (1993) three factor model, which introduces the size and the growth as a factor, and the Carhart (1997) that additionally includes a factor on momentum.

Even though there has been evidence that the more recent models are sometimes more accurate than the CAPM, this is still the most used when trying to estimate the value of a company. CAPM states that the return of a company, $E(r_i)$, is equal to the risk free rate of the market, r_f, adding the firm's beta, β_i, that is an estimate of the company's correlation with the market, multiplied by the market risk premium. The formula of the model is given below.

$E(ri) = rf + \beta i [E(rm) - rf]$

To calculate the cost of capital, and its components one needs a couple of inputs for the CAPM, our previously chosen asset pricing model.

The risk free rate calculation is often overlooked but it is a very important part of calculating the cost of capital, and when conducted wrongly may yield very inconsistent valuations. One of the most common mistakes, pointed in Fernandéz (2004), is the use of the historical average risk free rate. Instead the author states that the risk free rate to be used is the risk free government bond as of the day in which the cost of capital is calculated. The author still refers that it this rate should be the long term risk-free government bond. Koller et al (2005) states that the risk free rate should be the government bond in the same currency as the cash-flows are.

The market risk premium has been a puzzle in empirical studies since ever. Researchers have been trying to understand what causes the difference between returns on the market and the returns on the risk free government bond. It is usually computed as a historical average of this difference. There has been a discussion on which average to use, since the geometric average generates the best unbiased premium, but some suggest the geometric average since the former may overstate the premium. The return on the market should be the return of a stock market that truthfully reflects the business scope in which the company operates.

The beta of a company is a measure of the correlation between the firm and the market volatility, serving as a proxy for the firm's exposure to market risk. There are several ways to estimate the Beta. Damodaran suggests performing a regression of the returns of the firm security on the market returns. The market index should be a weighted index. It is also very important to define the time period we are regressing. It might seem clear that a bigger time frame should yield more accurate results and yet it would also increase the probability of very different firm characteristics. In terms of frequency of the data one cannot forget that while higher frequency will yield us a higher sample, one should take into account that daily returns are negatively correlated, and practitioners tend to use weekly or monthly returns.

2.2.1. Dividend Discount Model (DDM)

The DDM was the first widely accepted valuation technique and it was created with the publishing of Williams (1938) and later adapted to a more used model, the Gordon growth model, introduced in Gordon, et al (1956). The intuition behind the model is very simple and easy to understand. According to this method the stock of a company is as valuable as the discounted dividends of the following year, assuming these will grow in perpetuity at a constant rate, discounted by the by the investors' required rate of return. The formula is given bellow.

$$E_i = \frac{Div_{1,i}}{r_{e,i} - g_i}$$

The model seems straightforward and correct as there has been evidence that some investors do focus on dividends. It is also noticeable that the idea behind the model is to derive the cash-flows that will go to shareholders and so, calculate the value of Equity.

The main drawback arising from the model is that it is only useful for companies with stable dividends. In fact if a company retains cash and repays a small amount of the dividends, it will probably be undervalued by this method. Spending on good investments that generate value for the company is also not accounted for in this model.

Summing up this model has been less used than the ones described in the following paragraphs, but it is still very important since it established the based for the methods developed since.

2.2.2. Discounted Cash Flows (DCF)

Currently, there is no more widely used valuation method than the DCF. This method shares similar thinking of the DDM, but focuses on enterprise value rather than equity value, and so it accounts for investment opportunities that generate value for the company. In DCF we need to forecast future cash-flows that the firm will generate and discount it by the cost of capital that accounts for the cost of debt and equity of the firm, like the Weighted Average Cost of Capital (WACC). The WACC yields an entirely new discussion on itself and we will address it later. The DCF formula is given below. The terminal value will be detailed in the next topic.

$$Vi = \sum \left(\frac{FCFFi}{(1 + WACC)}\right) + \frac{TV_t}{(1 + WACC)^t}$$

It is a model that is simple, clear and demands a deep reflection and thinking of the drivers of the firm's business, as well as an understanding of the industry's future. Therefore the exercise is valuable in itself not just for investors, but also for the managers of the firm, given the strategic insights that should arise from it. Let's take a look at some of the steps that should be accounted for when using this method.

Firstly, one should forecast the cash-flows that will arise from the company's operations, and this is the where we can gain valuable knowledge about the firm and its industry. There is no optimal solution in determining for how many years we should forecast cash-flows, although periods from 5 to 10 years are the most used. Nonetheless the most important aspect is to forecast until the company is in the steady state, which might vary a lot depending on the company lifecycle.

Secondly, one should know that when valuing cyclical companies, like Vestas, it should not be forgotten to capture the whole cycle of the business while forecasting the cash-flows. After

defining the number of years to study one should compute the terminal value, which we will study later in this section. It is crucial to remember that the longer the forecasted period is, the less accurate will our expectations be.

Thirdly, it is important to understand the difference between forecasting the free cash-flows to the firm (FCFF) or the free cash flows to equity (FCFE). These two approaches are similar and, when performed correctly, must yield the same results, but the former looks at the cash-flows that will go to the firm while the later looks at the cash-flows from operations that should be available to equity holders. Also, while the first is discounted by the WACC, the second is discounted by the cost of equity. These cash flows are related through the following equation:

$$\text{FCFE} = \text{FCFF} - \text{Interest} * (1 - \text{t}) + \Delta\text{Net debt}$$

Notwithstanding the fact that the methods should yield the exact same results if the inputs are consistent, it is important to notice that the FCFF will demand more assumptions and require more thinking.

Even though DCF is one of the most widely used methods by professionals, it is not without its critiques. One of the biggest is that it assumes that, after the payment of dividends, all the cash-flow is used in project with returns that are at the same level as the discount rate that we are using.

Another shortcoming of the model is the need to use long term forecasts, in order to account for investments that will only generate return in the future. This model fits ideally with companies that have a stable growth rate of cash-flows. In addition, companies that have a lot of change in their capital structure are not suitable for this method and should therefore use the APV method that we will see later, since using the DCF would make the process extremely computational heavy.

Other drawback is that theory says that cyclical companies should not be evaluated through this method given the instability, and uncertainty surrounding their cash-flows. However, Koller et al (2005), states that "Using scenarios and probabilities, managers and investors can take a systematic DCF approach to valuing and analysing cyclical companies"5. In the same study publication it is stated that the most challenging part is to find if there is beginning a new growth trend in the business cycle, which the authors say can be minimize by building scenarios and allocating the right probabilities. All in all, with some extra caution, it is possible to use the DCF approach to value cyclical businesses.

[5] Koller, Tim, Marc Goedhart, and David Wessels. "Valuation: measuring and managing the value of companies". Vol. 499. John Wiley and Sons, 2010.

2.2.3. Terminal Value

The estimation of the terminal value is an integral part of the DCF method and very important since it usually contributes with the biggest part of the final value. It is necessary to compute the terminal value in most situations because of the already mentioned difficulties of estimating long-horizon cash-flow forecasts. The terminal value is a simple way to compute the value that the company will be worth at the time in which we stop our estimation period.

With this in mind let's take a look at the methods that allow us to calculate the values of a company in the future. Koller et al (2005) identifies four distinct methods by which to calculate the terminal value.

The cash-flow approach, also named the stable growth model, assumes that the company will continue operating and be growing at a stable rate. In order to use this approach one needs to make sure that the explicit period of cash flow forecasts is such that in the end of the period, where we are calculating the terminal value, the company is in their steady state and growing at a constant rate. This constant rate should be smaller than the growth rate of the economy in which the company is in.

The multiples approach assumes that the value of the company will be a multiple of its future earnings or book-value, which is based on today's company multiple. The reason behind this method is simple. The multiples of today should contain expected growth of the company not just for the explicit period as for the growth forever. The main limitations are if the prospects in the explicit period and after it might be different and that we are mixing a DCF valuation with a multiple valuation. In addition we have already seen the concerns in using relative valuation, which will be heightened by the fact that we are choosing multiples for maybe 10 years down the road.

The liquidation value states that the continuing value is equal to the expected value of the sale of the firm's assets minus the liabilities of the firm. Koller et al (2005) advise to only use this method if we expect that liquidation is likely since "In a growing industry, profitable industry, liquidation value is probably well below going concern value. In a dying industry, liquidation value may exceed going concern value"6.

2.2.4. Discount Rate (WACC)

The discount rate used in DCF is usually the WACC. The WACC is formula takes into account the capital structure of the firm, giving weight to debt, capital and sometimes mixed instruments that are in the middle of the two (in parentises in the formula below) . The formula is given below.

[6] Koller, Tim, Marc Goedhart, and David Wessels. "Valuation: measuring and managing the value of companies". Vol. 499. John Wiley and Sons, 2010.

$$WACC = \frac{D}{D+E+P} * r_d * (1-t) + (\frac{P}{D+E+P} * r_p) + \frac{E}{D+E+P} * r_e$$

The WACC became popular because it is fairly easy to compute and it encapsulates the advantage of debt, since higher debt means higher tax shield. However, the WACC, and the DCF since these are tied together, have become increasingly target of critics, and Luehrman (1997) considers the method "obsolete" since he considers it only useful if companies have a constant capital structure.

This has been in fact one of the major drawbacks of the model that has seen its importance fade due to three other factors: the weaker consensus that companies should have a target capital structure, the evolution of computation methods that made easier alternatives of the DCF and the diffusion of capital structures that include more exotics instruments. In fact one of the alternatives that we will in the following sections, the APV, is considered by Luehrman (1997) to "always work when WACC does, and sometimes when WACC doesn't, because it requires fewer assumptions"7.

2.2.5. Adjusted Present Value (APV)

The APV has become more popular due to the limitations of the DCF/WACC methodology that we have already seen. But the main advantage of this method is that, as described by Luehrman (1997), through its computation, a manager may get the sense of the different parts that constitute is company. The underlying idea behind the APV is both clear and logic. Compute the cash-flows of the firm and use the cost of equity as the discount factor. In this sense we are calculating the value of the firm as if it this were entirely financed by equity.

Afterwards we are going to calculate all the side effects of financing separately. In this sense is also a more desirably method especially for companies with more exotic capital structure, since the WACC, bundles the side effects of financing into a single discount rate. By calculating separately the Present Value of Interest Tax shield (PVTS), the bankruptcy costs and other costs, a manager gets a better sense of the value drivers of its business and the weaknesses of its financing system, giving the management team more knowledge and therefore, more flexibility to act.

The PVTS is the savings that a company will have by contracting a certain amount of debt. This happens because equity earnings are subjected to taxes while debt interests are not, and so, while a company pays first to its debt holders than its shareholders, the later will get the tax savings that came from interest payments. The PVTS formula is given below.

$$PVTS_t = \frac{D * r_d * T}{(1+r_d)^t}$$

[7] Luehrman, Timothy A. "Using APV (adjusted present value): a better tool for valuing operations." Harvard Business Review 75.3 (1996): 145-6.

Where D is the debt level, rd is the cost of debt and T is the tax rate. It is also worth pointing out that the interest payments will be debt multiplied by equity. One cannot forget that there are other methods to calculate the PVTS, as a matter of fact Fernandéz (2004) states that the formula above is only valid if the company does not increase its debt levels.

However the debt also has disadvantages. As the debt in a company increases, and tax savings increase, there are other costs, as is the case of cost of financial distress, that also increase. Therefore there should be an optimal level of debt in which a company should be based on its characteristics and in the ones of its industry, as well as other factors such as the country in which the company has its operations. Ultimately a company that has more liquid assets should be able to carry more debt, as the costs of financial distress should be lower.

An integral, and not very straightforward, part of calculating the APV is the computation of the Expected Bankruptcy Costs. This is one of the most important and also difficult tasks that one has to consider when using the APV method. While at a first glance (from the formula below) it seems easy to think and so, easy to apply, but the inputs of the formula will be hard to calculate.

$$E[BC] = PD * \text{Bankruptcy Costs}$$

There is no consensus methodology as how to calculate the Probability of Default (PD). Damodaran suggests the bond rating of a company as a good approximate measure of the probability of default. The bankruptcy costs provide a bigger challenge. These costs can be direct, like lawyer fees or auditor's fees, or indirect, like lost of sales or lost of financial alternatives. While the former are easy to estimate the later is harder to quantify.

All in all, this valuation approach provides very good insights on the parts that constitute a company and additionally gives the manager more knowledge and, consequently, more flexibility to act on the financing of the company. However, in companies that have fairly stable capital structures as well as the absence of exotic instruments, the APV provides a value in accordance with the DCF method.

2.3. Methods based on Profitability

According to Koller et al (2005) one of the main drawbacks of the cash-flow based methods is that "each year's cash-flows provides little insight on a company performance"[8], and so if there is a decrease in cash-flows might be poor performance of the company or investment that will only payoff in the future. In contrast the methods that are based on profitability indicate when and how a company generates value. We are going to take a look at two of these methods.

[8] Koller, Tim, Marc Goedhart, and David Wessels. "Valuation: measuring and managing the value of companies". Vol. 499. John Wiley and Sons, 2010.

2.3.1. Economic Value Added (EVA)

Koller et al (2005) present a version of this model that was derived from the DCF model and so should be equivalent given that some assumptions are take into account (the Invested Capital should be last year value, ROIC and invested capital must be calculated consistently and a constant cost of capital to discount projections). The formula presented is the one below.

$$V_{firm} = IC_0 * \sum_{t=1}^{\infty} \frac{IC_{t-1} * (ROIC_t - WACC)}{(1+WACC)^t}$$

As we can see from the formula, this model states that a company can only generate economic value if the return on invested capital (ROIC) exceeds its cost of capital. The value of a company is equal to the book value of invested capital adding the present value of the future economic profit will be generated by the firm. Naturally if the future value added is zero the company value is equal to the book value of invested capital. Like the DCF this model gives the value of the firm as a whole, looking at the value form a firm's perspective.

2.3.2. Residual Income (RI) Model or Dynamic ROE

This model is similar to the EVA, with the caveat that it looks at the valuation process from an equity perspective. This model has become more relevant since Ohlson (1995). The formula is the following.

$$V_{eq} = E_0 * \sum_{t=1}^{\infty} \frac{E_{t-1} * (ROE_t - K_e)}{(1+K_e)^t}$$

As we can see the reasoning is the same as we have seen previously, in the EVA section, only this time we see it form the perspective of the Equity. The return on equity (ROE) has to be bigger than the cost of equity (Ke). This model has an equivalent DCF model that is the DDM.

The main advantages of these methods that use profitability are that one can distinguish when a firm is having economic profit, which is the relation that DCF fails to capture. However the main drawback that comes from this method is the accounting standards of the firm. These models are based on accounting of a firm and all income and expenses must be included on the income statement, and if not, the valuation will be misleading.

In addition the methods based on profitability are more used for short term forecast horizons, therefore not being as universally used as cash-flows based models. A thorough analysis of a company accounts is advised before implementing these valuation methods.

2.4. Real Option Valuation

Real options based valuation as gained more relevance lately, mainly among researchers, since it accurately illustrates the options that a manager has in its activities. However, this is a very

hard process to execute and so it is mostly used in specific situations, where other methods failed. Such examples are the business of commodities exploitation firms or a film making studio.

An option should be a business decision where a manager has the choice of making or abandoning an asset. This asset should be tangible and should be able to be translated in the same way as a financial option is. Real option theory became popular since it captures the value of a choice, which managers always have, where a rigid DCF analyses fails to capture (if not performed with multiple and variable scenarios). Firms may, for example, ignore a project with negative NPV that, if included an option that is present could have a positive NPV.

All in all, the main advantage of real option valuation is the fact that we are capturing the value of flexibility that companies have like expanding a project that shows good results or scaling back a project that is delivering bad results. This can alter the value of a business substantially.

There are two methods to value a business and accounting for their options flexibility, the Binomial Model and the Black-Scholes Model. While the later has some strong assumptions regarding the volatility of the prices of the assets and therefore is more used on commodities exploitation, the former is more computational heavy but can be applied in more situations.

Fernandéz (2002) states that Real Options valuation can only be applied when it is possible to replicate a portfolio that displays the same return as the option that we are valuing, since this is the basics of option valuation.

The relevance of including flexibility on the valuation of a company has led some to suggest the use of options valuation in addition to the DCF, in order to not undervalue a company just for the fact that we are not accounting for the flexibility that comes from a business option. Koller et al (2005) states that in this valuation method uncertainty and flexibility are different and so the author suggests that in addition to valuing flexibility with options one should account for uncertainty with scenarios in the DCF valuation.

Ultimately the limitations of the existing models, and their computational heavy nature, has resulted in real options only being used in specific situations and when it is possible and clear to create a replicating portfolio.

2.5. Summary of Valuation Models

In order to summarize and make a clear decision on the model to use in the exercise of this study, we are going to observe the figure below that sums up the different methods advantages, disadvantages and the situations were ones are used instead of others. This will be very important to select which are the valuation methods that best apply to Vestas characteristics.

Type	Method	Advantage	Disadvantages	Firm Type

Relative Valuation	Multiple	Very easy to compute Good for understanding the industry and the competitors	Assumes efficient market Ambiguity in choosing peer group	This method is very useful mainly for checking other valuations methods
Cash-flow based methods	DDM	Simple to use Focus on Equity	It is dependent on dividend policy Does not account for value creation	Stable Firms that have stable dividends and significant dividend level.
	DCF	Easy to understand Makes one study the future of the business	WACC might overlook financing complexity Gives a whole estimate of the firm, not looking at the parts	Firms with stable capital structure, and no exotic debt instruments
	APV	Easy to understand Makes one study the future of the business Gives the parts of the company finances	Assumes that reinvestment yields cost of equity Bad cash-flows are poor performance or investment	Most firms since this is a valuable tool for managers Firms with exotic capital structures
Profitability based methods	EVA and RI	Focus on economic performance	Requires accounting methods to be studied	Most firms
Real Options	Binomial model Black-Scholes	Captures Flexibility that is present in managers decisions	Very hard to apply to most companies	Commodities exploration R&D companies

Table 1: Resuming Valuation Methods

2.6. Conclusion

But which of these methods applies to Vestas and its business? Is it necessary to choose one or will the exercise of different valuation methods yields us a more comprehensive firm's picture?

The real option valuation method does not apply since it would be very hard to create a replicating portfolio of the firm industrial activities and different aspects of the business. The company has not paid dividends since the last ten years, and although recently the company CFO has come forward and said that the company will be paying its dividends in a not so distant future, it is not expected that this should be relevant for a company of the business size of Vestas, and so the DDM will not be considered further.

The model chosen to valuate Vestas will be a DCF analysis that takes into account a reasonable number of scenarios (two scenarios in addition to the base case) to account for the uncertainty that comes from the industry's cyclicality.

The explicit forecasted period will be the necessary time frame to account for a full business cycle, and the terminal value will be calculated as the average of the explicit period cash-flows.

In addition an EVA valuation model will be performed not just to double check the results, but to better understand the value creating process of the company (the same scenarios will be included).

A multiple analyses will also be performed as a check measure. The multiples to be used will rely on forward looking multiples, and based on enterprise value since, as we have seen previously in this chapter, these are the ones that are more accepted by both researchers and investors.

3. Industry Overview

The Wind Energy market has been gaining relevance in the last decade and Vestas has been at the forefront of this growth, alongside General Electric and Siemens. Other companies have been emerging as competitors in some European companies like German Enercom and Spanish Gamesa, as well as some companies in the emerging markets that are supported by these governments like the Indian Suzlon or the Chinese Goldwind. In the graph below we can see the increase in the installed capacity of wind turbines since 1996.

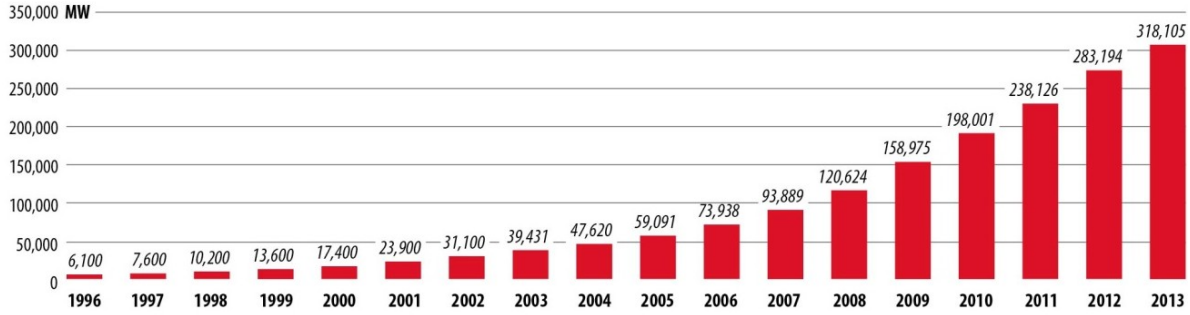


Figure 1: Global Cumulative Installed Wind Capacity, Source - Global Wind Energy Council (GWEC).

This industry is somewhat cyclical, as most manufacturing industries, mainly due to the high level of fixed costs. The industry was impacted by the 2008 financial crisis with a delay of two to three years since the main effect, particularly on Vestas, was felt in 2010 and 2011, not only due to the cyclicality but also due to the increased difficulty in financing large projects. In fact the financial crisis has prompted companies to restructure, decrease fixed costs and increase outsourcing. Vestas has done this restructuring in 2012 and 2013.

Nonetheless the crisis has not stopped the growing trend of demand of wind energy since this has become the most developed and efficient green energy. Additionally, the outlook of the

wind energy market is positive has it is expected to continue its growth due to the oil and gas becoming more scarce and pricier, continuing the trend observed in previous years. Countries and Governments have also been pushing to be less dependent on fossil fuels, which make the forecasted scenarios look even more encouraging for wind turbine manufacturers.

The industry is also deeply impacted by government policies. Whether it is regulation that favours green energy, international agreements regarding environment protection or subsidies and co-investments given by governments to energy distributors used to build facilities, the growth of the wind energy market is, and has been, strongly tied with politics actions. It is importance to notice that state subsidies have been very important in driving the growth of companies like Vestas that attribute most of their revenue to big projects. This is also evidenced by the recent growth of Chinese producers due to the government effort on decreasing fossil fuels dependency.

In the last decade there has been a growing concern among the worlds' demographic from the use of green energy as an alternative from not just the fossil fuels, but also the socially condemned nuclear energy. As green energy becomes more popular among consumers wind distributors have been looking to use more renewable energy sources and communicate their "greener" image.

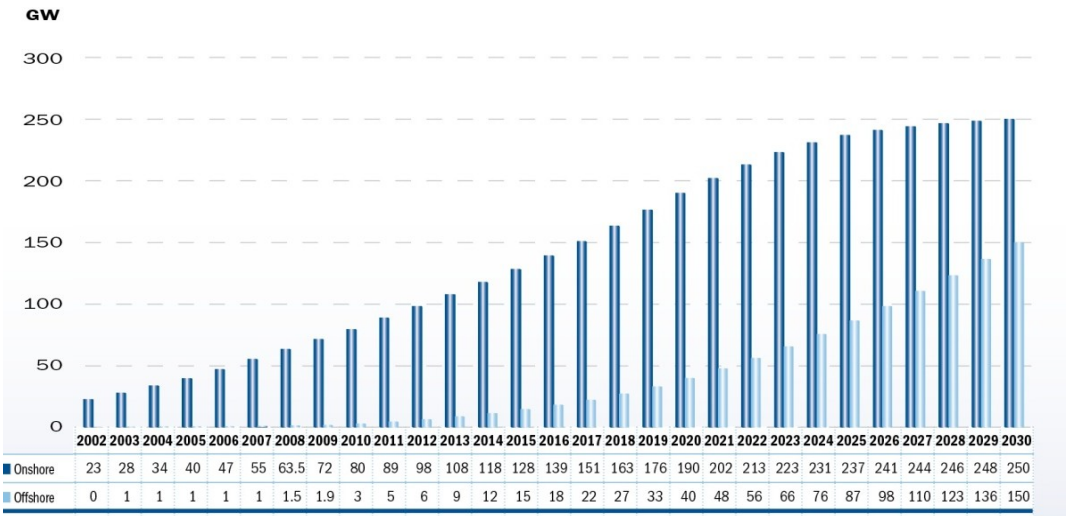
Notwithstanding the popularity of wind energy, there are still some fractions of the population against it, mainly people that live close to wind farms and complain about the effect on the landscape and the noise generated by the turbines.

Another factor that might contribute to the positive outlook on the demand in wind energy is the focus of the producers to invest in research and development, which has been driven by the desire to get an edge over the competition, in order to provide more power/cost efficient turbines. This is also notable by the number of patents that these companies possess. In the long term this expenses should make wind energy more attractive, therefore increasing its demand.

It is also very important to notice that a big part of the expected growth in this industry shall be driven by the increase in demand in emerging markets. This is a very consensual forecast among analysts of the industry, which expect mainly India and China to drive growth. Vestas acknowledges that it does not have a dominant role in these markets, and has made it a goal to increase its share in the emerging markets.

The industry has high entry barriers due to the high fixed costs of that are associated with the manufacturing of the turbines. The main substitutes for wind energy are the fossil fuels that are becoming more expensive and loosing relevance to renewable energy, nuclear energy that has been losing importance due to the negative effects caused by disasters and other green sources, that are not as efficient or with such potential as the wind energy.

The clients (that distribute wind power) have somewhat strong bargaining power and due to the alternative of turbine producers, while the suppliers have lower negotiation power due to the big number of parts manufacturers. The competition among producers is strong. The biggest players are General Electric, Siemens and Vestas but there are European, Indian and Chinese companies that rose to prominence due to the support of their home governments.



	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Onshore	23	28	34	40	47	55	63.5	72	80	89	98	108	118	128	139	151	163	176	190	202	213	223	231	237	241	244	246	248	250
Offshore	0	1	1	1	1	1	1.5	1.9	3	5	6	9	12	15	18	22	27	33	40	48	56	66	76	87	98	110	123	136	150

Figure 2: Onshore and Offshore annual installed capacity forecasts; Source - EWEA (2009): "Pure Power", p.45.

One main limitation is that wind turbines production is still heavily dependent on the wind levels, which can cause overloads in the grid infrastructure of the wind farms. This is one of the reasons for the increase in the importance of offshore wind farms as opposed to the onshore wind farms. In the graph above we can see that although being a fairly new technology, their forecasts for the future are more positive than that of onshore segment.

Although the whole industry has positive growth outlooks, the offshore market seems to be increasingly more attractive mainly due to the higher level of wind in these areas and the technological improvements that have made possible the building turbines that are capable of capturing higher wind levels, which require less maintenance and that have higher potency. Vestas has been in a leading position in this high growth segment that has higher barriers of entry than the onshore segment.

The manufacturers of this industry, besides producing wind turbines, provide an array of services different than one might be expecting. In addition to producing, assembling and delivering the wind turbines, most of the producers also provide counselling and overseeing, implement and project planning for optimisation of wind farms, while also providing maintenance and repairs of the grid infrastructure.

Additionally some manufacturers, like Gamesa for example, also manage the wind farms and sell energy to distributors, having a similar role to some of its clients, which is something that

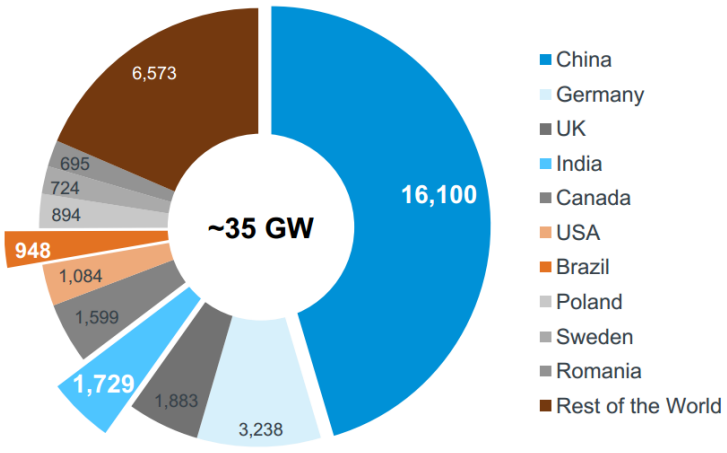
Vestas has always shied away from, considering itself solely as a wind turbine manufacturer. However Vestas has announced a renewed emphasis on making services more profitable on the Capital Markets Day of 2014.

All in all, the wind energy market is an attractive industry mainly due to its positive growth outlook, and the both the economic agents preference for green energy coupled with the developed technology of the wind turbines that make this the most efficient green source. Nonetheless the cyclicality of the business and the fact that it is heavily dependent on government support and policies add to the riskiness of the industry.

Additionally these industry players have high R&D expenses to allow them to be at the forefront of wind turbine making technology and differentiate them in this way and to be able to find the best cost/power efficient turbine possible as well as new ways to transport or setup a wind farm to better capture the full capacity of the wind.

Finally it is crucial to notice the importance of the emerging markets penetration in order fully capture the growth that will be experienced in the industry in the following years. In the figure below, taken from a presentation of Vestas Capital Markets Day, we can see that India, China and Brazil account for more than 50% of the wind capacity installations in 2013, a trend that is expected to continue.

Vestas identifies the dominance of these markets as an important step to maintain its position as a global leader, both in its Capital Markets Day and in the presentation of its half-year report of 2014



Country	MW	% Share
China	16,100	45%
Germany	3,238	9%
UK	1,883	5%
India	1,729	5%
Canada	1,599	5%
USA	1,084	3%
Brazil	948	3%
Poland	894	3%
Sweden	724	2%
Romania	695	2%
Rest of the World	6,573	19%
Total Top 10	**28,894**	**81%**
World Total	**35,467**	**100%**

Figure 3: Wind Capacity Installations in 2013, Source: "Grow profitability in mature and emerging markets", Capital Markets Day; 2014, June 12.

4. Vestas Wind Systems A/S

4.1. The Company

Wind. It means the world to us.

Vestas was the world pioneer in wind turbine manufacturing and still is one of the world leaders in this fast growing industry. But this has not been a clear path from the local Danish company that started as a small blacksmith in a small town in Denmark called Lem, in 1989. Establishing credibility with the production of window steel frames the brand grew and by 1968 the company was exporting hydraulic cranes for 65 countries.

After the first oil crisis, people became more aware of the relevance of clean sources of energy. Vestas started to study the potential of turning wind into electricity and the Danish government was very supportive, which led to the first wind turbine produced by the company in 1979. In 1987 Vestas decides to focus solely on wind energy, and making it a possible alternative for traditional, and not clean, energy sources.

In 1995 Vestas develops one of the world's first offshore wind farm, and sees the potential of this segment. The company has been dominating the fast growing wind energy market and in 1998 Vestas goes public and it is listed in the Copenhagen Stock Exchange ever since. Since then Vestas has been growing and, despite having lost significant amount of market share since 2007, mainly to new competitors from emerging markets. Meanwhile they had been recovering market share having 20% of the world's installed capacity, and 30% of the offshore capacity.

The last financial crisis had an impact on Vestas and made emerge a necessity for restructuring the operations of the firm as well as its solvency situation. Therefore the company has been undergoing the restructure process mainly focusing on decreasing fixed costs, mainly through the disposable of non necessary assets. Also important to notice are the targets for solvency announced by Vestas in terms of Solvency ratio (higher than 30%) and Net Debt to EBITDA (lower than 1), which can be seen below.

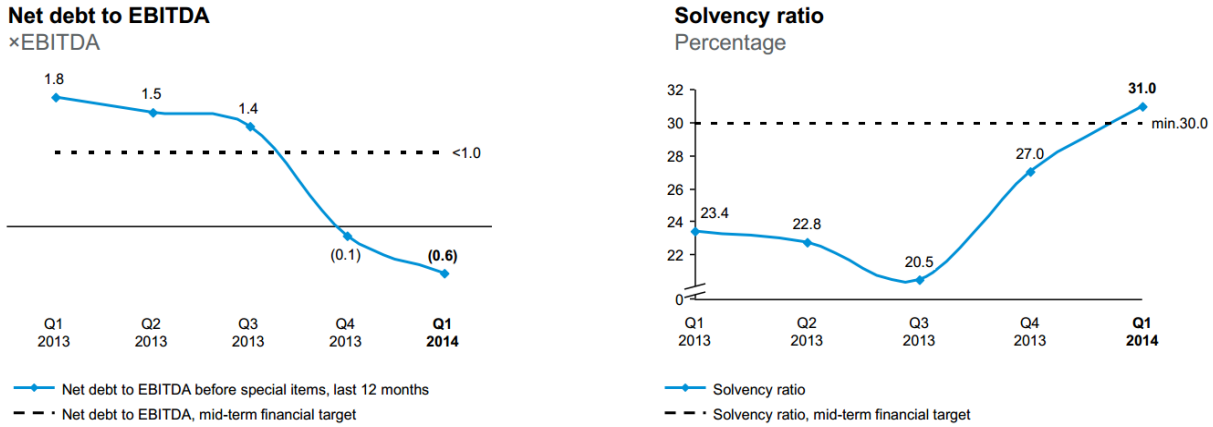


Figure 4: Source: "Introduction", Capital Markets Day; 2014, June 12.

In accordance with this low fixed costs policy Vestas has entered in a joint venture with Mitsubishi Heavy Industries Ltd specially directed at attaining and maintaining the global leadership of the offshore wind segment. The company believes that this Joint Venture coupled with a new turbine the V164-8.0MW, which was designed to be able to capture the high offshore wind levels while providing the cost efficiency and requiring low maintenance, will allow the company to achieve this goal.

Additionally it is important to notice that Vestas, like its competitors, has high R&D investments in order to be at the forefront of the industry and be able to provide the best cost efficient turbines, which is evidenced by the number of research centres. However since 2012 there has been a reduction in R&D costs, with a lot of research facilities being closed.

The 2013 and 2014 2nd Quarter showed an improvement in performance in terms of revenues and operating expenses in addition to having met its self imposed solvency targets, which indicates that Vestas efforts to restructure operations seem to have put the company in a good financial and operational position to respond the growth demands that are expected in the industry's positive outlooks.

Finally one cannot forget that Vestas is, as wants to remain, the most recognized brand in the wind turbine manufacturing business being associated with innovation and reliability. The company wants to enhance this image as is evidenced, for example, by the recently announced sponsoring of the team Vestas Wind in the Volvo Ocean race. In fact the company CEO stated that the competition is a "perfect match for us to engage with our customers, showcase our technology and strengthen our brand" [9] adding that it supports the company's corporate strategy of "Profitable Growth".

4.2. The Outlook

Vestas is a much admired company in Denmark and the Scandinavian countries being one of the most successful companies coming out of the area. Its business experience has made it a known name in the wind turbine business not just in the markets it dominates Europe and North America as also by the markets where Vestas has less expression like the Asian markets.

The new strategy of Vestas focuses on four focal points, being the first is to grow profitably in mature and emerging markets. As mentioned previously, the company wants to increase its market share in emerging market in addition to maintaining its position in its other markets. The company strongly believes in its customer relations and has made efforts position it globally to be able to access these markets.

[9] "Vestas brings passion for the wind to ocean racing, enters Volvo Ocean Race 2014-2015 with first-ever Danish-sponsored boat". (2014, August 12).

Secondly the company will focus on better capturing the full potential of the service business, mainly project planning and plant management. Vestas plans to establish a new service organization with direct report to the CEO and bundle its service business in all new orders.

Thirdly, is to reduce the Levelised Cost of Energy (LCoE). This means that Vestas will focus on, not just having the most cost efficient wind turbine in the market, but to make wind energy has affordable as other energy sources. This measure, the LCoE, as been decreasing yearly, but the company wants to decrease it at a faster rate than the market, mainly trough innovation.

Lastly, but probably most importantly, is Vestas will to diminish operating expenses to a much lower level than they were in previous years. As mentioned previously it can be seen that in the 2nd Quarter of 2014 this is already producing effects, mainly due to the reduction of the number of workers the disinvestments in some factories that are replaced by 3rd party production among other measures.

Vestas believes that with less production, but close relationship with suppliers for quality control, it can be more flexible and therefore it should be able to better adapt to the business cycles. In the figure below we can see the disinvestment made by the company that reduces from 31 world factories to 19.

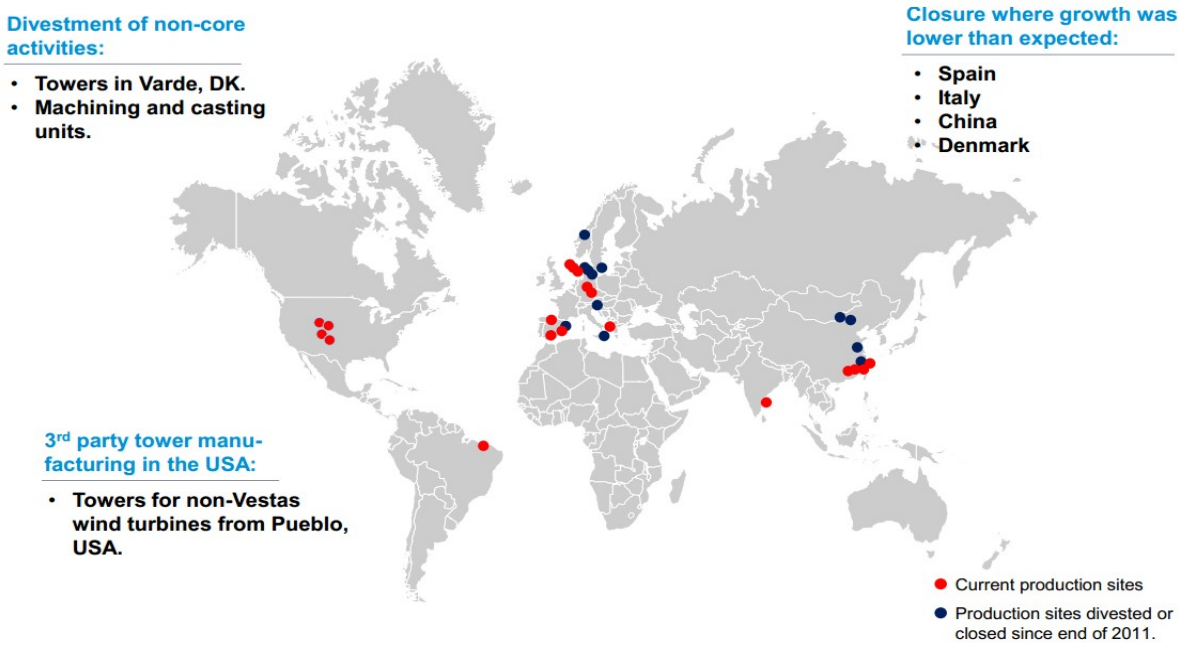


Figure 5: Source: "Improve in operational excellence", Capital Markets Day; 2014, June 12.

Vestas believes that these four points will allow the company to increase its market share as well as increase its profitability by reducing operating expenses. The significant improvement in operational efficiency is notable in the company's recently published results, but it remains to be seen that Vestas can increase market share in emerging markets where there are already established companies in the industry like India (Suzlon) and China (Goldwind, among others).

Strategy and market outlooks aside, Vestas Chief Financial Officer, Marika Fredriksson, has announced plans that are directly tied to shareholders interests. In February of 2014, the company declared it was closer to paying a dividend of about 30% of annual net results, with the contingency that the company solvency targets, mentioned earlier, are met.

4.3. The Peer Group

The peer group selection is the most important part when conducting multiples valuation. In the case of Vestas it is very hard to find a suitable group mainly due to the nature of the industry's competitors.

The companies that have as much global brand awareness as well as international business volume are parts of bigger groups and so they cannot be used in relative valuation. These are General Electric Wind and Siemens Wind Energy. The former has been the biggest challenger of Vestas for the wind energy turbine market, while the later has lost relevance in the previous years but is still one of the biggest manufacturers in the market.

There are some relevant European competitors although these fail to capture the global business that Vestas captures. These companies are fairly smaller and were able to penetrate the market due to the support of their respective governments. The Spanish Gamesa and the Swedish Nordex are both listed companies and have similar business model to Vestas, and despite being much smaller than the company we are studying, will be included in the peer group. The German Enercom is similar to these but is a private company.

Additionally there are some companies that are similar to the European ones described above but are from emerging market. The already mentioned Indian Suzlon and Chinese Goldwind are wind turbine manufacturers that have great expression in their respective countries and benefited from political support. These are both listed companies that have a smaller revenue volume than Vestas. Both these companies will be used in the peer group.

So from the paragraphs above we can see that the peer group is constituted by four companies that are fairly smaller than Vestas (Gamesa, Nordex, Suzlon and Goldwind). Ideally General Electric Wind and Siemens Wind Energy, maybe in conjunction with the European countries, would form a suitable peer group but as these are part of bigger groups they cannot be used. As the peer group is not the most suitable, one should take multiples valuation as just a way to triangulate results and not as a standalone valuation technique, as we have already mentioned in the peer review segment.

5. The Weighted Average Cost of Capital

In this chapter we will focus on calculating the Weighted Average Cost of Capital (WACC). As we have seen previously we know that to calculate this discount rate that will be used in the DCF valuation one needs first to calculate its inputs. This section is dedicated to the

methodology and assumption behind the calculus of the Cost if debt, the market risk premium, the risk free, the cost of equity, so we can finally calculate the WACC.

5.1. The Cost of Debt

There are several approaches to estimate the cost of debt. When a company has bonds that are listed on an exchange, then one can see the yield and have the cost of debt for those, if the bonds have a medium term one can use that yield as a cost of debt. Alternatively, when with a high number of bonds one can do an average of the yields to get the cost of debt. Neither was the case with Vestas that has one publicly traded bond with a short term maturity.

Another approach is to use the rating of a company and then consult a rating table, which will indicate us a proxy for the cost of debt of a company. These scores are normally given by the rating agencies that follow and analyze the companies' creditworthiness and solvency outlooks. There are no rating agencies following Vestas.

Therefore Vestas rating was calculated using a tool that is available in Damodaran website. This is an excel spreadsheet that needs some inputs regarding the company's activity and yields a rating. The inputs are highlighted in the table below.

Input	Value	Explanation
Type of firm	Large Manufacturing Firm	Vestas is in its essence a manufacturing firm and can be considered to be large
Current Ebit	€ 123 m	This should be an average of the last periods if the company does not have stable cash flows. In Vestas case it was used the average from 2009 to 2014.
Current Interest Expenses	€ 90 m	As with the Ebit, this could be an average of the last periods. In Vestas case it was used from 2012 to 2013, because this better reflects the financial stability of the firm.
Risk free	1,24%	This is the same risk free as we use for the WACC of the project.

Table 2: Cost of Debt Inputs' Assumptions

These inputs yield a rating of an interest coverage ratio of B- which yields an estimated cost of debt of 8,49%. Now we need to calculate the after tax cost of debt, which is just the cost of debt without the effect of the effective tax rate. The final after tax cost of debt is then 6,12%. The assumptions behind the risk free rate will be seen next.

5.2. The Risk Free Rate and Market Risk Premium

Before computing the cost of equity, it is necessary to establish some assumptions about the risk free and market risk premium calculations, as was previously mentioned in the literature review section

For the risk free rate one should use the risk free rate of the currency of the country where the company is from. However, in the case of Vestas, and due to the fact that this is a company

that is global in its business, as evidenced by the presentation of its official reports in Euros, it should not be used the Danish risk free. This, coupled with the stable exchange rate between the Euro and the Danish Krone, while being a company that has the most of its revenues outside of Denmark contributes to the choosing of the of the risk free rate of the Euro.

The closest to a Euro currency risk free rate should be a German government bond index, with a maturity of ten years because that is closer to the explicit period. So GDBR10 Index was used with monthly data from January 2009 until June 2014. As this is an index the returns are annualized and we need to transform them into monthly frequency. As mentioned in the Literature Review, this should be a date at a point in time and not an average of a period. The date chosen was 30th June of 2014 to which corresponds an annualized rate of 1,24%.

The market risk premium as further considerations to make, but the rationale is the same. Although usually one should use the market were the country is situated, in the case of Vestas that is a global company, Koller et al (2005) states that a good alternative should be one of the MSCI indexes. As the majority of Vestas activity is in Europe, the MSCI Europe Index was chosen as a proxy for the market returns.

Again monthly data was taken from January 2009 to June 2014. Monthly data was used to decrease the autocorrelation among observations, as explained in the literature review, and the period was chosen to reflect the current state of the market, without the effects of the last financial crisis(for this purpose the data for the market risk premium will not include 2009 since the market was very much affected as a whole). The annualized historical average for this period is 4,25%. Although this seems a fairly low number for the market risk premium, it should be noted that historically Germanic and Scandinavian markets have had low risk premiums.

5.3. The Cost of Equity

As mentioned previously when reviewing the valuation models, to compute the cost of equity one as to assume an asset pricing model. In this case the CAPM was chosen as this is the most widely accepted model. The equation for this model is stated below.

$$K_e = r_f + \beta_e * MRP$$

Since we already have in the previous sub-section the risk free rate and the market risk premium, we are only missing the Beta of the company. To get this we need to regress excess returns of the company ($K_e - r_f$) by the market risk premium. Again the data selected was similar to the one for the market risk premium mainly for the same reason (to assure there is no autocorrelation among observations) and to be consistent (Only using the data from 2009).

This yields a beta equal to 1,43. The beta measures the correlation of the market volatility with the company volatility. And as we can see the volatility of the company is far less smooth in

relation with the market. This high also reflects the cyclicality of Vestas business, which adds to its volatility and therefore will yield a higher cost of equity.

Now that we have all the inputs to fill the equation above we can compute the cost of equity and it yields us a result of 7,33%.

5.4. The WACC

We have almost all the inputs necessary to calculate the WACC, using the formula that was previously described. However we know that Vestas does not have mixed instruments in its capital structure, and so the formula will be simplified as the one given below.

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

So the only missing inputs are the weights of equity and debt and for this we need to find the company's capital structure. For this we need to know the current company value of equity and debt at market value. The current market value of equity is just the number of outstanding shares multiplied by the share price, which yields an equity value of € 56.870 m, as of 18th July 2014.

The current market value of debt is more challenging to find. For the publicly traded bond we just need to use the value at which the bond is being traded. For the short term loans we can assume that book value equals the market value. F

or the medium to long term debt, that in the case of Vestas is just one outstanding loan, I will use the interest paid on the loan and dived by the new calculated cost of debt and therefore get the market value of the long term loan. Summing the value of the parts of debt we get the current market value of the debt of € 9.857 million.

With this we have an approximated capital structure and therefore the weights of 14,77% and 85,23%, of debt and equity respectively. In order to understand if this was Vestas target capital structure, the historical capital structure was analyzed.

It seems that besides 2012, where the company went through a major restructuring process, the capital structure as been fairly stable, being that the average has been of about 16%. It is interesting to see that the peer group, despite following the same fluctuations, seems to have historically more debt than Vestas, about more 10% which is a significant difference.

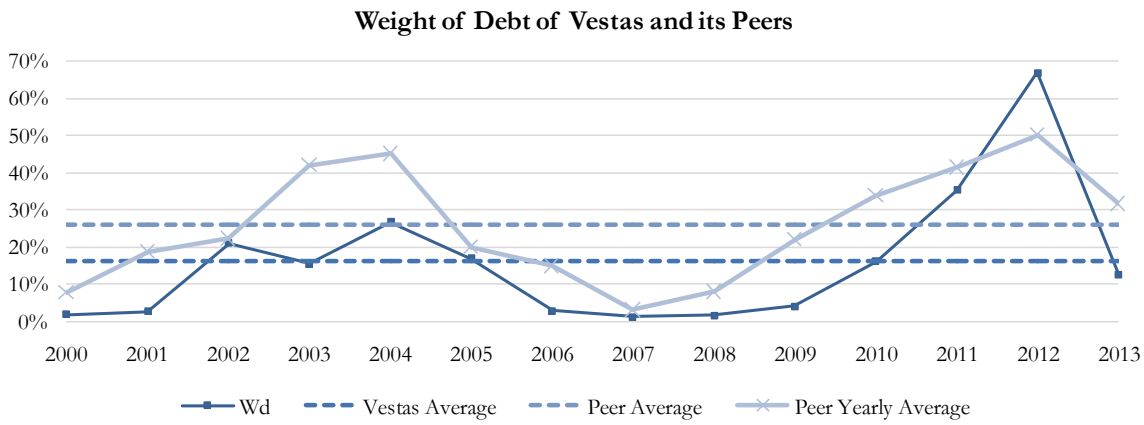


Figure 6: Weight of Debt of Vestas and its Peers Source: Bloomberg Database

Assuming that Vestas will continue with a similar capital structure to the current one, that is in accordance with historical capital structure we have all the inputs to calculate the WACC, with the formula described in the literature review, we are able to get an estimated cost of capital of 6,84%. This seems to be a low value that is mainly driven by the impact of the market risk premium and consequently low cost of equity.

In the table below we have the resume of all the inputs values that were calculated and explained in this segment as well as the final value of the WACC. The estimation of the tax rate will be seen in the following chapter.

WACC Computation Resume					
Rf	1,24%	Ke	7,33%	Kd	6,12%
MRP	4,25%	We	85,23%	Wd	14,77%
Tax	28,00%				
		WACC	**6,84%**		

Table 3: WACC Inputs and Final Outcome

6. Valuation Estimates

In this section, we will analyze the assumptions necessary to estimate the evolution of the various figures in Vestas's Income Statement, Balance sheet and cash flow statement. An estimation period from 2015 to 2029 will be used to capture to full business cycles, with 7 years each.

In this section it will also be explained the assumptions behind the base case, that relies on the assumption that Vestas maintains its market share and grows with the industry, and then the difference between this and the two other scenarios will be detailed. The Income Statement and Balance Sheet as reported by the company are in Annex 1 and 2, respectively. The final forecasted Income Statement and Balance Sheet are in annexes 3 and 4, respectively.

Notwithstanding the importance of looking at the annexes for a full understanding of the valuation forecasts, for the convenience of the reader it was decided to put in the table below the estimates detailing the Income Statement forecast for the first cycle of the explicit period (from 2015 to 2021).

Income Statement Forecast (Base Case)										
Cyclicality				Cycle Beginning						Cycle End
Cycle Point	Low			High			Low			
million Eur	2012	2013	2014	2015F	2016F	2017F	2018F	2019F	2020F	2021F
Revenue	7.198	6.080	6.994	8.623	9.418	10.178	10.821	11.985	12.922	14.046
COGS	6.404	5.185	5.503	6.640	7.529	8.086	9.069	10.204	10.545	11.018
Gross Profit	794	895	1.492	1.983	1.889	2.092	1.752	1.781	2.377	3.028
Operating Expenses	790	685	636	900	983	1.063	1.130	1.252	1.349	1.467
EBITDA	4	211	856	1.083	905	1.029	622	530	1.028	1.561
Depreciation	701	109	101	94	130	142	154	163	181	195
EBIT	**-697**	**102**	**754**	**989**	**775**	**887**	**469**	**366**	**847**	**1.366**
Net Financing Income	-14	-138	-118	-17	8	9	19	10	-17	3
Financial Income	78	5	1	61	10	10	21	11	0	5
Finacial expenses	92	143	119	78	1	1	1	1	17	1
EBT	-711	-36	636	972	784	896	488	376	830	1.369
Taxes	-250	-46	-178	-272	-219	-251	-137	-105	-232	-383
NI	**-961**	**-82**	**458**	**700**	**564**	**645**	**351**	**271**	**598**	**986**

Table 4: Condensed Income Statement (Base Case) Forecast

6.1. Revenues

The revenue estimation is the most important assumption behind this valuation exercise since it will be the driver for many of the other figures. Historically the revenues have not been stable at least in the last years but has this is a company that is still growing, in a business that has some good growth prospects it is necessary to find another driver to explain revenues.

For this estimation it was first taken from the Global Wind Energy Council (GWEC) the estimated forecasts for the world's cumulated installed wind capacity until 2018, while also taking historical values since 2009. The next step was to take the same data for the same periods but for new annual installed wind capacity.

So we had an historical base from 2009 to 2014 and a forecasted one from 2015 to 2018. From 2019 onwards growth in cumulative wind capacity is equal to the mean of the last two years growth (minus 0,005 to simulate the declining trend that growth was suffering).

With this growth rate for each period we can estimate the cumulative and yearly installed wind capacity until 2029. In the graph below we can see the historical evolution and the evolution of this study's estimates.

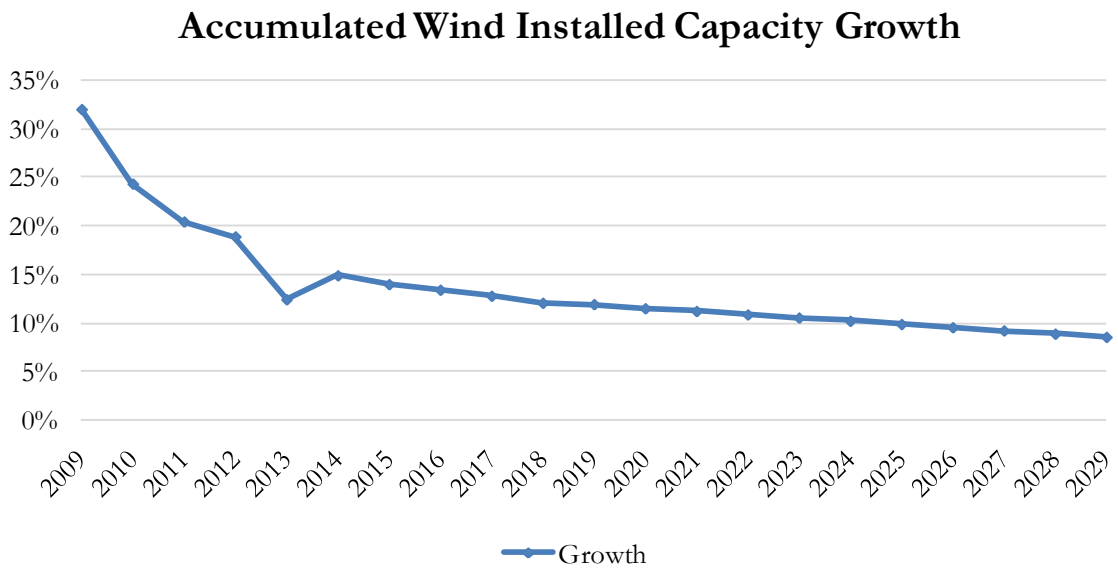


Figure 7: World's wind capacity growth, historically and forecasted for the explicit period

By obtaining the new annual installations made by Vestas in the historical period one can compute the market share of the company in those years simply by dividing the world's new installed capacity by Vestas new installed capacity. Having this we can analyze historically the market share that Vestas has since 2009 until 2013 and doing a mean of these values yields as an average market share of 13,87%. This will be the basis for the whole valuation.

In the base case we assume that the company will maintain its market share through the whole period and so to calculate the value of new installations by Vestas we need to multiply our market share by the new annual installed wind capacity. So now we have the estimated Vestas new annual installed wind capacity.

The last step is to find a way to transform installed capacity into revenues. For this purpose it was created an historical value that relates the two variables (from 2009 to 2013), consisting on revenues in a year divided by the Vestas installed capacity of that year. Having these historical values it was decided to use only a mean of the last two years, since these values will better reflect the company after its aforementioned restructuring.

Having this driver we only need to multiply this value by the installed capacity by Vestas of each year to get the estimated revenues for each year, from 2015 to 2029. With the revenues for the forecasted period one is in position to estimate the rest of the inputs that are connected with the revenues. The GWEC estimates are the main assumption behind revenue estimates. In annex 5 it can be seen the revenues calculation process that was described in this section.

6.2. COGS

The COGS can be, and usually are, calculated as a percentage of revenues but doing so in this case would overlook the cyclicality of the business, therefore we need to find a more suitable

solution. From the table below representing the COGS in percentage of revenues, with the period corresponding to the one of the previous business cycle, we can see that the periods in which we are in the high point we have lower percentages and, conversely in the periods we are in a downturn these percentage is higher. In this table we can also see the up and down historical trend of COGS.

COGS as a percenatge of Revenues

7 years average cyclicality

Cycle Turn	High			Low			
Year	2008	2009	2010	2011	2012	2013	2014
COGS	4.866	4.246	5.742	5.122	6.404	5.185	5.503
Growth		-12,74%	35,22%	-10,79%	25,03%	-19,04%	6,13%
GOCS/Revenue	80,46%	83,54%	83,02%	87,58%	88,97%	85,27%	78,67%

Table 5: Historical percentage of COGS in terms of Revenues

It seems to follow the expected pattern being that the only exception is 2014 (that should be slightly higher than the 2008 value) maybe because in this year we could already see the effect of the recent Vestas restructuring.

Taking this into account it will be assumed that the value in 2015 will be a value that accounts for the restructuring and the current operational improvements, while being the high point of the new cycle. It was assumed that this value is 77%. Constructing a variable that relates the previous cycle with the new, by dividing the value of 2008 by our assumed value of 2015, yields us a driver of 1,045, which allows us to forecast the whole business cycle percentages for the COGS. The outputs of this calculation are in the table below.

COGS as a percenatge of Revenues

7 years average cyclicality

Cycle Turn	High			Low			
Year	2015	2016	2017	2018	2019	2020	2021
GOCS/Revenue	80,46%	83,54%	83,02%	87,58%	88,97%	85,27%	77,12%

Table 6: Estimated Forecasts for the COGS as a percentage of Revenues for the Explicit Period

The value of 2021 is the only exception since 2014 was an anomaly in the previous business cycle. Instead of using the value of 2014 and the calculated driver we use an average of the value of 2013 and 2014, which yields us a more acceptable value while being economically reasonable.

Having the COGS/Revenue for the next cycle after the restructuring it is assumed that the following cycle from 2022 to 2028 has the same values. In this way we have the COGS for all the years in the forecasted period that can be seen annex 3, of the income statement forecasts.

6.3. Inputs that Vary with Revenues

Operating expenses varies as a percentage of revenues. Having the historical values of operating expenses allows us to make historical percentage of operating expenses in terms of revenues. Since 2009 until 2014 the average percentage is of 11,02%, but the average of the last three periods is just 10,44%. This might be a small difference but is impactful in terms of valuation results, which adds to the importance of making the most reasonably correct assumption. Due to the fact that Vestas restructure in 2012 focused on the reduction of operating expenses, it was assumed that the average of the last three years would better reflect the business the firm (2012, 2013 and 2014).

Accounts Receivables will also vary as a percentage of revenues. Again we look at the historical behavior of this category of the balance sheet in terms of revenues. Using the same intuition about Vestas restructuring the average of the last three periods will be used to as the driver to calculate the account receivables for the forecasted period.

For the Property, plant and equipment (PPE) the same rationale was applied. As we have seen previously the since the restructuring of Vestas there was also a decrease in the number of factories which as well as other disinvestment in this area. Therefore the three last years were taken into account to calculate the mean of the PPE in percentage of revenues. This is a very important category because it will allow us to calculate Capital Expenditures and Depreciation. These three figures that change as a percentage of revenues are further detailed in annex 6.

6.4. Inputs that Vary with COGS

Even though revenues estimation is the used driver to estimate other variables there are some in which the most correct way should be to use instead COGS. This is the case with the Inventories category form the Balance sheet. Therefore the same methodology as the one described above was used, by computing inventories in terms of COGS and using an average of the last three years following the belief that this period will better reflect Vestas' restructuring effort.

The same holds true for Accounts payables. This category is directly tied with the COGS and so the same approach was used. The last three years of the historical values of the accounts payables as a percentage of COGS were used to compute the average that will allow the forecasting of the explicit period accounts payable.

While both these category are sometimes computed as a percentage of revenues, Koller et al (2005) states that as these categories should be tied with the COGS to better represent changes in input prices. The tables detailed in annex 7 present the outcome of this section.

6.5. Capex and Net Working Capital (NWC)

The calculation of Capex is tied with both PPE and depreciation. As we have already seen how to forecast PPE, as a percentage of revenues, we now need to understand the most correct way to forecast depreciation.

This category should be estimated as a percentage of PPE of the previous year, since depreciation is directly tied with the level of these assets. Therefore it was computed the percentage of depreciation in terms of the PPE of the previous years. Despite having the historical values since 2009, only the period from 2013 to 2014 will be used, to be consistent with the rest of the assumptions and capture only the period after the restructuring. We are deliberately excluding the year of 2012 because this period has a high depreciation in terms of last year´s PPE.

Having both the PPE and the Depreciation for the explicit period we are able to calculate Capex. This is calculated by the change in PPE plus the year's depreciation. When using this methodology one should remember that using PPE in terms of revenues, if a company has a low growth rate and improvements in capital efficiency this will lead to negative capital expenditures. This is not the case with Vestas since it has fairly high growth levels.

Net working capital is just the sum of all the current assets minus the current liabilities with the exception of nonoperating assets like short term debt and cash and equivalents. The change in NWC is what will be necessary in the DCF computation. The calculation of the inputs calculated in this section is detailed in the annex 8.

6.6. Interest Income and Expenses

Although the Net Financing Income will only be used to assure that we are calculating the FCFF correctly (by reaching the FCFE from the FCFF, through the equation detailed in the literature review chapter, more specifically the DCF section), it is still important to understand the computation of this item.

To calculate interest expenses we will, similarly to the previous categories will see the relation of interest expenses in relation with debt (long and short term). The historical mean of the last three years will be used since this should be a more accurate picture of Vestas credit worthiness.

In similar fashion it will be calculated interest income but in relation with excess cash. Again the last three years will be used for consistency purposes. Summing up both will yield net Financing income that will give us the flexibility to analyze both FCFF and FCFE as a check the functioning of the model. The calculations can be seen in annex 9.

6.7. Taxes

In terms of expected effective tax rate one should look at the company's annual report to understand what the company believes will be their tax rate. Alternatively one should look for

the tax rate paid historically. Vestas states in its annual report the expected tax rate is 28% which goes in accordance with the historical value since 2001 of 29,79%, while we know that the Danish corporate tax rate is 25%. The one provided by the company will be used in since it should yield a more accurate result.

6.8. Final Balance Sheet Assumptions

Having forecasted most of the items on the balance sheet, there are still categories that need to be mentioned. Retained earnings for the year will be calculated by summing last year's retained earnings plus previous year's net income minus dividends.

As of right now Vestas does not pays dividends but having considering the CFO announcing that the company is close to paying dividend of 25 to 30%, it was assumed that the this is happen as soon as 2015 and will grow in the following years. This does not have a big impact on valuation results, like DCF or EVA, but it is a way to decrease a very big increase in cash and equivalents that might arise from the method to adjust the balance in the following paragraph.

To adjust the balance sheets account and match assets with equities and liabilities it is usually used cash and equivalents or short term debt if total assets are lower or bigger, respectively, than total equity and liabilities. This is done because it usually does not affect valuation. The final forecasted Income Statement and Balance Sheet for the base case are in annex 3 and 4, respectively.

6.9. Valuation Scenarios

The previous section was explained using assumptions regarding the base case scenario, where Vestas was able to maintain its market share and have the operational improvements close to the same level as the ones registered in 2014.

However, to account for the uncertainty of the cash flows of a cyclical company, two alternative scenarios were created: a growth and a decline scenario. The scenarios were thought in terms if economically reasonability and are directly related to the challenges that Vestas will face in the following years.

In the growth case we will assume that the recent effort in brand promotion as well an increased presence in emerging market contributes to the increase in market share (0,5% increase per year). Additionally the operational restructuring that Vestas went through has a higher effect and reduces operational expenses even further (COGS/Revenues in the 2015 equal to 76%). In the graph below we can see the difference in market shares comparison between the three cases.

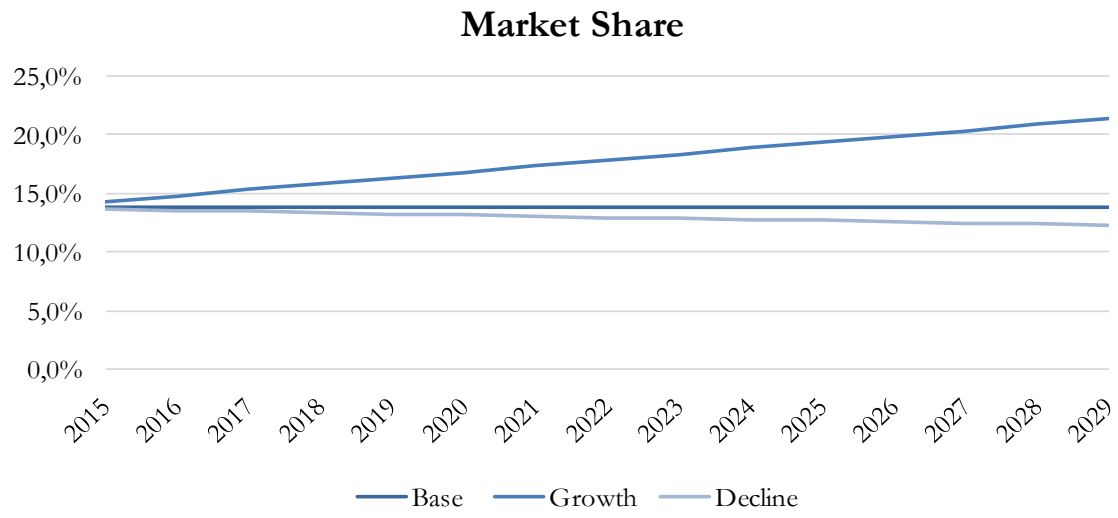


Figure 8: Market Shares in Different Cases

In the decline scenario Vestas fails to capture the emerging markets but maintains its position in its consolidated markets, which yields a decrease in the market share (0,01 decrease per year).

Coupled with this decrease another effect is that the operational improvements, that yielded the first results in 2014, fail to have much of the expected impact (COGS/Revenues in the 2015 equal to 79%). In the table below one can see the difference between the operating restructure effects in the three scenarios by observing the COGS/Revenues for the estimated period's cycles.

In annex 10 and 11 the Final Income statements can be seen for the High Growth case and for the Decline case, respectively.

Forecasted COGS as a percenatge of Revenues

7 years average cyclicality

Cycle Turn	High			Low			
Year	2015	2016	2017	2018	2019	2020	2021
Base	77,00%	79,94%	79,45%	83,81%	85,14%	81,60%	78,44%
Growth	76,00%	78,91%	78,41%	82,72%	84,03%	80,54%	77,43%
Decline	79,00%	82,02%	81,51%	85,98%	87,35%	83,72%	80,48%

Table 7: Differences in Operating Improvements among Cases

7. Valuation

In this section we will perform the chosen valuation tools to determine the value of Vesatas. Firstly we will perform the DCF valuation looking at the evolution of the cash-flows, secondly we will look at the company's ability to generate economic profit through the EVA approach,

thirdly we will triangulate the results with relative valuation and finally we will perform a risk assessment of holding Vestas with a VaR analysis.

7.1 DCF

The use of the DCF method when evaluating a company like Vestas, a cyclical company, is not consensual. However, as previously mentioned in the literature review section, Koller et al (2005) states that even for these companies this method should be used with the building of scenarios and others caveats to account for uncertainties of the cycle. The values and computations of these methods are stated in annex 12.

In this study it was decided to use this method due to its general acceptability and because for its execution it is necessary to understand and make assumptions about the business of the company, the evolution of the industry and the prospects for the macroeconomic scenarios.

As previously mentioned the DCF method might be computed using either FCFF or FCFE. The methods should yield the same result using directly FCFF through its formula or reaching through FCFE and then using the formula in the literature review to reach FCFF. Both methods were done to make sure the computations were all correct. The FCFF formula is stated below, but the results will be presented in FCFF.

$$\text{FCFF} = \text{EBIT}(1 - \text{T}) + \text{Depreciation} - \Delta\text{NWC} - \text{CAPEX}$$

7.1.1. Terminal Value

For the terminal value some additional assumptions need to be made regarding growth and the FCFF that is the most adequate to use. Firstly we know that for cyclical companies one needs to use not the previous year's cash flow but instead use and average cash flow of the cycle. If one was to use the last year's cash flows, in our case were the last period of the cycle is almost the high point of the cycle this would yield an artificially high interest rate.

In addition it was decided to do a two stage terminal value, since in 2029 we still have a fairly high growth rate of the wind energy market (8,5%), and using a growth rate close to a the economy's growth, like 3%, would understate the value of the company while using a higher value might overestimate this value.

Given this and the need to accurately portray the growth forecasts of the company, the solution found was a two stage growth period. The first period it's a 7 year period, equivalent to one cycle where the growth will be equal to 7,49%. The rationale behind this value is that it would be the average of the following cycle if the wind energy growth remained the same.

Even a high growth company like Vestas should not sustain high growth in the long term, since as Koller et al (2005) stated "Because most products have natural life cycles, the only way

to achieve lasting high growth is to continue introducing new products at an increasing rate-which is just about impossible"[10].

Given this reasoning and considering this thought process, a value of 3% was used, knowing that this value will be subjected to a sensitivity analysis in order to estimate its impact on the valuations result.

7.1.2. The FCFF Evolution

The FCFF estimation can be seen detailed in the annex 12.

Having understood the assumption behind the calculations of the FCFF and terminal value it is interesting to see the evolution of the cash flows, since it was a concern expressed in this study to replicate historically the cyclicality of Vestas future (this was achieved by using COGS proportional to the previous historical cycle from 2008 to 2015). In the graph below this evolution is pictured and the cycles are separated by the vertical line.

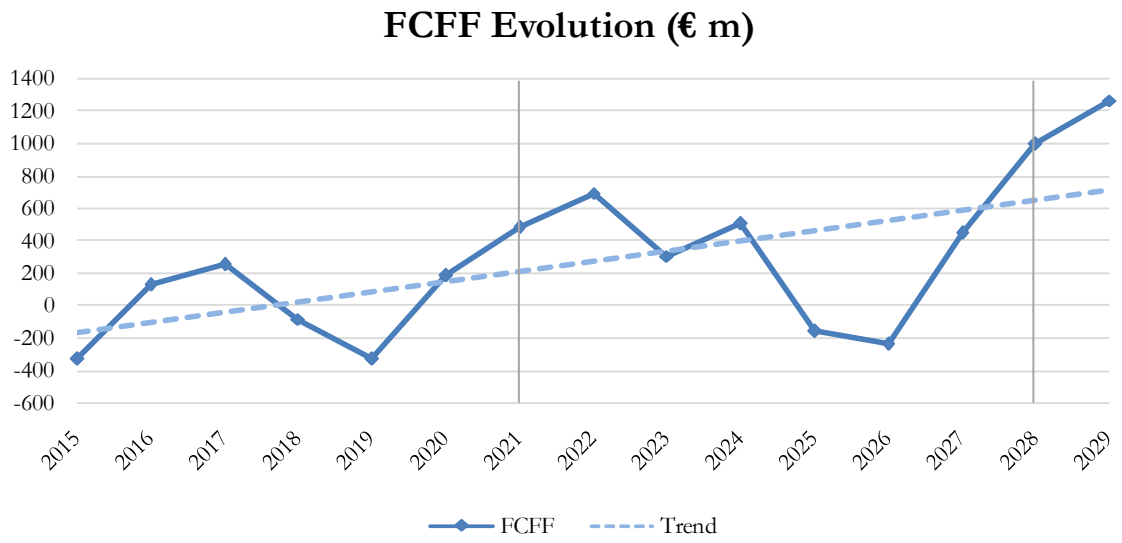


Figure 9: FCFF Cyclicality and Trend (Base Case)

From the graph above we can see the cycle evolution and the periods of low levels of cash flows (2018 to 2019 and 2025 to 2026). The periods of high cash flow level are also observable (2015, 2022 and 2029) and its worth mentioning that the low value of 2015 is mainly due to the initially high CAPEX level that is registered in that years, since EBIT and NOPLAT are higher this year than in the following years.

The trend line shows us that despite the cyclicality of the business there seems to exist a growing tendency for the company's FCFF.

[10] Koller, Tim, Marc Goedhart, and David Wessels. "Valuation: measuring and managing the value of companies". Vol. 499. John Wiley and Sons, 2010.

After calculating the cash-flows in the base case scenarios, we can now calculate the terminal value of the company with the formula described in the literature review. The actualized terminal value of the company following a DCF method is of kr. 72.152,75 m, giving an enterprise value of kr. 79.586,62 m and an equity value of kr. 67.829,75 m, while yielding a final price of kr. 302,71. These are the results of the DCF valuation in the base case.

To know the final valuation for the three scenarios we first need to estimate economically reasonable probabilities to the likelihood of these. The base case where Vestas maintains its market share and grows organically with the industry as a probability of 50% since this is the most likely scenario. Both other scenarios have a weight of 25% each. These scenarios are equally likely due to their dependency on two uncertain challenges that the company is facing: the entry in the emerging markets and the efficiency of the 2012 operational restructuration. While success in these challenges leads to the Growth scenario, failure means the Decline scenario.

Having estimated the likelihood of the scenarios we can now present a resume of the DCF valuation of Vestas. In the table below we can see the enterprise value, the equity value and the price of the different scenarios as well as the final weighted value. The firm has currently 224.074.513 shares outstanding. The estimations of the Growth scenario's DCF and Decline scenario's DCF can be seen in the annex 13 and 14, respectively.

DCF Valuation Resume

	Base (50%)	Growth (25%)	Decline (25%)	**Final Value**
Enterprise Value (m)	kr. 81.710,04	kr. 109.684,27	kr. 42.930,82	**kr. 79.008,79**
Equity (m)	kr. 69.639,50	kr. 93.481,26	kr. 36.588,90	**kr. 67.337,29**
Price	kr. 310,79	kr. 417,19	kr. 163,29	**kr. 300,51**

Table 8: DCF Valuation with the three Scenarios

7.1.3. Sensitivity Analysis

Sensitivity analysis is a very useful and widely accepted practice to see the impact of some variables change, alone or in conjunction, in the value of a company.

The growth rate and WACC are very important in determining the final price of the company mainly due to the fact that they play an integral part in continuation value estimation and also in discounting the cash flows. We will conduct the sensitivity analysis on the final value of Vestas that accounts for the three scenarios.

As we can see from the table below the changes in WACC or in the long term growth rate, in this case second stage growth rate, severely impacts the value of Vestas. A decrease in the WACC of 0,5% yields a significant higher price while a decrease in the growth rate of 0,5% yields a lower price. From this we can conclude that the impact of a change in WACC is higher than the impact of a change in the growth.

Sensitivity analysis on Prices

WACC\g	1,00%	1,50%	2,00%	2,50%	**3,00%**	3,50%	4,00%	4,50%	5,00%
5,40%	331,19	345,98	365,13	390,88	**427,38**	483,10	578,71	780,84	1.491,53
5,90%	305,30	315,96	329,35	346,68	**370,00**	403,04	453,49	540,05	723,06
6,40%	284,59	292,46	302,11	314,24	**329,94**	351,06	380,99	426,69	505,10
6,90%	**267,72**	**273,64**	**280,77**	**289,52**	**300,51**	**314,74**	**333,88**	**361,00**	**402,42**
7,40%	253,78	258,30	263,67	270,13	**278,06**	288,03	300,93	318,28	342,87
7,90%	242,09	245,60	249,71	254,57	**260,44**	267,63	276,67	288,37	304,11
8,40%	232,19	234,94	238,13	241,86	**246,27**	251,59	258,12	266,33	276,95
8,90%	223,72	225,91	228,41	231,30	**234,68**	238,69	243,52	249,45	256,90
9,40%	216,42	218,17	220,15	222,42	**225,05**	228,12	231,77	236,15	241,54

Table 9: DCF Sensitivity Analysis on WACC and Long-term Growth rate

Although the extreme values presented in the table above are very unlikely, the exercise was extremely important to see the importance of the computation of WACC and the assumptions behind the long term growth rate.

Additionally a variable that is very crucial to the final valuation and is surrounded by uncertainty is the operating expense that we have seen in the valuation estimates segment. This variable was calculated as an average of the percentage in terms of revenues of the last three years under the assumption that Vestas restructuring was successful.

As we can see in the graph below this effect of Operating expenses on price are fairly significant. An increase in the operating expenses in terms of revenues of 1% decreases prices by kr. 81,33 yielding a price of kr. 219,18.

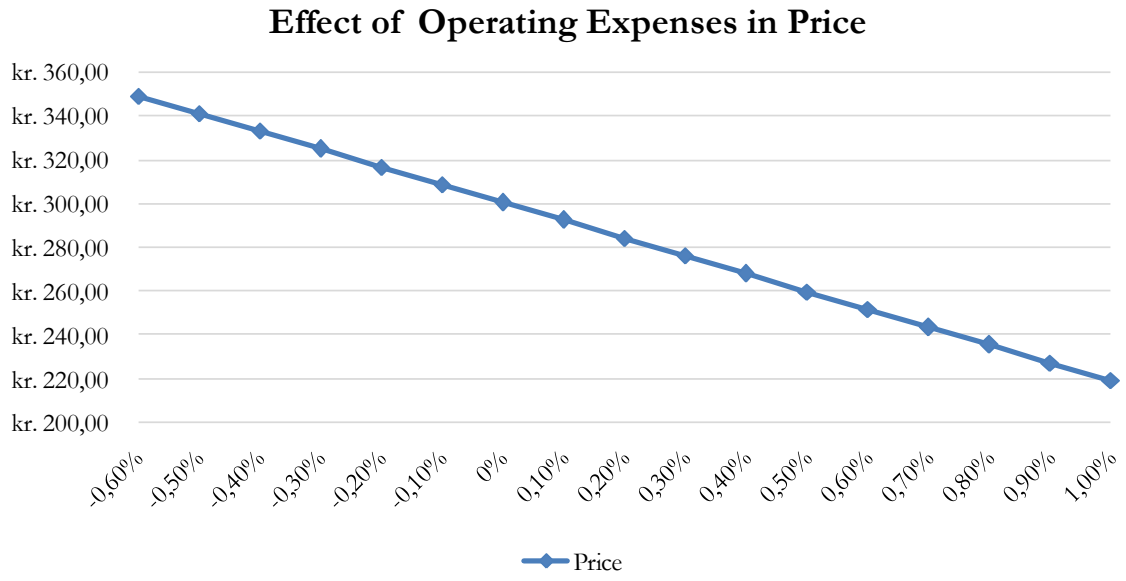


Figure 10: Operating Expenses change Impact on DCF Valuation Results

A decrease in operating expenses driver by 1% is highly unlikely, but we can see that small changes in this variable are not as impactful in valuation results as changes in WACC or in the

growth rate. This sensitivity analysis gives us a better understanding of the model and the effects of assumption changes in the valuation of a firm or more precisely in the final price.

7.1.4. DCF Conclusion

The DCF is the most used valuation tool. After creating the assumptions behind the model, estimating the parameters for crucial variables, thinking of the likelihood of different scenarios we are able to achieve a final value for the company of kr. 79.008,79 m which yields a price of kr. 300,51, which is a higher value than the current market price of the company.

Additionally, the DCF process and sensitivity analysis allowed us to understand the critical market developments that Vestas will face and will greatly impact its value. These challenges are the entry in the emerging markets, the improvements in operational expenses and COGS that will come from the successful implementation of the restructuring efforts the WACC and the long term growth rate.

7.2. EVA

The EVA is a valuation method that calculates the enterprise value through expected profitability of the firm. As previously mentioned in the literature review section the main advantage of these methods that use profitability is the ability to know when and how the company generates value.

A company generates value only if the ROIC (NOPLAT divided by Invested Capital at the beginning of the year) is higher than WACC. For this method the same three scenarios were applied.

Remembering the formula stated previously the value of a company through the EVA method of Vestas should be the Invested Capital in 2014 plus the sum of all future economic profits (Invested Capital of the previous year multiplied by the year´s ROIC and WACC).

As we have forecasted the balance sheet and all other items necessary for the EVA we can execute this valuation approach with the same explicit period as the one used in the DCF method. In annex 15 we can see the detailed economic profit calculation for each year of the valuation period for the Base case.

7.2.1. Terminal Value

There are additional assumptions that need to be made in order to calculate the terminal value, even though this computation will be similar to the one done in the DCF methodology. As Vestas is a cyclical company one needs to compute the economic profit for the terminal value as an average of the cycle economic profit, just like in the DCF terminal value computation.

Again similarly to the DCF, we will calculate the perpetuity of the economic profit valuation and we need to make assumptions regarding growth.

It will also be assumed that there are two stages in the calculation of the termination value. The first period is the seven years after the estimation period and the growth of this period will be again equal to 7,49%. The long term growth will also be having a value of 3%.

The assumptions behind both models terminal values are very similar, which is natural, since these capture the same periods and are done with the same estimation and forecasts regarding the industry and the business of the company.

7.2.2. Economic Profit Evolution

In the graph below we can see the economic profit for each year of the forecasted period as well the value condition, ROIC-WACC. The vertical line separates the cycles.

We can immediately observe that the there is no year of the forecasted period in which the company does not generate value, becoming very close in 2026.

We can also see that the economic profit of each year as well as the value creation condition follow the cyclicality of the business being high in the growth part of the cycles (in 2015 and 2022), and low when the cycle is on the downturn (in 2018 to 2019 and 2025 to 2026).

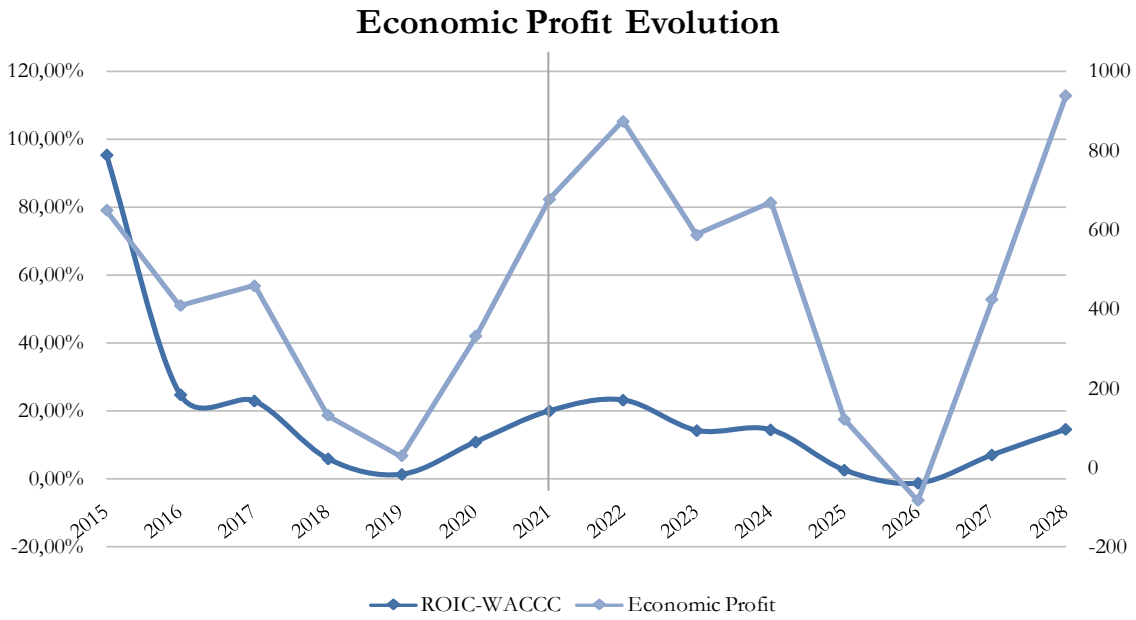


Figure 11: EVA Model Value Driver's Growth

Having the yearly economic profit we can calculate the terminal value for base case scenario. The present value of the terminal value is kr. 52.197,66 m, an enterprise value of kr. 83.388,36 m, an equity value of kr. 71.069,88 m and a price per share of kr. 317,17. We can see that the percentage of the terminal value on the total value of the company in this method is much lower than the same percentage in the DCF method. This is a usually registered difference between both valuation methods.

Adding the Growth and the Decline scenarios, with the same rationale behind it in terms of likelihood and probabilities of each scenario, it is possible to reach the final value. The value of the different scenarios is displayed on the table below.

EVA Valuation Resume

	Base (50%)	Growth (25%)	Decline (25%)	**Final Value**
Enterprise Value (m)	kr. 83.388,36	kr. 154.690,17	kr. 53.572,17	**kr. 93.759,77**
Equity (m)	kr. 71.069,88	kr. 131.838,70	kr. 45.658,27	**kr. 79.909,19**
Price	kr. 317,17	kr. 588,37	kr. 203,76	**kr. 356,62**

Table 10: EVA Valuation with three Scenarios

7.2.3. Sensitivity Analysis

A sensitivity analysis is always necessary to understand what the critical variables that affect a company value are. The long term growth rate and the WACC are always important inputs behind most models and in this case it will be interesting to compare the effects of these variables in EVA approach against the DCF approach.

By observing the table below we can see that, in similar fashion to the DCF, a change in the WACC as a higher effect in the price than same magnitude a change in the growth rate. The extreme values in this table are not likely to come to fruition, but the understanding of these inputs allows us to better access the model and the valuation exercise.

Sensitivity analysis on Prices

WACC\g	1,00%	1,50%	2,00%	2,50%	**3,00%**	3,50%	4,00%	4,50%	5,00%
5,40%	382,01	393,52	408,42	428,46	**456,86**	500,22	574,61	731,90	1.284,93
5,90%	361,34	369,63	380,05	393,54	**411,68**	437,39	476,65	544,01	686,42
6,40%	344,72	350,84	358,35	367,79	**380,01**	396,44	419,73	455,29	516,31
6,90%	**331,10**	**335,71**	**341,26**	**348,06**	**356,62**	**367,69**	**382,58**	**403,69**	**435,92**
7,40%	319,78	323,30	327,48	332,50	**338,68**	346,43	356,47	369,97	389,11
7,90%	310,22	312,96	316,15	319,94	**324,50**	330,10	337,14	346,24	358,49
8,40%	302,08	304,22	306,70	309,60	**313,04**	317,18	322,26	328,64	336,91
8,90%	295,06	296,76	298,71	300,96	**303,59**	306,71	310,47	315,08	320,88
9,40%	288,96	290,32	291,86	293,63	**295,68**	298,07	300,90	304,32	308,51

Table 11: EVA Sensitivity Analysis on WACC and Long-term Growth rate

In addition one should check the effects of operational expenses changes on the final price of the company, as we did in the DCF case. The graph below shows this relation. Initially we can see that the behavior is very similar but while in the DCF approach the effect on price by an increase in 0,1% in operational expenses is kr. 8,13, the same change on the EVA approach yields an change in kr. 7,95.

This means that a change in operational expenses has a lower effect on the EVA calculated price than on the DCF price. The way the EVA is calculated, by putting an emphasis on value creation and how the generation of value takes place, might be the reason of the effect that is seen. It is interesting to see that even in the extreme case of a 1% increase in the operational

expenses driver the price calculated through EVA is still higher than the current price of a share that is in the market.

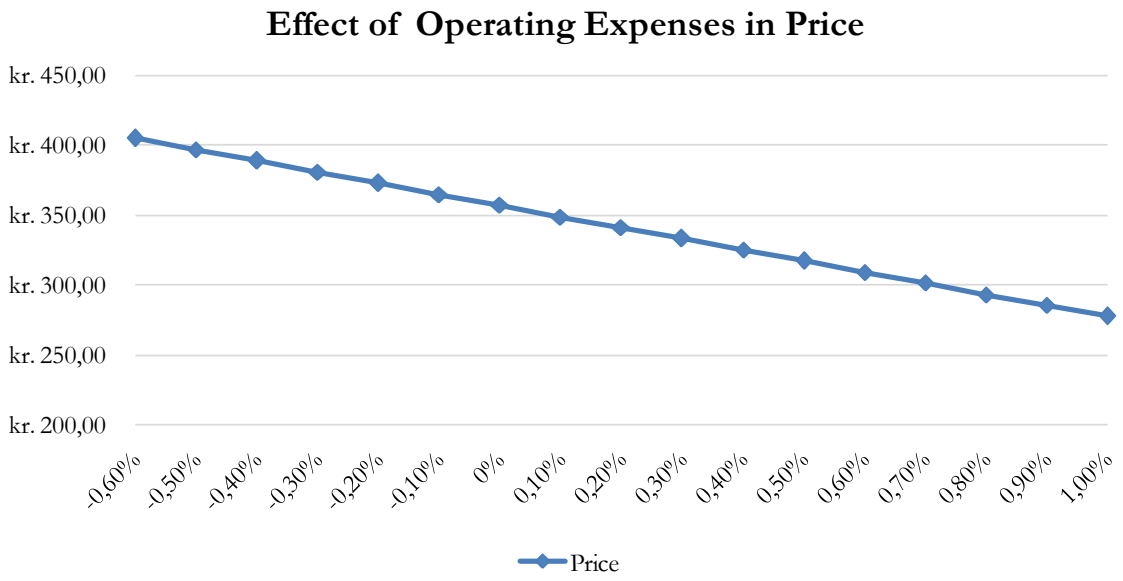


Figure 12: Operating Expenses change Impact on EVA Valuation Results

7.2.4. EVA Conclusion

The EVA valuation has fairly different results than the DCF approach, which might be due to the different computations behind each model. Even though these valuations yield different values, this study tends to favor the DCF valuation method since it asks for more assumptions and a better insight on the business and the industry.

However, the EVA approach is not to be discarded since it has greatly contributed to the depth of this study. The computation of the EVA is an exercise that allows us to think further of when and how is the value created for the company and served to show the cyclicality of Vestas is directly tied to its ability to generate value. The Base case, the Growth and the Decline case computation details are in annexes 15, 16 and 17, respectively.

7.3. Multiples

As previously mentioned in the literature review segment, relative valuation is a method that is very useful valuation tool, however not used as a standalone valuation approach but as a way to triangulate results. Therefore this section will be dedicated to establishing the value of Vestas using some of the most accepted multiples with the purpose of thinking of the business and its competitors and to check for the reasonability of both the DCF and the EVA model.

One of the most important aspects this valuation method is the definition of the peer group which we already did in the industry overview section. In this section we also found that the group of four companies that most resemble Vestas business model are fairly smaller in size than the company that is the subject of this study.

As mentioned in section 4.3 that explains the Peer Group selection, Vestas does not have a large number of comparable firms and so the use of a statistical tool like the centroid analysis would be obsolete. Having contacted the company's Investors Relations Office, the list previously described in the aforementioned section was confirmed, since Vestas states as its main competitors GE Wind, Siemens Wind, Enercom, Nordex, among others previously mentioned.

Those are the group of companies that offer the same products as Vestas, large orders of wind turbines and its maintenance. Due to the limitations of these companies that was previously explained in section 4.3, we achieve a Peer Group constituted by Gamesa, Nordex, Goldwind and Suzlon. All in all the peer group companies are chosen because these have the same product as Vestas as well as a big enough dimension to be comparable with the company.

The multiples to be used are for 2014 and 2015. While the later is clearly a forward looking multiple the former is computed using half year results and forecasting the second half of 2014. The array of multiples will be used to access the value of Vestas are the Price to earnings ratio, widely accepted but as we have seen usually not the most correct way to evaluate the company, the price to sales, which might overlook the operational differences among firms and the enterprise value multiples to EBIT and to EBITDA, which should yield the most accurate results.

To use some forward looking multiples for the peer group companies, despite needing usual data regarding market share and current market prices, one needs to have estimates regarding these companies' EBITDA, EBIT, NOPLAT (or Net income, representing earnings) and Revenues. For these estimates, which are for 2015 and second half of 2014, data was taken from Bloomberg. The same estimates from Vestas were taken from the DCF projections presented earlier in this study.

The PER is computed by dividing the last market price by the yearly earnings per share, or Net income of last year. The same market price is used to compute the price to sales ratio, computed by dividing it by the number of sales per share. The EV to EBIT or EBITDA ratios are calculated by dividing current enterprise value by the year's earnings before interest and taxes or before depreciation respectively.

In the table below we can see the peer group valuation resume. It was decided to present the computations of the value without Suzlon mainly to be able to see a more reasonable value for the PER multiple. However the most correct values should be the ones of the peer group as a whole.

Peer Group Valuation Resume

	Peer Group				Without Suzlon			
Year	2014		2015		2014		2015	
	Average	Price	Average	Price	Average	Price	Average	Price
PER	#NA	#NA	#NA	#NA	8,93	kr. 161,54	6,07	kr. 144,04
P\SALES	1,09	kr. 254,81	0,93	kr. 268,34	0,49	kr. 115,29	0,41	kr. 118,07
EV\EBIT	14,81	kr. 351,77	9,78	kr. 302,01	14,48	kr. 343,61	10,44	kr. 323,69
EV\EBITDA	9,86	kr. 260,72	7,04	kr. 233,67	10,14	kr. 268,72	7,52	kr. 250,83

Table 12: Relative Valuation Results

As we can see from the table above the Prices of Vestas seem to be higher in 2014 than with forward looking of 2015, with the P\SALES being the exception. This multiple is giving a slightly higher valuation than what the market price currently is. On the other hand the enterprise value to EBITDA yields a lower valuation than what the market currently is. The PER ratio gives a much smaller valuation (just by observing the values of Peer group without Suzlon) but this might be due to the different capital structures of the peer group companies and Vestas.

Finally the enterprise value to EBIT seems to give the most accurate valuation, yielding a value that is similar to the one we found in the DCF valuation section. This not only seems to be the most fitting, valuation method but additionally, as the EV\EBITDA, seems to be consistent with our without Suzlon.

Taking a different look at the assumptions behind each multiple we should develop a rationale to understand which better represents the value of the company. P/SALES multiple reflects poorly the profitability of the firm as stated in Liu et al (2002), maybe due to not allowing to account for differences in operating performances. Due to this we will forego the results given by this multiple for valuation purposes.

The PER is, as previously mentioned, not good to evaluate companies with different capital structures which is precisely Vestas and its peer group case. Although interesting the results from this multiple will not be considered further for valuation purposes.

Therefore the multiples to be used should be the enterprise value based ones. The enterprise value to EBIT or EBITDA should translate operating performance and therefore earnings. The value of the company with the EV\EBIT is significantly higher than EV\EBITDA, maybe due to the lower value of depreciation of Vestas in relation to its peers (due to the restructure that Vestas made in 2012 diminishing fixed assets).

Given this both enterprise value multiples will be used to resume the relative valuation of the company. The EV\EBIT always yields a higher valuation than the current market value and close to the value of the company through the DCF approach, meaning the company is undervalued in both valuation methods. The EV\EBITDA yields a higher valuation in 2014 but lower valuation with forward looking multiples, and also a lower valuation with Suzlon

included, yielding overall a valuation very close to market price as opposed to the previous multiple.

These multiples based on enterprise value are different and so one must choose which is the most adequate for our company. While the EBITDA is an operational cash flow EBIT is a result of the company. The later will be used in order to have a measure of the firm's profitability. More precisely the multiple to be used is the one for 2015, because this is forward looking, with Suzlon included in the peer group (kr. 302,01).

Concluding, and accepting the EV\EBIT multiple a the most correct one to the relative valuation of Vestas and say that through relative valuation the company is undervalued, in accordance with both the DCF and the EVA approaches. In fact this was to be expected as the multiples reflect the market prices and growth assumptions and expectations that are embedded in these prices.

The valuation using multiples gives us a good insight to the peer group and the differences between its companies and Vestas. It allows us to check the validity of our other valuation methods and it provides us a better understanding on the market expectations on Vestas business future.

7.4. Value at Risk

The Value at Risk (VaR) is a tool to measure risk, more specifically, it tell us the potential loss of an asset given a predetermined confidence level. Despite being a tool mainly used to measure the risk of portfolios of financial companies, it has become more accepted and more frequently used in valuation reports for non-financial companies.

The computation of VaR can be done trough a Monte Carlo simulation, trough a variance covariance matrix or by making assumptions on returns and market risk. In this study a Monte Carlo simulation will be presented. For this purpose daily data of the stock returns of Vestas from 1999 to 2014 was taken from Bloomberg.

Using excel tool random number generator it was simulated a normal distribution with the same mean and standard deviation as the one registered in the sample (a mean of 0,0005 and a standard deviation of 0,0371). Additionally we know that 10.000 numbers were generated. The generated normal distribution is shown in the graph below.

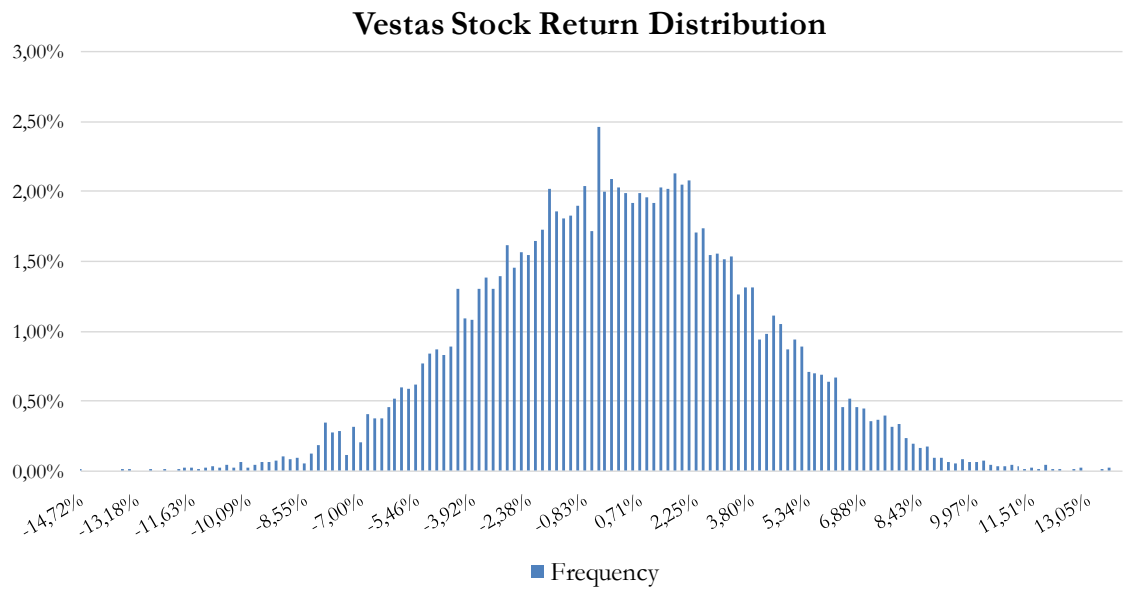


Figure 13: Randomly Generated Normal Distribution

By conducting a Jarque-Bera test to check for the normality we get a statistic of 0,68, which means we cannot reject the null hypothesis that the returns follow a normal distribution with a degree of confidence of 90% (and a Chi-Square critical value of 4,60).

Having the randomly generated sample we can compute VaR with different confidence levels. The table below presents expected losses in percentage of the value invested, in this case the current stock price of Vestas, for the confidence levels of 90%, 95% and 99%.

Resume of Value at Risk

Significance Level	Probability	Daily VaR
90%	10%	-4,66%
95%	5%	-5,95%
99%	1%	-8,35%

Table 13: Value at Risk Results

The computation of this tool allows us to know what the value that we may lose daily in 10%, 5% or 1% of the cases. This is a useful tool when used together with our valuation since the one might take our target price range in conjunction with the knowledge of what the expected losses of holding a Vestas stock is to have a better understanding of the implications of the recommendation presented in this study.

8. Valuation Comparison

As a comparison basis for this study valuation, a report of Skandinaviska Enskilda Banken (SEB bank) will be used. This report was produced by Chartered Financial Analyst Daniel Patterson from the SEB Equity Research team and published on 12th of May 2014.

There are some fundamental differences in the valuation performed in the bank's report than the one presented in this study.

Firstly the valuation methodology chosen in this study is DCF approach with the computation of multiples and EVA approach used to check the validity of the DCF results and to look at the various aspects of the company. Meanwhile, the SEB Bank's report uses a relative valuation approach in a standalone basis to estimate the value of the company, more specifically an EV\EBIT multiple. Additionally the estimation period in this report only extends for three years, from 2014 to 2016, while the one presented in the thesis is from 2015 to 2028, in order to capture the two full business cycles that are expected in our DCF valuation.

Another major difference relies on the estimation of revenues. While this study takes a top-down approach, by taking into account expectations of the market as a whole and through the market share of Vestas computing the revenues. On the other hand the SEB Bank equity research team looks at the future expected orders as away to try and estimate the revenues.

As we have seen in the literature review segment multiples valuation is not very much used as a standalone basis. Nonetheless many analysts use it that way, due to its simplicity and straight forwardness in relation to other methods and because, by reflecting market expectations this method is, on average, correct.

Since the multiples valuation was also performed in this thesis we will compare this valuation together with the EVA method with the multiples valuation of the Bank, keeping in mind that the most important valuation to the recommendation of this study is the DCF result. In the table below there is a resume of the valuation approaches presented in this thesis, with the bank's valuation and the DCF valuation highlighted.

Reports Comparison	**Thesis**			**SEB Report**
Method	**DCF**	EVA	EV\EBIT	**EV\EBIT**
Revenues Assumption	Expected Market Share and Installed Capacity Growth			Expected orders
Final Year of Explict Period	2028	2028	2015	2016
Price	**kr. 300,51**	kr. 356,62	kr. 302,01	**kr. 300,00**
Recommendation	Undervalued			Undervalued

Table 14: Valuation Comparison Review

As we can see from the table above one needs to know that although the valuation conducted in this thesis, through different methods, provides an approximate range of values from kr 300 to 360, the DCF valuation (300,51) is the one that one should feel more confident that provides an accurate result. In the next chapter the differences between estimators will be studied in more detail.

8.1. Estimator's Comparison

In the previous segment the difference between the two revenues estimations was explained. Nonetheless a further study on these differences allows understanding that the SEB equity research team considers that Vestas will be losing market share in the following years (a market share in 2015 and 2016 of 13,0% and of 12,7%, respectively, from a value that was close to 13,9% in 2013. In contrast, this study assumes (in the base case), as we have seen in the assumptions estimate chapter, that Vestas will maintain its market share of 2013. This difference results in lower revenues in the analyst's report. The figure below highlights these differences.

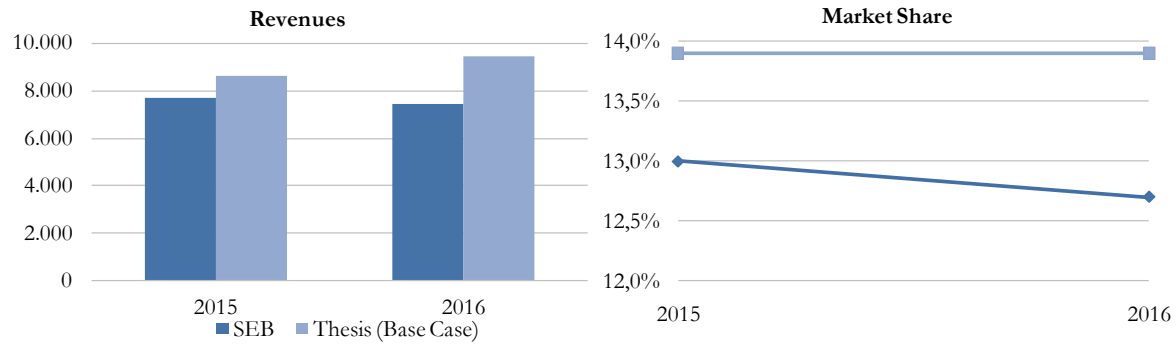


Figure 14: Revenues and Market Shares Comparison

In terms of COGS we cannot conclude how the bank research team estimated this rubric of the income statement; however these values are considerably lower than the thesis estimates, which can be seen in the graph below. Additionally we know that the estimates from the bank's report that EBITDA are similar (graph below), with less than one hundred million Euros in both years, which might be an indication that the estimates for operating performance are similar in both valuations.

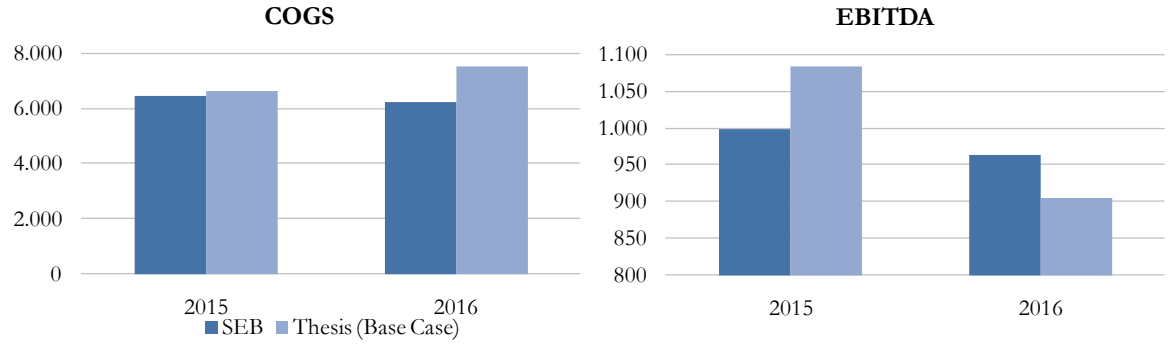


Figure 15: COGS and EBITDA Comparison

In addition there are differences in the calculus of depreciation and amortization in both reports that are fairly significant. In the SEB equity research team's report we know that these levels are about 300 million euros while this thesis estimated values are closer to one hundred

million. Therefore it is easy to understand the differences in EBIT estimations among both reports that can be seen below.

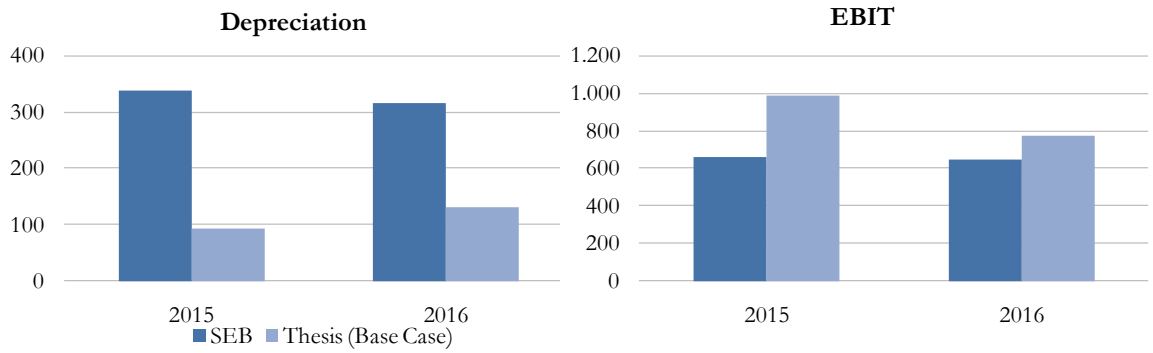


Figure 16: Depreciation and EBIT Comparison

Summarizing the differences between valuations we can see that in the SEB bank case the market share is decreasing which makes the revenue levels smaller. This effect is counterbalanced by higher costs which makes the EBITDA levels similar in both reports. The depreciation level of the bank's report has also lower depreciation which leads to lower EBIT levels in the estimated period. Ultimately it is also noticeable that this thesis looks for three different cases, while the equity research team report does not.

8.2. Multiples Comparison

There are also significant differences in the multiples valuation. This thesis construction of the peer group was already detailed in the previous chapter, together with the other calculations that were required to calculate the multiples valuation.

Regarding the SEB report we do not have the information about the computation of the peer group, even though it should be fairly similar due to the small number of companies' with a similar business models as Vestas.

By looking at the two valuations, on the table below, we can take some conclusions about the differences in multiples computation. As said previously, this thesis considers for the final price of the relative valuation to be the forward looking EV\EBIT, (2015), and with the peer group including Suzlon.

Relative Valuation Comparison	**Thesis**		**SEB Report**	
Multiple	**EV\EBIT**	EV\EBITDA	**EV\EBIT**	EV\EBITDA
Year	**2015**	2015	**2015**	2015
Computed Multiple	**9,78**	7,04	**8,60**	5,90

Table 15: Multiples Valuation Comparison Resume

From the table above we can see two multiples that were computed for the valuation of the company in the two reports. These forward looking multiples were both computed for the 2015 year and from this we can conclude the Thesis peer group as a higher multiple in both

multiples. This difference might be fairly small but might lead to high differences in valuations depending on the EBIT estimates differences.

Nonetheless the calculated multiple in the SEB report is not the one presented above. The bank states that due to the revisions of the expected orders and the expected volume they use a multiple of 11*EV\EBIT. This is a revision upward from the last recommended multiple of 10. This multiple leads to a target price of kr 300 that was presented above. Despite the differences, the relative valuation in both reports in terms of final prices is similar.

8.3. Concluding Reports' Comparison

In conclusion we can see from table 13, presented in the first section of this chapter, that the valuations in both reports are fairly similar. The SEB reports implies a target price ratio of kr 300 based on multiples, while this thesis reports presents a range of kr 300 to 360 based on DCF (three cases), EVA (three cases) and the multiples valuation.

Despite some different assumptions and estimates the values are fairly similar although the study of this Thesis report should yield a deeper understanding of the business, the industry and the prospects of Vestas.

9. Conclusion

Concluding this thesis report, we are confident to be better able to understand the differences and particularities of each valuation technique being able to better access how to value a company based on its characteristics. This idea of how to better value a company was achieved in the literature review segment of the thesis report.

After understanding the industry and the company, as well as the future forecasts that are expected to occur in the short to medium term trends that will impact the business. This exercise enabled us to determine our estimates for the explicit period of our valuations, being able to forecast P&L and Balance Sheet Statements that permitted us to be in a flexible state to easily employ the chosen valuation method.

The DCF, EVA and the forward looking enterprise value to EBIT multiple were used in order to determine the value of Vestas. The first is the most used method among both researchers and professionals, implying many assumptions and providing a good assessment on the cash-flow evolution of a company. The EVA approach adds value due to the ability to enlighten the investor on the years were the company will generate value. The creation of scenarios enabled us to apply both these methods in a cyclical company like Vestas.

The multiples valuation is also very much used among professionals mainly to its quick calculation and to being easily understandable to investors. In this Thesis the Relative valuation was very important in the understanding of the industry and its competitors. All three methods

implied a target price ranging from 300 to 360 Danish krones, which implies that the company is undervalued in the market.

Finally a comparison with SEB bank equity research team's report was conducted. From this analysis it was possible to understand that despite the fact that final recommendations are similar, methods and estimates can still differ a lot. This report also arrives to the conclusion that Vestas is undervalued, even though through different paths.

All in all, this thesis allowed the study of company valuation methods, the understanding of Vestas business and future and the estimates and valuations that can be in the exercise of equity research. The final take away from this Thesis is that Vestas is currently undervalued, presenting an interesting investment opportunity.

10. Annex

Annex 1: Income Statement as Reported

This is the income statement as reported by Vestas. The data was taken from the annual reports from year 2009 to 2013 and detailed in the table below.

mEur	2009	2010	2011	2012	2013
Revenue	5.083	6.916	5.848	7.198	6.080
COGS	4.246	5.742	5.122	6.404	5.185
Gross Profit	837	1.174	727	794	895
Other revenue	0	0	0	0	0
Operating Expenses	585	707	765	790	685
Operating profit before special item	251	468	-38	4	211
Special Items\ Depreciation	0	158	22	701	109
EBIT	**251**	**310**	**-60**	**-697**	**102**
Net Financing Income	-47	94	104	-14	-138
Financial Income	0	172	200	78	5
Finacial expenses	47	78	96	92	143
EBT	204	404	44	-711	-36
Taxes	-79	-83	-13	-250	-46
NI	**125**	**321**	**31**	**-961**	**-82**

Annex 2: Balance Sheet as Reported

Similarly to the income statement this is the balance sheet as reported by Vestas, with the data taken from the annual reports from year 2009 to 2013.

mEur	2009	2010	2011	2012	2013
Assets					
Cash & Near Cash Items	488	335	375	851	694
Short-Term Investments	0	0	0	0	0
Accounts & Notes Receivable	525	624	663	792	626
Inventories	3929	2736	2545	2243	1424
Other Current Assets	343	381	583	604	743
Total Current Assets	5285	4076	4166	4490	3487
Total intagible assets	812	1034	1243	1016	741
Total PPE	1461	1704	1898	1286	1221
Total Other noncurrent assets	401	253	381	179	190
Total noncurrent assets	2674	2991	3522	2481	2152
Total Assets	**7959**	**7067**	**7688**	**6971**	**5639**
Liabilities and Equity					
Liabilities					
Accounts Payable	1062	1120	1563	1008	832
Short-Term Borrowings	12	4	6	293	4
Other Short-Term Liabilities	3744	2132	2470	2396	2452
Total Current Liabilities	4818	3256	4039	3697	3288
Long-Term Borrowings	339	910	914	1458	604
Other Long-Term Liabilities	260	147	159	194	223
Total Long-Term Liabilities	599	1057	1073	1652	827
Total Liabilities	5417	4313	5112	5348	4115
Equity					
Total Preferred Equity	0	0	0	0	0
Dividend	0	0	0	0	0
Share Capital & APIC	27	27	27	27	27
Retained Earnings & Other Equity	2515	2728	2548	1595	1496
Total Equity	2542	2755	2575	1622	1523
Total Liabilities & Equity	**7959**	**7068**	**7687**	**6970**	**5638**

Annex 3: Income Statement Forecasts (Base Case)

Stated below is the Income Statement forecasted for the whole explicit period, as well as the historical values from 2012 to 2014. It is important to notice that the 2014 values were calculated based on the half year reports, with a comparison being made between the half year of 2013 and the one of 2014. This way the 2014 result is a "half" forecasted value.

In addition it is important to know the cyclicality and the cycle point where it is expected that each year should be on. This is why we can see above each year the "High" and "Low" marks.

The computation of each of the parameters is explained in this thesis and will be further documented in the next annexes presented in this thesis.

Cyclicality	Low			Cycle Beginning High				Low		Cycle End	Cycle Beginning High				Low			Cycle End	
mEur	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Revenue	7.198	6.080	6.994	8.623	9.418	10.178	10.821	11.985	12.922	14.046	15.114	16.251	17.376	18.517	19.643	20.752	21.827	22.855
COGS	6.404	5.185	5.503	6.640	7.529	8.086	9.069	10.204	10.545	11.018	11.638	12.992	13.804	15.519	16.724	16.934	17.122	17.598
Gross Profit	794	895	1.492	1.983	1.889	2.092	1.752	1.781	2.377	3.028	3.476	3.259	3.571	2.998	2.919	3.818	4.705	5.257
Other revenue	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Operating Expenses	790	685	636	900	983	1.063	1.130	1.252	1.349	1.467	1.578	1.697	1.814	1.934	2.051	2.167	2.279	2.387
Operating profit before special items	4	211	856	1.083	905	1.029	622	530	1.028	1.561	1.898	1.562	1.757	1.065	868	1.651	2.426	2.870
Special Items\ Depreciation	701	109	101	94	130	142	154	163	181	195	212	228	245	262	279	296	313	329
EBIT	**-697**	**102**	**754**	**989**	**775**	**887**	**469**	**366**	**847**	**1.366**	**1.686**	**1.334**	**1.512**	**803**	**589**	**1.355**	**2.113**	**2.541**
Net Financing Income	-14	-138	-118	-17	8	9	19	10	-17	3	28	60	67	90	75	63	94	149
Financial Income	78	5	1	61	10	10	21	11	0	5	29	61	68	91	76	64	96	151
Finacial expenses	92	143	119	78	1	1	1	1	17	1	1	1	1	1	1	1	1	1
EBT	-711	-36	636	972	784	896	488	376	830	1.369	1.714	1.394	1.578	893	663	1.418	2.207	2.690
Taxes	-250	-46	-178	-272	-219	-251	-137	-105	-232	-383	-480	-390	-442	-250	-186	-397	-618	-753
NI	**-961**	**-82**	**458**	**700**	**564**	**645**	**351**	**271**	**598**	**986**	**1.234**	**1.004**	**1.136**	**643**	**478**	**1.021**	**1.589**	**1.937**

Annex 4: Balance Sheet Forecasts (Base Case)

In this annex we can see the Forecasted Balance Sheet of the company, displayed in a similar way to the Income statement in the previous annex. For 2014 the same method was adopted to calculate the full year values based on the2014 and 2013 half year results. In addition the computation of each parameter is further detailed in the thesis.

Cyclicality	Low			Cycle Beginning High			Low			Cycle End	Cycle Beginning High			Low				Cycle End
mEur	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Assets																		
Cash & Near Cash Items	851	694	1.060	171	176	360	196	0	83	512	1.065	1.186	1.592	1.327	1.124	1.666	2.627	3.734
Short-Term Investments	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Accounts & Notes Receivable	792	626	483	810	885	957	1.017	1.126	1.215	1.320	1.421	1.528	1.633	1.740	1.846	1.951	2.052	2.148
Inventories	2.243	1.424	1.942	2.164	2.454	2.636	2.956	3.326	3.438	3.592	3.794	4.235	4.500	5.059	5.452	5.520	5.582	5.737
Other Current Assets	604	743	650	650	650	650	650	650	650	650	650	650	650	650	650	650	650	650
Total Current Assets	4.490	3.487	4.135	3.796	4.166	4.603	4.820	5.103	5.385	6.074	6.930	7.599	8.376	8.776	9.072	9.787	10.910	12.270
Total intagible assets	1.016	741	698	698	698	698	698	698	698	698	698	698	698	698	698	698	698	698
Total PPE	1.286	1.221	1.121	1.551	1.694	1.831	1.947	2.156	2.325	2.527	2.719	2.924	3.126	3.332	3.534	3.734	3.927	4.112
Total Other noncurrent assets	179	190	403	403	403	403	403	403	403	403	403	403	403	403	403	403	403	403
Total noncurrent assets	2.481	2.152	2.222	2.652	2.795	2.932	3.048	3.257	3.426	3.628	3.820	4.025	4.227	4.433	4.635	4.835	5.028	5.213
Total Assets	**6.971**	**5.639**	**6.357**	**6.449**	**6.961**	**7.535**	**7.868**	**8.360**	**8.811**	**9.702**	**10.750**	**11.623**	**12.603**	**13.209**	**13.707**	**14.622**	**15.938**	**17.483**
Total assets - excess cash	6.120	4.945	5.297	6.277	6.785	7.175	7.671	8.360	8.728	9.190	9.685	10.438	11.010	11.882	12.583	12.956	13.311	13.748
Liabilities and Equity																		
Liabilities																		
Accounts Payable	1.008	832	1.178	1.177	1.335	1.434	1.608	1.809	1.869	1.953	2.063	2.303	2.447	2.751	2.965	3.002	3.035	3.120
Short-Term Borrowings	293	4	607	0	0	0	0	126	0	0	0	0	0	0	0	0	0	0
Other Short-Term Liabilities	2.396	2.452	2.335	2.335	2.335	2.335	2.335	2.335	2.335	2.335	2.335	2.335	2.335	2.335	2.335	2.335	2.335	2.335
Total Current Liabilities	3.697	3.288	4.120	3.512	3.670	3.769	3.943	4.270	4.204	4.288	4.398	4.638	4.782	5.086	5.300	5.337	5.370	5.455
Long-Term Borrowings	1.458	604	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Other Long-Term Liabilities	194	223	216	216	216	216	216	216	216	216	216	216	216	216	216	216	216	216
Total Long-Term Liabilities	1.652	827	227	227	227	227	227	227	227	227	227	227	227	227	227	227	227	227
Total Liabilities	5.348	4.115	4.347	3.739	3.897	3.996	4.170	4.497	4.431	4.515	4.625	4.865	5.009	5.313	5.527	5.564	5.597	5.682
Equity																		
Total Preferred Equity	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dividend	0	0	0	210	169	194	105	81	179	296	370	301	341	193	143	306	477	581
Share Capital & APIC	27	27	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
Retained Earnings & Other Equity	1.595	1.496	1.980	2.470	2.865	3.316	3.562	3.752	4.170	4.861	5.724	6.427	7.223	7.673	8.007	8.722	9.834	11.190
Total Equity	1.622	1.523	2.010	2.710	3.064	3.540	3.698	3.863	4.380	5.186	6.125	6.758	7.594	7.895	8.180	9.058	10.340	11.801
Total Liabilities & Equity	**6.970**	**5.638**	**6.357**	**6.449**	**6.961**	**7.535**	**7.868**	**8.360**	**8.811**	**9.702**	**10.750**	**11.623**	**12.603**	**13.209**	**13.707**	**14.622**	**15.938**	**17.483**

Annex 5: Revenue Estimation (Base Case)

Detailed below is the revenue estimation process that was explained previously, with the historical period as well as the forecasted period. The tables were divided into two groups. The second cycle is described in the second table that should be seen as a continuity of the first.

Cyclicality					Low		Cycle Beginning High				Low		Cycle End
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Accumulated Wind Capacity	158.908	197.637	238.050	283.048	318.105	365.400	416.400	472.100	532.300	596.300	667.185	743.613	826.685
Growth	32,10%	24,37%	20,45%	18,90%	12,39%	14,87%	13,96%	13,38%	12,75%	12,02%	11,89%	11,46%	11,17%
New Installed Wind Capacity	38.793	38.265	40.398	44.799	35.289	47.295	51.000	55.700	60.200	64.000	70.885	76.428	83.072
Growth		-1,36%	5,57%	10,89%	-21,23%	34,02%	7,83%	9,22%	8,08%	6,31%	10,76%	7,82%	8,69%
Installed By Vestas	4.766	5.842	5.213	6.020	4.893	6.559	7.073	7.725	8.349	8.876	9.831	10.600	11.521
Growth		22,58%	-10,77%	15,48%	-18,72%								
Market	12,29%	15,27%	12,90%	14,00%	13,10%	13,70%	13,87%	13,87%	13,87%	13,87%	13,87%	13,87%	13,87%
Revenue/Vestas' Intallations	107%	118%	112%	120%	124%								
Revenue	**5.083**	**6.916**	**5.848**	**7.198**	**6.080**	**6.994**	**8.623**	**9.418**	**10.178**	**10.821**	**11.985**	**12.922**	**14.046**
Average Market Share Driver						**13,87%**							
Revenue/Vestas' Intallations Driver						**122%**							

Cycle Beginning High				Low			Cycle End	
2022	2023	2024	2025	2026	2027	2028	2029	
916.077	1.012.196	1.114.963	1.224.481	1.340.657	1.463.397	1.592.490	1.727.666	
11%	10,49%	10,15%	9,82%	9,49%	9,16%	8,82%	8,49%	
89.393	96.118	102.767	109.519	116.176	122.740	129.093	135.176	
7,61%	7,52%	6,92%	6,57%	6,08%	5,65%	5,18%	4,71%	
12.398	13.330	14.252	15.189	16.112	17.022	17.903	18.747	
13,87%	13,87%	13,87%	13,87%	13,87%	13,87%	13,87%	13,87%	
15.114	**16.251**	**17.376**	**18.517**	**19.643**	**20.752**	**21.827**	**22.855**	

Annex 6: Inputs that Vary with Revenues

In the tables below we can see the items that vary as a percentage of sales. We can see also the growth of these values both historical and forecasted, as well as the historical values as a percentage of revenues. As explained previous the driver is the average of the values in the last three years of the forecasted period.

Cyclicality				Low			Cycle Beginning High			Low			Cycle End
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Operating Expenses	585	707	765	790	685	636	900	983	1.063	1.130	1.252	1.349	1.467
Growth		20,69%	8,21%	3,32%	-13,35%	-7,09%	41,58%	9,22%	8,08%	6,31%	10,76%	7,82%	8,69%
As percentage of Revenues	11,52%	10,22%	13,07%	10,98%	11,26%	9,09%							
Driver for the forecasted period						***10,44%***							
Accounts & Notes Receivable	525	624	663	792	626	483	810	885	957	1.017	1.126	1.215	1.320
Growth		18,89%	6,20%	19,45%	-20,97%	-22,82%	67,80%	9,22%	8,08%	6,31%	10,76%	7,82%	8,69%
As percentage of Revenues	10,33%	9,03%	11,33%	11,00%	10,29%	6,91%							
Driver for the forecasted period						***9,40%***							
Total PPE	1.461	1.704	1.898	1.286	1.221	1.121	1.551	1.694	1.831	1.947	2.156	2.325	2.527
Growth		16,63%	11,38%	-32,24%	-5,05%	-8,19%	38,40%	9,22%	8,08%	6,31%	10,76%	7,82%	8,69%
As percentage of Revenues	28,74%	24,64%	32,45%	17,87%	20,08%	16,03%							
Driver for the forecasted period						***17,99%***							

Cycle Beginning High				Low			Cycle End	
2022	2023	2024	2025	2026	2027	2028	2029	
1.578	1.697	1.814	1.934	2.051	2.167	2.279	2.387	
7,61%	7,52%	6,92%	6,57%	6,08%	5,65%	5,18%	4,71%	
1.421	1.528	1.633	1.740	1.846	1.951	2.052	2.148	
7,61%	7,52%	6,92%	6,57%	6,08%	5,65%	5,18%	4,71%	
2.719	2.924	3.126	3.332	3.534	3.734	3.927	4.112	
7,61%	7,52%	6,92%	6,57%	6,08%	5,65%	5,18%	4,71%	

Annex 7: Inputs that Vary with COGS

The items that vary with the COGS are stated below. In addition we can see the historical and forecasted growth of this item as well as the percentage of the input in terms of COGS historically. The driver is the average of the last three years as it was previously explained.

Cyclicality	Low						Cycle Beginning High			Low			Cycle End
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Accounts Payable	1.062	1.120	1.563	1.008	832	1.178	1.177	1.335	1.434	1.608	1.809	1.869	1.953
Growth		5,49%	39,49%	-35,51%	-17,47%	41,64%	-0,08%	13,39%	7,41%	12,15%	12,52%	3,34%	4,49%
As percentage of Revenues	25,01%	19,51%	30,51%	15,74%	16,04%	21,41%							
Driver for the forecasted period						***17,73%***							
Inventories	3.929	2.736	2.545	2.243	1.424	1.942	2.164	2.454	2.636	2.956	3.326	3.438	3.592
Growth		-30,37%	-6,96%	-11,87%	-36,50%	36,33%	11,46%	13,39%	7,41%	12,15%	12,52%	3,34%	4,49%
As percentage of Revenues	92,53%	47,65%	49,70%	35,03%	27,47%	35,29%							
Driver for the forecasted period						***32,60%***							

Cycle Beginning High			Low			Cycle End	
2022	2023	2024	2025	2026	2027	2028	2029
2.063	2.303	2.447	2.751	2.965	3.002	3.035	3.120
5,63%	11,63%	6,25%	12,42%	7,76%	1,26%	1,11%	2,78%
3.794	4.235	4.500	5.059	5.452	5.520	5.582	5.737
5,63%	11,63%	6,25%	12,42%	7,76%	1,26%	1,11%	2,78%

Annex 8: CAPEX and Net Working Capital

In the tables below are the calculations necessary to compute both the CAPEX and the NWC. The details on the computations were in explained previously in the thesis.

Cyclicality				Low			Cycle Beginning High			Low			Cycle End
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
PPE t-1		1.461	1.704	1.898	1.286	1.221	1.121	1.551	1.694	1.831	1.947	2.156	2.325
Depreciation		158	22	701	109	101	94	130	142	154	163	181	195
Depreciation\PPE t-1		10,81%	1,29%	36,93%	8,48%	8,29%							
Driver for the forecasted period						***8,38%***							
CAPEX =Change in PPE+DEP	**606**	**470**	**425**	**167**	**73**	**201**	**1.037**	**982**	**1.053**	**1.106**	**1.263**	**1.335**	**1.460**
Accounts & Notes Receivable +		624	663	792	626	483	810	885	957	1.017	1.126	1.215	1.320
Inventories +		2.736	2.545	2.243	1.424	1.942	2.164	2.454	2.636	2.956	3.326	3.438	3.592
Other Current Assets +		381	583	604	743	650	650	650	650	650	650	650	650
Accounts Payable -		1.120	1.563	1.008	832	1.178	1.177	1.335	1.434	1.608	1.809	1.869	1.953
Other Short-Term Liabilities -		2.132	2.470	2.396	2.452	2.335	2.335	2.335	2.335	2.335	2.335	2.335	2.335
NWC		**489**	**-242**	**235**	**-491**	**-438**	**113**	**320**	**474**	**681**	**959**	**1.098**	**1.274**
Change in NWC = (NWCt-NWCt-1)		**489**	**-731**	**477**	**-726**	**53**	**551**	**207**	**154**	**206**	**278**	**139**	**176**

Cycle Beginning High				Low			Cycle End	
2022	2023	2024	2025	2026	2027	2028	2029	
2.527	2.719	2.924	3.126	3.332	3.534	3.734	3.927	
212	228	245	262	279	296	313	329	
1.559	**1.676**	**1.784**	**1.896**	**2.005**	**2.111**	**2.213**	**2.309**	
1.421	1.528	1.633	1.740	1.846	1.951	2.052	2.148	
3.794	4.235	4.500	5.059	5.452	5.520	5.582	5.737	
650	650	650	650	650	650	650	650	
2.063	2.303	2.447	2.751	2.965	3.002	3.035	3.120	
2.335	2.335	2.335	2.335	2.335	2.335	2.335	2.335	
1.466	**1.775**	**2.001**	**2.363**	**2.648**	**2.784**	**2.913**	**3.080**	
193	**308**	**226**	**362**	**285**	**136**	**129**	**168**	

Annex 9: Net Financing Income Calculation

Below are the calculations for the Net Financing Income. As we can see the Net Financing Income is mostly positive in the forecasted period due to the excess cash. However these values will not affect the DCF valuation, done through the FCFF.

Cyclicality				Low			Cycle Beginning High			Low			Cycle End
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Cash & Near Cash Items	488	335	375	851	694	1.060	171	176	360	196	0	83	512
Short-Term Borrowings	12	4	6	293	4	607	0	0	0	0	126	0	0
Long-Term Borrowings	339	910	914	1.458	604	11	11	11	11	11	11	11	11
Financial Income	0	172	200	78	5	1	61	10	10	21	11	0	5
As percentage of Revenues		35,25%	40,98%	15,98%	1,02%	0,20%							
Driver for the forecasted period						***5,74%***							
Finacial expenses	47	78	96	92	143	119	78	1	1	1	1	17	1
As percentage of Revenues		22,22%	10,50%	10,00%	8,17%	19,58%							
Driver for the forecasted period						***12,58%***							
Net Financing Income	**-47**	**94**	**104**	**-14**	**-138**	**-118**	**-17**	**8**	**9**	**19**	**10**	**-17**	**3**

Cycle Beginning High			Low			Cycle End	
2022	2023	2024	2025	2026	2027	2028	2029
1.065	1.186	1.592	1.327	1.124	1.666	2.627	3.734
0	0	0	0	0	0	0	0
11	11	11	11	11	11	11	11
29	61	68	91	76	64	96	151
1	1	1	1	1	1	1	1
28	**60**	**67**	**90**	**75**	**63**	**94**	**149**

Annex 10: Forecasted Income Statement (High Growth Case)

In the table below there is stated the income statement for the High Growth case. Stated in red are the main differences in assumptions, namely the market share and the Revenue\COGS driver.

Cyclicality				Cycle Beginning					Cycle End		Cycle Beginning					Cycle End		
	Low			High			Low				High			Low				
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Market Share	13,44%	13,87%	13,87%	14,37%	14,87%	15,37%	15,87%	16,37%	16,87%	17,37%	17,87%	18,37%	18,87%	19,37%	19,87%	20,37%	20,87%	21,37%
Revenue	7.198	6.080	6.994	8.934	10.097	11.279	12.381	14.145	15.718	17.590	19.473	21.525	23.640	25.861	28.141	30.479	32.843	35.215
COGS	6.404	5.185	5.503	6.790	7.967	8.845	10.242	11.887	12.659	13.619	14.800	16.984	18.537	21.391	23.648	24.548	25.429	26.763
Revenue\COGS Driver	88,97%	85,27%	78,67%	76,00%	78,91%	78,41%	82,72%	84,03%	80,54%	77,43%	76,00%	78,91%	78,41%	82,72%	84,03%	80,54%	77,43%	76,00%
Gross Profit	794	895	1.492	2.144	2.130	2.435	2.140	2.259	3.058	3.971	4.674	4.541	5.103	4.469	4.493	5.931	7.414	8.452
Operating Expenses	790	685	636	933	1.054	1.178	1.293	1.477	1.641	1.837	2.034	2.248	2.469	2.700	2.939	3.183	3.430	3.677
Operating profit before special ite	4	211	856	1.211	1.075	1.257	847	781	1.417	2.134	2.640	2.293	2.634	1.769	1.555	2.748	3.985	4.774
Special Items\ Depreciation	701	109	101	94	135	152	170	187	213	237	265	294	325	357	390	424	460	495
EBIT	**-697**	**102**	**754**	**1.117**	**941**	**1.105**	**677**	**595**	**1.204**	**1.897**	**2.375**	**1.999**	**2.310**	**1.412**	**1.165**	**2.323**	**3.525**	**4.279**
Net Financing Income	-14	-138	-118	-17	8	5	13	-2	-59	-40	6	42	46	71	44	20	58	132
Financial Income	78	5	1	61	9	6	14	0	0	0	7	43	47	73	45	22	59	134
Finacial expenses	92	143	119	78	1	1	1	2	59	40	1	1	1	1	1	1	1	1
EBT	-711	-36	636	1.100	948	1.109	689	593	1.145	1.857	2.381	2.041	2.355	1.483	1.209	2.344	3.583	4.411
Taxes	-250	-46	-178	-308	-266	-311	-193	-166	-321	-520	-667	-571	-659	-415	-338	-656	-1.003	-1.235
NI	**-961**	**-82**	**458**	**792**	**683**	**799**	**496**	**427**	**824**	**1.337**	**1.714**	**1.469**	**1.696**	**1.068**	**870**	**1.688**	**2.580**	**3.176**

Annex 11: Forecasted Income Statement (Decline Case)

In the table below there is stated the income statement for the Decline case. Stated in red are the main differences in assumptions, namely the market share and the Revenue\COGS driver.

Cyclicality				Cycle Beginning					Cycle End		Cycle Beginning						Cycle End	
	Low			High			Low				High			Low				
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Market Share	13,44%	13,87%	13,87%	13,77%	13,67%	13,57%	13,47%	13,37%	13,27%	13,17%	13,07%	12,97%	12,87%	12,77%	12,67%	12,57%	12,47%	12,37%
Revenue	7.198	6.080	6.994	8.561	9.282	9.958	10.509	11.553	12.363	13.337	14.242	15.197	16.123	17.048	17.943	18.807	19.623	20.383
COGS	6.404	5.185	5.503	6.763	7.613	8.117	9.036	10.091	10.351	10.734	11.251	12.464	13.142	14.659	15.673	15.746	15.793	16.103
Revenue\COGS Driver	88,97%	85,27%	78,67%	79,00%	82,02%	81,51%	85,98%	87,35%	83,72%	80,48%	79,00%	82,02%	81,51%	85,98%	87,35%	83,72%	80,48%	79,00%
Gross Profit	794	895	1.492	1.798	1.669	1.841	1.473	1.461	2.013	2.603	2.991	2.732	2.981	2.390	2.270	3.062	3.830	4.280
Operating Expenses	790	685	636	894	969	1.040	1.097	1.206	1.291	1.393	1.487	1.587	1.684	1.780	1.874	1.964	2.049	2.129
Operating profit before special ite	4	211	856	904	700	801	376	255	722	1.210	1.504	1.145	1.298	609	396	1.098	1.781	2.152
Special Items\ Depreciation	701	109	101	94	129	140	150	158	174	186	201	215	229	243	257	271	284	296
EBIT	**-697**	**102**	**754**	**810**	**570**	**661**	**225**	**97**	**547**	**1.024**	**1.302**	**931**	**1.068**	**366**	**139**	**827**	**1.497**	**1.856**
Net Financing Income	-14	-138	-118	-17	1	-7	1	-29	-85	-78	-45	0	-3	10	-32	-82	-49	14
Financial Income	78	5	1	61	2	0	3	0	0	0	0	2	0	11	0	0	0	16
Finacial expenses	92	143	119	78	1	7	1	29	85	78	45	1	3	1	32	82	49	1
EBT	-711	-36	636	793	571	655	227	67	462	946	1.257	931	1.065	376	107	745	1.448	1.870
Taxes	-250	-46	-178	-222	-160	-183	-63	-19	-129	-265	-352	-261	-298	-105	-30	-209	-406	-524
NI	**-961**	**-82**	**458**	**571**	**411**	**471**	**163**	**49**	**333**	**681**	**905**	**670**	**767**	**271**	**77**	**536**	**1.043**	**1.347**

Annex 12: Discounted Cash Flow (Base Case)

Stated below are the FCFF processes estimation as well as all the inputs put together for the DCF Valuation method. This process was detailed in Chapter 7 of this thesis.

	Cycle Beginning						Cycle End	Cycle Beginning						Cycle End
	High			Low				High			Low			
mEur	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**
Ebit	989	775	887	469	366	847	1.366	1.686	1.334	1.512	803	589	1.355	2.113
Taxes (-)	277	217	248	131	103	237	382	472	374	423	225	165	379	592
NOPLAT	712	558	639	338	264	610	984	1.214	961	1.088	578	424	975	1.521
Dep (+)	606	839	917	991	1.053	1.166	1.258	1.367	1.471	1.582	1.691	1.802	1.912	2.020
CAPEX (-)	1.037	982	1.053	1.106	1.263	1.335	1.460	1.559	1.676	1.784	1.896	2.005	2.111	2.213
NWC (-)	551	207	154	206	278	139	176	193	308	226	362	285	136	129
FCFF	-269	208	347	15	-224	303	606	829	448	660	10	-64	640	1.199
Discounted FCFF	**-252**	**182**	**284**	**12**	**-160**	**203**	**380**	**486**	**246**	**339**	**5**	**-29**	**269**	**471**
WACC		6,90%												
Average FCFF Following Cycle		650												
1st Stage Growth		7,49%												
Lenght Cycle		7 Years												
2nd Stage Growth		3%												
Terminal Value														**21.659**
PV (Sum of FCFF)		2.436												
PV (Terminal Value)		8.513												
Value of the Company		10.949												
We		85,23%												
Equity		9.332												
Shares (in million)		224												
DKK to Eur		0,134												
Price in DKK		**310,79**												

Annex 13: Discounted Cash Flow (High Growth Case)

	Cycle Beginning						Cycle End	Cycle Beginning						Cycle End
	High			Low				High			Low			
mEur	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**
Ebit	1.117	941	1.105	677	595	1.204	1.897	2.375	1.999	2.310	1.412	1.165	2.323	3.525
Taxes (-)	313	263	309	189	167	337	531	665	560	647	395	326	651	987
NOPLAT	804	677	795	487	428	867	1.366	1.710	1.439	1.663	1.017	838	1.673	2.538
Dep (+)	606	869	983	1.098	1.205	1.377	1.530	1.712	1.895	2.095	2.301	2.517	2.739	2.966
CAPEX (-)	1.093	1.079	1.195	1.296	1.522	1.660	1.867	2.051	2.264	2.475	2.700	2.927	3.159	3.392
NWC (-)	602	284	242	311	410	263	319	353	518	430	633	550	354	353
FCFF	-284	184	341	-22	-300	321	710	1.018	553	853	-16	-122	898	1.759
Discounted FCFF	**-266**	**161**	**279**	**-17**	**-215**	**215**	**445**	**597**	**303**	**438**	**-8**	**-55**	**377**	**691**
WACC		6,90%												
Average FCFF Following Cycle		897												
1st Stage Growth		7,49%												
Lenght Cycle		7 Years												
2nd Stage Growth		3%												
Terminal Value														**29.895**
PV (Sum of FCFF)		2.947												
PV (Terminal Value)		11.750												
Value of the Company		14.698												
We		85,23%												
Equity		12.527												
Shares (in million)		224												
DKK to Eur		0,134												
Price in DKK		**417,20**												

Annex 14: Discounted Cash Flow (Decline Case)

	Cycle Beginning High				Low		Cycle End	Cycle Beginning High			Low			Cycle End
mEur	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**
Ebit	810	570	661	225	97	547	1.024	1.302	931	1.068	366	139	827	1.497
Taxes (-)	227	160	185	63	27	153	287	365	261	299	103	39	232	419
NOPLAT	583	411	476	162	69	394	737	938	670	769	264	100	595	1.078
Dep (+)	606	833	903	969	1.023	1.124	1.203	1.298	1.386	1.479	1.569	1.659	1.746	1.830
CAPEX (-)	1.026	963	1.025	1.068	1.211	1.270	1.378	1.461	1.558	1.646	1.736	1.820	1.902	1.977
NWC (-)	563	194	139	188	255	115	148	162	270	188	313	235	92	84
FCFF	-400	87	216	-125	-373	134	414	613	228	415	-216	-296	348	847
Discounted FCFF	**-374**	**76**	**177**	**-96**	**-268**	**89**	**259**	**359**	**125**	**213**	**-104**	**-133**	**146**	**333**
WACC		6,90%												
Average FCFF Following Cycle		378												
1st Stage Growth		7,49%												
Lenght Cycle		7 Years												
2nd Stage Growth		3%												
Terminal Value														**12.588**
PV (Sum of FCFF)		805												
PV (Terminal Value)		4.948												
Value of the Company		5.753												
We		85,23%												
Equity		4.903												
Shares (in million)		224												
DKK to Eur		0,134												
Price in DKK		**163,29**												

Annex 15: Economic Value Added (Base Case)

		Cycle Beginning						Cycle End	Cycle Beginning						Cycle End
		High				Low			High			Low			
mEur	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**
Invested Capital t-1	683	683	1.664	2.014	2.306	2.628	3.115	3.423	3.801	4.186	4.698	5.127	5.695	6.182	6.518
ROIC		102,2%	31,5%	29,7%	12,6%	8,0%	17,6%	26,7%	29,9%	21,0%	21,2%	9,3%	5,4%	13,8%	21,3%
Economic Profit	683	651	410	460	132	30	333	679	876	588	670	122	-83	425	941
Discounted FCFF	**683**	**609**	**359**	**376**	**101**	**21**	**223**	**426**	**514**	**323**	**344**	**58**	**-37**	**179**	**370**
WACC			6,90%												
Average Economic Profit Cycle			506												
1st Stage Growth			7,49%												
Lenght Cycle			7 Years												
2nd Stage Growth			3%												
Terminal Value															**16.854**
PV (Sum of FCFF)			4.550												
PV (Terminal Value)			6.625												
Value of the Company			11.174												
We			85,23%												
Equity			9.523												
Shares (in million)			224												
DKK to Eur			0,134												
Price in DKK			**317,17**												

Annex 16: Economic Value Added (High Growth Case)

		Cycle Beginning						Cycle End	Cycle Beginning						Cycle End
		High				Low			High			Low			
mEur	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**
Invested Capital t-1	683	683	1.772	2.265	2.720	3.229	3.957	4.503	5.158	5.850	6.736	7.547	8.580	9.540	10.314
ROIC		117,8%	38,2%	35,1%	17,9%	13,3%	21,9%	30,3%	33,1%	24,6%	24,7%	13,5%	9,8%	17,5%	24,6%
Economic Profit	683	757	555	639	300	205	594	1.055	1.354	1.036	1.198	496	247	1.015	1.827
Discounted FCFF	**683**	**708**	**486**	**523**	**229**	**147**	**398**	**662**	**794**	**568**	**615**	**238**	**111**	**426**	**718**
WACC			6,90%												
Average Economic Profit Cycle			506												
1st Stage Growth			7,49%												
Lenght Cycle			7 Years												
2nd Stage Growth			3%												
Terminal Value															**34.146**
PV (Sum of FCFF)			7.307												
PV (Terminal Value)			13.421												
Value of the Company			20.728												
We			85,23%												
Equity			17.666												
Shares (in million)			224												
DKK to Eur			0,134												
Price in DKK			**588,37**												

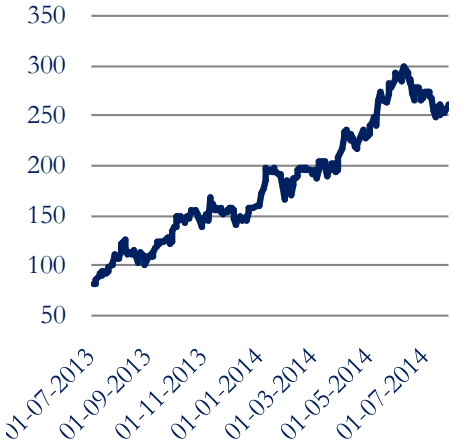
Annex 17: Economic Value Added (Decline Case)

		Cycle Beginning						Cycle End	Cycle Beginning						Cycle End
		High				Low			High			Low			
mEur	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**
Invested Capital t-1	683	683	1.666	1.989	2.250	2.537	2.980	3.241	3.564	3.889	4.331	4.685	5.165	5.561	5.808
ROIC		85,4%	24,7%	23,9%	7,2%	2,7%	13,2%	22,7%	26,3%	17,2%	17,8%	5,6%	1,9%	10,7%	18,6%
Economic Profit	683	536	296	339	7	-106	188	514	692	402	470	-60	-256	212	677
Discounted FCFF	**683**	**501**	**259**	**278**	**5**	**-76**	**126**	**322**	**406**	**220**	**241**	**-29**	**-115**	**89**	**266**
WACC			6,90%												
Average Economic Profit Cycle			506												
1st Stage Growth			7,49%												
Lenght Cycle			7 Years												
2nd Stage Growth			3%												
Terminal Value															**10.177**
PV (Sum of FCFF)			3.178												
PV (Terminal Value)			4.000												
Value of the Company			7.179												
We			85,23%												
Equity			6.118												
Shares (in million)			224												
DKK to Eur			0,134												
Price in DKK			**203,76**												

Recent Operational Improvements and Market Growth Prospects Contribute to the Positive Outlook

Target Price Range (DKK)	**300 - 360**
Target Price Range (Eur)	**40 - 48**
Daily VAR (5% Prob.)	**-5,95%**
Daily VAR (1% Prob.)	**-8,35%**
Recommendation	**Buy**
Risk	**High**

Price Performance Last 12m



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Vestas Wind Systems A/S is one of the market leaders in wind turbine manufacturing and power plant installer and planner. Competition has been increasing especially since 2007 and in Emerging markets.

Vestas is still in position to be at the forefront of the industry but there are some developments in the short term that will dictate the success of the firm in this fast growing market.

It is given a positive recommendation and a target price range of 300 to 360 to the Company based on several valuations methods among which a DCF, EVA and multiples Valuation. In addition to this, scenarios were developed to make sure that the Cyclicality is taken into account. We forecasted two whole business cycles (2015 until 2021 and 2022 until 2028).

Vestas seems to be on the right track to maintain its position as one of the Leaders in the market due to its technology and know-how in the offshore wind segment (the fastest growing segment) and its efforts to penetrate in the Emerging markets (the fastest growing markets).

The Operational improvements that Vestas has been registering since 2013 is also a point of emphasis in this recommendation as it has permitted Vestas to attain positive results after the 2012 year.

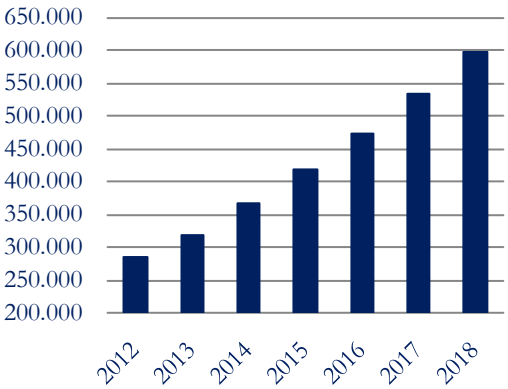
It is important to remember that Vestas has announced in their Half Year, namely the solvency Ratio and Net Debt to EBITDA (bigger than 30% and lower than 1, respectively). In our estimates this target will be easily attained. These and other key figures can be seen in the table below (only until 2021).

Key Estimates	2012A	2013A	2014E	2015F	2016F	2017F	2018F	2019F	2020F	2021F
Revenue (mEur)	7.198	6.080	6.994	8.623	9.418	10.178	10.821	11.985	12.922	14.046
Operating Profit	4	211	856	1.083	905	1.029	622	530	1.028	1.561
EBIT	-697	102	754	989	775	887	469	366	847	1.366
NI	-961	-82	458	571	411	471	163	49	333	681
NOPLAT	-502	73	543	712	558	639	338	264	610	984
Margins										
Gross Margin	11%	15%	21%	23%	20%	21%	16%	15%	18%	22%
Operating Margin	-10%	2%	11%	11%	8%	9%	4%	3%	7%	10%
Profit Margin	-7%	1%	8%	8%	6%	6%	3%	2%	5%	7%
ROIC	-30%	5%	74%	104%	34%	32%	15%	10%	20%	29%
Capital Structure Ratios										
Net Debt\EBITDA	3,58	-0,34	-1,76	-0,64	-0,66	-1,39	-0,74	0,55	-0,29	-1,99
Solvency ratio	0,48	1,23	1,65	119,85	127,04	141,39	120,74	9,61	161,50	203,75

Market Developments to Watch For

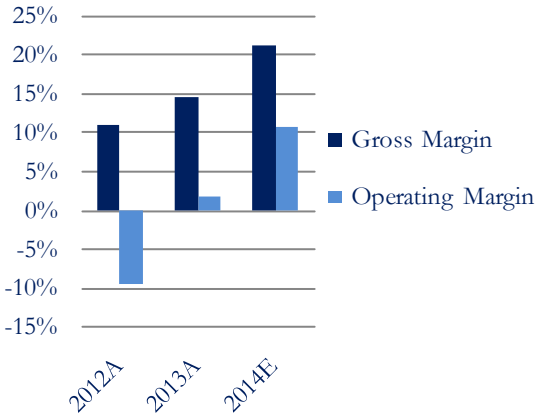
The Investment case presented is due to the research team take on the challenges that Vestas will face in the short to medium term, and will provide a profound impact on the company value. The developments that the investor should look for are:

World´s Accumulated Wind Capacity in MW Estimates of GWEC



1. **The Continued Growth of the wind energy capacity demands, and the ability of Vestas to maintain its market share –** This growth is expected to continue, with double digits, as wind continues to be the green energy that provides the lowest Levelised Cost of Energy (LCoE), fossil fuels become scarcer and the public view of nuclear energy deteriorates. The growth will be registered mostly in the Emerging Markets and in the offshore wind segment, where Vestas plans to capture the market through its Joint Venture with Mitsubishi Heavy Industries and its recently announced 8MW wind turbine.

Operating Expenses After 2012



2. **The Success of the Operational improvements following the turnaround –** Vestas underwent an operational turnaround following a down 2012 year, in an effort to reduce fixed costs and "trim" the extra costs and unnecessary production capacity. After registering small improvements in 2013, the 2014 1ST Quarter and 1ST Half - Year reports seem to be indicating a successful process due to the lower COGS and operating expenses. The 2014 annual report and 2015 initial reports should provide further insight on this fact.

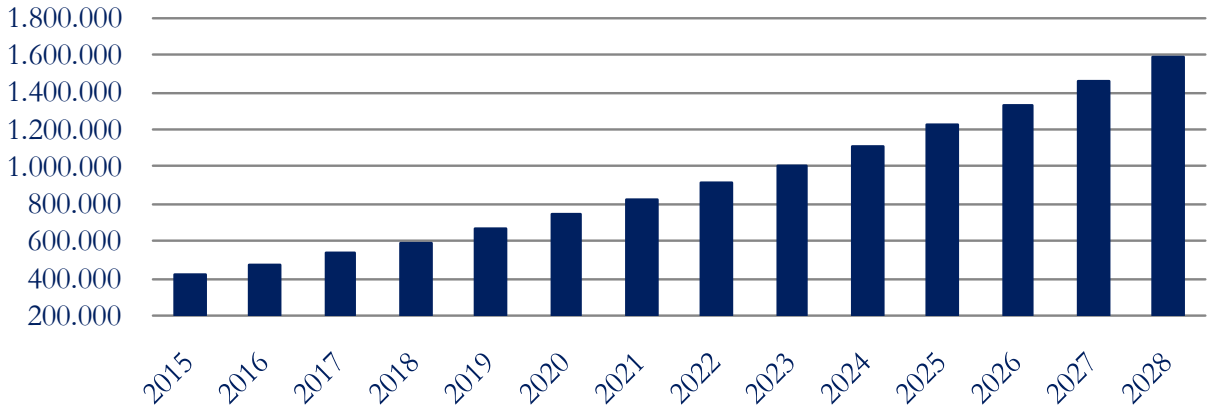
3. **The successful penetration in the Emerging Markets –** This will greatly contribute to the increase or decrease in the market share developments of Vestas. The company has addressed these concerns and has disclosed, in 2014´s Capital Markets Day, that they were sending the specialized sales teams to strategic points in these markets.

Tracking Developments and Investment Case

In order to understand the results of our valuation one needs to know our takes on the developments mentioned in the previous segments. In addition three scenarios (Base Case, Growth and Decline) were created to account for the uncertainty of certain assumptions

1) **The Continued Growth of the wind energy capacity demands, and the ability of Vestas to maintain its market share –** After previously seeing the estimates of the Global Wind Energy Council (GWEC) we can see in the graph below the estimates in this report. We are also encouraged by Vestas ability to maintain its market share by increasing its penetration in the emerging markets as well as maintaining its position in its other markets. In addition the Joint Venture with Mitsubishi Heavy Industries will allow Vestas to increase its position in the offshore segment.

World´s Accumulated Installed Wind Capacity in MW Estimates



2) **The Success of the Operational improvements following the turnaround –** As previously mentioned we know that early indications regarding the success of the restructure that Vestas underwent seem to be favorable. Taking this into to account we estimated the COGS taking into account the evolution of last cycle's historical percentage of COGS in terms of revenues. We will account for the uncertainty of these estimates by creating different estimates for the three different scenarios which can also be seen in the table below. The estimates for the second cycle of the explicit period (2022 to 2028) are the same.

COGS as a percenatge of Revenues							
Cycle Turn	High			Low			
Year	2008	2009	2010	2011	2012	2013	2014
COGS	4.866	4.246	5.742	5.122	6.404	5.185	5.503
Growth		-12,74%	35,22%	-10,79%	25,03%	-19,04%	6,13%
GOCS/Revenue	80,46%	83,54%	83,02%	87,58%	88,97%	85,27%	78,67%

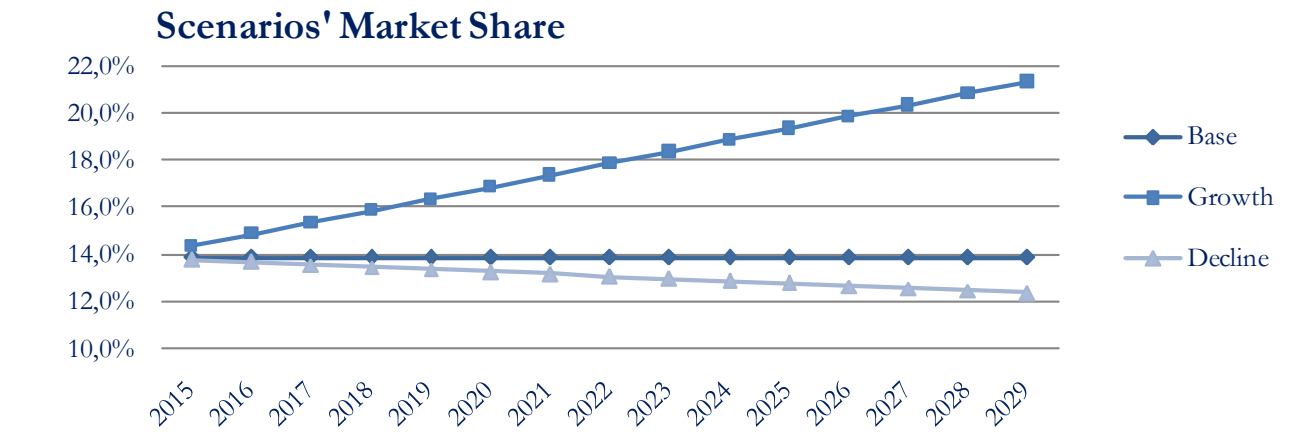
Year	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
Base Case	77,00%	79,94%	79,45%	83,81%	85,14%	81,60%	78,44%
Growth	76,00%	78,91%	78,41%	82,72%	84,03%	80,54%	77,43%
Decline	79,00%	82,02%	81,51%	85,98%	87,35%	83,72%	80,48%

3) **The successful penetration in the Emerging Markets –** Our estimates is that Vestas will be able to maintain its market share by increasing its presence in the Emerging markets and maintaining its dominant position in its already dominant markets like North America and Europe. Therefore our estimation for the base case is that Vestas will maintain its market share. However we will use the scenarios to account for the uncertainty regarding Vestas future market share developments.

   i. **Base Case**: Vestas will be able to maintain its Market share and therefore grow with the market.

   ii. **Growth Case**: Vestas is very successful in entering the emerging markets and in addition is able to capture the big portion of the offshore segment with little competition.

   iii. **Decline Case**: Vestas is not successful in entering the emerging markets, due to the established companies in those countries. However Vestas is still a very established firm in the market and it is unlikely that it would lose it at a faster pace.



Valuation

As previously mentioned the target price range is from 300 to 360, and in this chapter the valuation methods behind this model will be explained.

- **DCF valuation**: The most widely accepted method to estimate the value of company this is the method in which we base most of our evaluation. This method looks at the evolution of a company's cash-flows and how these will be generated. The three previous scenarios were used and the main driver of the model is the Revenues estimated with the world's accumulated installed capacity growth and assumed Vestas' market share.

DCF Valuation Resume

	Base (50%)	Growth (25%)	Decline (25%)	**Final Value**
Enterprise Value (m)	kr. 81.710,04	kr. 109.684,27	kr. 42.930,82	**kr. 79.008,79**
Equity (m)	kr. 69.639,50	kr. 93.481,26	kr. 36.588,90	**kr. 67.337,29**
Price	kr. 310,79	kr. 417,19	kr. 163,29	**kr. 300,51**

- **EVA Valuation**: This is a method that is mainly used as an alternative to DCF. Instead of looking at the cash-flows of a company, which might overlook the ability to generate profit by looking at each explicit year period economic profit. Therefore this method can be used with th DCF to have a better understanding of Vestas future economic prospects.

EVA Valuation Resume

	Base (50%)	Growth (25%)	Decline (25%)	**Final Value**
Enterprise Value (m)	kr. 83.388,36	kr. 154.690,17	kr. 53.572,17	**kr. 93.759,77**
Equity (m)	kr. 71.069,88	kr. 131.838,70	kr. 45.658,27	**kr. 79.909,19**
Price	kr. 317,17	kr. 588,37	kr. 203,76	**kr. 356,62**

- **Relative Valuation**: This valuation approach is rarely used as a standalone tool. Instead it is mostly used as an instrument to check the reasonability of other methods results. We will use an enterprise value to EBIT multiple. This will be a forward looking multiple to better reflect the growth prospects of the company.

Relative Valuation Comparison

Multiple	Forward Year	Computed Multiple	Price
EV\EBIT	2015	9,78	kr. 302,01

- **Value at Risk (VaR):** This is a tool that measures risk. The VaR shows us the potential loss of holding an asset, or a portfolio, with a given confidence level. This is a tool mostly used to measure the risk of financial companies' portfolios. However it has become more frequently used in valuation reports of non financial companies, has it shows investors the risk of the recommendation.

Resume of Value at Risk		
Significance Level	Probability	Daily VaR
90%	10%	-4,66%
95%	5%	-5,95%
99%	1%	-8,35%

- Other Estimates: For the valuation methods one needs to calculate the WACC to have a discount factor for the EVA and DCF. The inputs for the WACC are displayed below, namely the cost of equity, cost of debt and the capital structure.

WACC Computation Resume							
Rf	1,24%	German 10 year t-bill	Ke	7,33%	CAPM	Kd	6,12%
MRP	4,25%	Europe Market Index	We	85,23%		Wd	14,77%
Tax	28,00%	Effective tax rate					
			WACC	**6,84%**			

Concluding Valuation

Having seen the justification for the valuation methods we can now understand the price range of 300 to 360, being that it is important to understand that this yields a buy recommendation for the company as we believe Vestas stock is undervalued. In the table below we can see the valuation estimates resume.

Resuming Valuation Results			
	Value		
Method	**DCF**	**EVA**	**EV\EBIT**
Price	**kr. 300,51**	kr. 356,62	kr. 302,01
Recommendation	Undervalued	Undervalued	Undervalued
	Risk		
Method	**VaR**		
Result	95% Confidence Level; -5,95%		
Recommendation	High Risk		

Estimates Detailed

In this section we will detail some of the estimates for the base case. These estimates are the base for the aforementioned valuation methods.

- **The revenue estimation** provides the basis for the estimation of the some of the items in the forecasted period. We first analyze the expected growth of wind installed capacity

Revenue Estimation and Historical Values (Base Case)

Cyclicality				Low		
	2009	2010	2011	2012	2013	2014
Accumulated Wind Capacity	158.908	197.637	238.050	283.048	318.105	365.400
Growth	32,10%	24,37%	20,45%	18,90%	12,39%	14,87%
New Installed Wind Capacity	32,10%	38.265	40.398	44.799	35.289	47.295
Growth		-1,36%	5,57%	10,89%	-21,23%	34,02%
Installed By Vestas	4.766	5.842	5.213	6.020	4.893	6.559
Growth		22,58%	-10,77%	15,48%	-18,72%	
Market	12,29%	15,27%	12,90%	14,00%	13,10%	13,70%
Revenue/Vestas' Intallations	107%	118%	112%	120%	124%	
Revenue	**5.083**	**6.916**	**5.848**	**7.198**	**6.080**	**6.994**
Average Market Share Driver						**13,87%**
Revenue/Vestas' Intallations Driver						**122%**

Cycle Beginning				Cycle End		
High			Low			
2015	2016	2017	2018	2019	2020	2021
416.400	472.100	532.300	596.300	667.185	743.613	826.685
13,96%	13,38%	12,75%	12,02%	11,89%	11,46%	11,17%
51.000	55.700	60.200	64.000	70.885	76.428	83.072
7,83%	9,22%	8,08%	6,31%	10,76%	7,82%	8,69%
7.073	7.725	8.349	8.876	9.831	10.600	11.521
13,87%	13,87%	13,87%	13,87%	13,87%	13,87%	13,87%
8.623	**9.418**	**10.178**	**10.821**	**11.985**	**12.922**	**14.046**

- **The Income statement** for the first part of the explicit period is stated below. This is the income statement for the base case

Income Statement Forecast (Base Case)

Cyclicality	Low			Cycle Beginning High			Low		Cycle End	
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Revenue	7.198	6.080	6.994	8.623	9.418	10.178	10.821	11.985	12.922	14.046
COGS	6.404	5.185	5.503	6.640	7.529	8.086	9.069	10.204	10.545	11.018
Gross Profit	794	895	1.492	1.983	1.889	2.092	1.752	1.781	2.377	3.028
Operating Expenses	790	685	636	900	983	1.063	1.130	1.252	1.349	1.467
Operating profit before special items	4	211	856	1.083	905	1.029	622	530	1.028	1.561
Special Items\ Depreciation	701	109	101	94	130	142	154	163	181	195
EBIT	**-697**	**102**	**754**	**989**	**775**	**887**	**469**	**366**	**847**	**1.366**
Net Financing Income	-14	-138	-118	-17	8	9	19	10	-17	3
Financial Income	78	5	1	61	10	10	21	11	0	5
Finacial expenses	92	143	119	78	1	1	1	1	17	1
EBT	-711	-36	636	972	784	896	488	376	830	1.369
Taxes	-250	-46	-178	-272	-219	-251	-137	-105	-232	-383
NI	**-961**	**-82**	**458**	**700**	**564**	**645**	**351**	**271**	**598**	**986**

❖ **The Balance Sheet Forecast,** for the base case, for the first part of the explicit period is stated below.

Income Statement Forecast (Base Case)

Cyclicality	Low			Cycle Beginning High			Low		Cycle End	
mEur	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Assets										
Cash & Near Cash Items	851	694	1.060	171	176	360	196	0	83	512
Accounts & Notes Receivable	792	626	483	810	885	957	1.017	1.126	1.215	1.320
Inventories	2.243	1.424	1.942	2.164	2.454	2.636	2.956	3.326	3.438	3.592
Other Current Assets	604	743	650	650	650	650	650	650	650	650
Total Current Assets	4.490	3.487	4.135	3.796	4.166	4.603	4.820	5.103	5.385	6.074
Total intagible assets	1.016	741	698	698	698	698	698	698	698	698
Total PPE	1.286	1.221	1.121	1.551	1.694	1.831	1.947	2.156	2.325	2.527
Total Other noncurrent assets	179	190	403	403	403	403	403	403	403	403
Total noncurrent assets	2.481	2.152	2.222	2.652	2.795	2.932	3.048	3.257	3.426	3.628
Total Assets	**6.971**	**5.639**	**6.357**	**6.449**	**6.961**	**7.535**	**7.868**	**8.360**	**8.811**	**9.702**
Liabilities and Equity										
Liabilities										
Accounts Payable	1.008	832	1.178	1.177	1.335	1.434	1.608	1.809	1.869	1.953
Short-Term Borrowings	293	4	607	0	0	0	0	126	0	0
Other Short-Term Liabilities	2.396	2.452	2.335	2.335	2.335	2.335	2.335	2.335	2.335	2.335
Total Current Liabilities	3.697	3.288	4.120	3.512	3.670	3.769	3.943	4.270	4.204	4.288
Long-Term Borrowings	1.458	604	11	11	11	11	11	11	11	11
Other Long-Term Liabilities	194	223	216	216	216	216	216	216	216	216
Total Long-Term Liabilities	1.652	827	227	227	227	227	227	227	227	227
Total Liabilities	5.348	4.115	4.347	3.739	3.897	3.996	4.170	4.497	4.431	4.515
Equity										
Dividend	0	0	0	210	169	194	105	81	179	296
Share Capital & APIC	27	27	30	30	30	30	30	30	30	30
Retained Earnings & Other Equity	1.595	1.496	1.980	2.470	2.865	3.316	3.562	3.752	4.170	4.861
Total Equity	1.622	1.523	2.010	2.710	3.064	3.540	3.698	3.863	4.380	5.186
Total Liabilities & Equity	**6.970**	**5.638**	**6.357**	**6.449**	**6.961**	**7.535**	**7.868**	**8.360**	**8.811**	**9.702**

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