LISBON SCHOOL OF ECONOMICS & MANAGEMENT
UNIVERSIDADE DE LISBOA

MASTER OF SCIENCE IN FINANCE

MASTERS FINAL WORK

PROJECT

EQUITY RESEARCH:
VWS WIND SYSTEMS A/S

MÁRCIA ALEXANDRE MARQUES

OCTOBER 2018

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SUPERVISION:

PROF. DOUTOR JOÃO CARVALHO DAS NEVES

OCTOBER 2018

Abstract

This report is a valuation of Vestas Wind Systems A/S, prepared as a Masters' of Finance Final Work Project at ISEG. This Equity Research follows the recommended format by the CFA Institute (Pinto, Henry, Robinson, and Stowe, 2010). This study was conducted considering publicly available data on October 26th, 2018 accordingly to diverse sources, such as company reports, Thomson Reuters, and Bloomberg L.P.. Hence, any events or circumstances occurring after this date were not taken into account in this report.

The target price was achieved based on the Economic Value Added Method, complemented with the relative valuation approach of Comparables.

With a price target of €65.00 for YE18, representing an upside potential of 18.26% from the current price of €54.96, our final recommendation for Vestas Wind Systems A/S stands for "Buy", and our risk assessment estimates a medium risk for VWS.

JEL Classification: G1; G3

Keywords: Equity Research; Vestas; Valuation; Economic Value Added

Resumo

Este relatório contém uma avaliação da *Vestas Wind Systems A/S*, preparado como Projeto Final de Mestrado em Finanças do ISEG. Este Relatório de Avaliação segue o formato recomendado pelo *CFA Institute* (Pinto, Henry, Robinson, and Stowe, 2010). O presente estudo foi organizado considerando informação publicamente disponível a 26 de outubro de 2018, de acordo com diversas fontes, entre as quais relatórios de contas anuais, Thomson Reuters, e Bloomberg L.P. Deste modo, quaisquer eventualidades ocorridas após esta data não são consideradas no relatório.

O preço-alvo foi alcançado com recurso ao método do Valor Económico Acrescentado, com complemento ao método de avaliação relativa dos múltiplos.

Com um preço-alvo obtido de €65.00 e um potencial de valorização de 18.26% face ao atual de €54.96, a nossa recomendação final para a *Vestas Wind Systems* é de 'Compra', e a nossa avaliação de risco é de médio risco para VWS.

Classificação JEL: G1; G3

Palavras-chave: *Equity Research*; Vestas; Avaliação de empresas; Valor Económico Acrescentado

Acknowledgements

Writing this project was a hard-working process with some obstacles in middle, but it gave me a sense of accomplishment, as it marks the end of my academic path.

First and foremost, I would like to thank my family for all the opportunities they gave me and the encouragements to pursue my goals. Thank you, mom, dad, and sister for your unconditional support, without you this wouldn't have possible. I will always be grateful to you.

To all my friends, those who I've known since forever, and the friendships I've made at ISEG, with a special thanks to Ana Margarida, Tiago, Ana Filipa, and Marta. I've had amazing moments with you, throughout this learning journey. We've had each other's backs and you made this seem so much easier.

Last but not least, to my supervisor João Carvalho das Neves, thank you for accepting to guide me through this final step, for all your insights and your patience during this process. And thank you to all my Professors at ISEG, who contributed to my future career, to shape me as a professional.

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Vestas Wind Systems A/S

FY18 Price Target of €65.00 (18.26%); Recommendation: Buy

Buy

Medium risk

October 2018

Portugal

Standing strong in a transitioning market

Vestas Wind Systems A/S (VWS) is a Denmark-based leading wind turbine manufacturer, being at the top in terms of installed wind power capacity. Its business is divided into two segments: Power Solutions and Service.

Vestas' key statistics

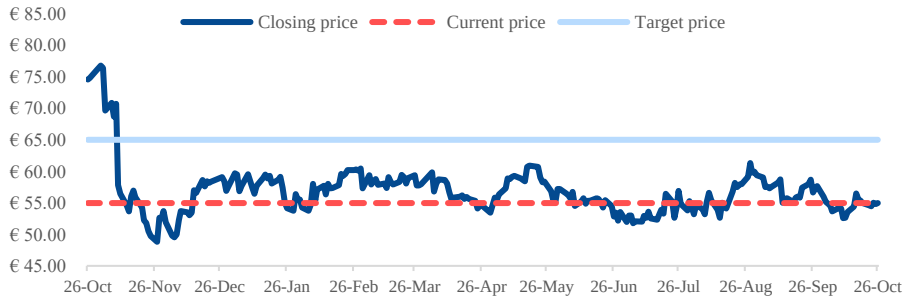
Ticker	VWS:GR	52-Wk High	€ 77.85	Shares Outs.	201.4	5-year Beta	1.11
Website	https://www.vestas.com/	52-Wk Low	€ 48.17	Market Cap.	€11.07bn	Float	97.40%
Industry	Renewable Energy	Current Price	€ 54.96	Dividend yield	2.19%	Institut. Own.	39.59%

Source: Bloomberg and Reuters

Stock Performance

Figure 1: Historical stock prices

Source: Reuters and author analysis



Highlights

- With a price target of €65.00 and an upside potential of 18.26% from the current price of €54.96, our recommendation for Vestas stands for **Buy**. In FY18F and FY19F we estimate an EPS of €4.64 and €4.83, contrasting with FY16A and FY17A EPS' of €4.41 and €4.23, respectively. The conclusions retrieved from the Market Approach support our assessment from the EVA Approach. According to Monte Carlo simulation, there is only a 5% probability of one of the key variables prompting a change in our recommendation.
- Despite being behind analysts' forecasts in the first quarter, the second quarter showed an improvement that can be explained by somewhat stable average selling turbine prices along with high placed orders and deliveries. Service revenues continues to steadily increase, and we believe Vestas will keep on intensifying its focus on this segment to offset any struggles felt as a result of the competition scheme of auctions and tender offers, in order to maintain its profitability. We estimate overall revenues to grow at a CAGR of 4.3% during the valuation period.
- We expect EBIT margins of 12.1% in FY18F and 12% in FY19F, compared with 12.4% in FY17A. These lower margins reflect an increase in R&D combined with reduced grants from governments, as Vestas will continue to explore new and more efficient technologies to stand out from its competitors, but with the promise of an improvement by FY23F.

Table 4: VWS Valuation sensitivity analysis

Source: Author analysis

	Market Risk Premium						
Beta	3.88%	4.38%	4.88%	5.38%	5.88%	6.38%	6.88%
0.81	€ 121.87	€ 109.40	€ 98.96	€ 90.09	€ 82.47	€ 75.85	€ 70.05
0.91	€ 109.88	€ 98.19	€ 88.44	€ 80.20	€ 73.14	€ 67.03	€ 61.69
1.01	€ 99.77	€ 88.77	€ 79.65	€ 71.96	€ 65.39	€ 59.72	€ 54.78
1.11	€ 91.14	€ 80.77	€ 72.20	€ 65.00	€ 58.87	€ 53.59	€ 48.99
1.21	€ 83.68	€ 73.88	€ 65.80	€ 59.04	€ 53.29	€ 48.36	€ 44.07
1.31	€ 77.17	€ 67.89	€ 60.26	€ 53.89	€ 48.49	€ 43.85	€ 39.84
1.41	€ 71.44	€ 62.63	€ 55.41	€ 49.39	€ 44.30	€ 39.93	€ 36.16

Low | **Medium** | High

Our risk assessment reflects intense competition coupled with subsidy squeeze to allow wind energy to fully compete with conventional energy sources, which is putting pressure on prices throughout the supplying chain.

Table 1: Consolidated revenue

€ bn	1Q	2Q	3Q	4Q	FY
18A	1,694	2,260	-	-	10,377
17A	1,885	2,206	2,743	3,119	9,953
16A	1,464	2,557	2,903	3,313	10,237
15A	1,519	1,749	2,120	3,035	8,423
14A	1,283	1,341	1,813	2,473	6,910
13A	1,096	1,185	1,442	2,361	6,084

Source: Company Annual Reports

Table 2: EVA Valuation

in €m		
Enterprise Value		**14,318**
Debt		1,251
Equity Value		13
Number of shares outstanding (mil)		201.4
YE18 Price Target	**€**	**65.00**
Price at October 26th, 2018	€	54.96
Upside potential		**18.26%**

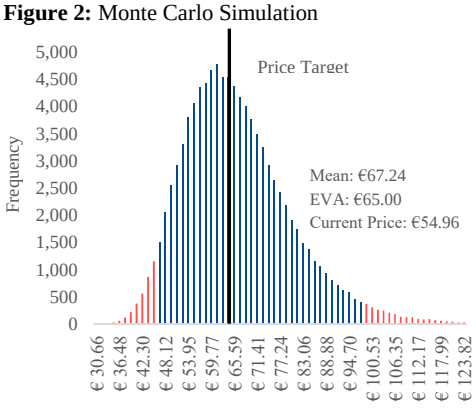
Source: Author analysis

Table 3: Multiples Valuation

in €m		
Enterprise Value		**14,000**
Debt		1,251
Cash and cash equivalents		4,237
Equity Value		16,986
Number of shares outstanding (mil)		201.1
YE18 Price Target	**€**	**84.49**
Price at October 26th, 2018	€	54.96
Upside potential		**53.72%**

Source: Author analysis

Figure 2: Monte Carlo Simulation



Source: Crystal Ball software and author analysis

Investment Summary

With a price a price target of €65.00 for YE18F and an upside potential of 18.26% from a current price of €54.96, our recommendation for Vestas Wind Systems is **Buy**. We expect VWS' stock growth to be high, mainly for two reasons. First, despite a decreasing ROIC during our valuation period, it is clear that VWS is still generating returns for its investors, which also contributes to our classification as **medium risk**, and with better and more stable margins than its peers, putting VWS undervalued in comparison with its competitors. Secondly, VWS currently trades below its intrinsic value, as result of the uncertainty felt in the market given the new competition mechanism that is pressuring prices down, which also supports our medium risk classification.

VWS holds a strong position in the wind power market, being the world's biggest wind turbine manufacturer. Despite the major driver of VWS' growth being the development of wind turbines, the service market is showing great progress and is becoming key in VWS strategy, as it provides predictable and profitable streams of revenue, complementing the Power Solutions business.

Valuation methods

The target price was achieved recurring to the Economic Value Added Approach, a method that evaluates a company's ability to generate surplus value, as required by investors. We conducted our analysis at a consolidated level, as we had insufficient segment information. Additionally, to support the conclusions drawn from the EVA method, we applied a relative valuation, through the multiples method, in which peer group was selected according to a set of criteria, to ensure we achieved solid results.

The new market trend – movement towards auctions

VWS faces new challenges with the new market dynamics, which are driving prices down, and increasing the competition environment. Wind energy is turning into a mature market, capable of competing with other energy sources. VWS focus is to maintain leadership in the market and continue its profitable growth while still delivering competitive costs for energy solutions.

New strategies, commercial capabilities, and close collaborations with its customers enable VWS to succeed in auctions. Optimization and tailoring for each project is also a key differentiator for VWS, and keeping exploring new and more efficient technologies will bring new revenue opportunities and respond effectively to the new market requirements that keep growing with the demand for renewable energy.

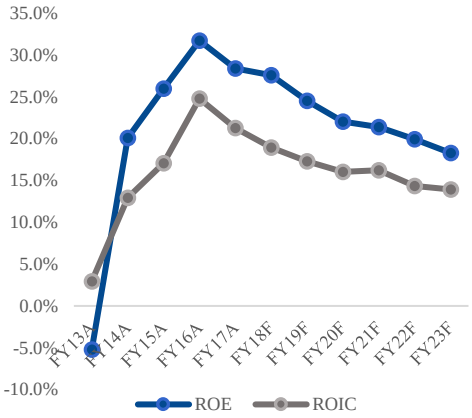
Recent stock performance

Over the past 52-weeks, VWS stock traded between a low of €48.15 and a high €77.85, registering 42.8% in terms of annualized stock volatility. The stock has been trading under the price target and since the beginning of 2018, often slightly above the current price.

Risks to the investment case

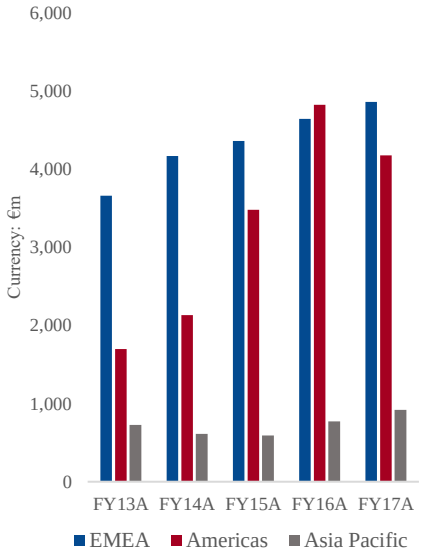
Investors should be aware of the vulnerabilities of the business that could impact our estimations in what concerns the target price. These include, among others: (i) foreign currency risk, arising primarily from USD currency, which impacts revenue directly; (ii) competition, given the new market dynamics; (iii) cyber risks, as VWS relies on its technologies; (iv) possibility of increasing its financial debt; and (v) safety risks posing on employees arising from the heavy turbines and site conditions.

Figure 3
Return on Equity and Return on Invested Capital



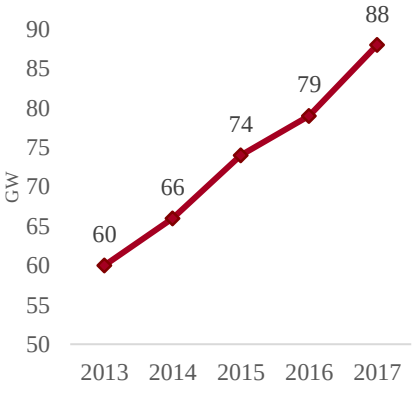
Source: Company Annual Reports and author analysis

Figure 4
VWS' total revenues, by region



Source: Company Annual Reports

Figure 5
VWS' total installed capacity



Source: Company Annual Reports

Business Description

Vestas Wind Systems A/S (NASDAQ Copenhagen: VWS) is a Danish energy company with headquarters in Aarhus, Denmark, that provides efficient sustainable energy solutions on a global scale. Its main business consists in the production, maintenance, and development of wind power solutions. Founded in 1898 by a blacksmith family and producing wind turbines since 1979, VWS is a pioneer in the renewables industry and nowadays a global leader in the wind power market, with a solid position in all its activities.

Spread across 76 countries (Figure 6), with sales and service offices, manufacturing facilities, research and development facilities, and installed turbines, the company has under service the largest fleet worldwide, corresponding to 78 GW and has installed alongside its customers 64,998 turbines worth over 94 GW of wind power capacity, holding more than 17% of the global installed base. VWS praises for having a wide and flexible product range, adapting to each site's specific conditions.

As a global company, VWS's revenue comes mostly from international activity, which accounts for 96.2% of total revenue, with 48.9% coming from the Americas, 41.9% from EMEA, and 9.2% flow in from Asia Pacific.

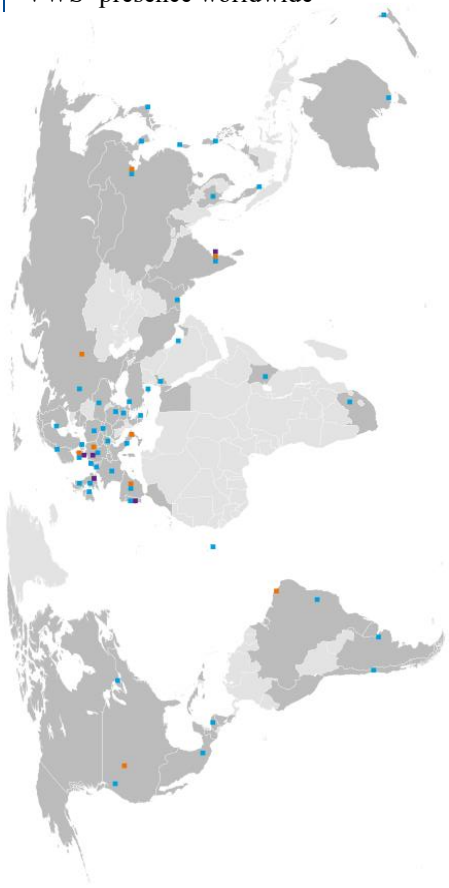
VWS operations are composed by two main segments: Power solutions and Service.

Power solutions involve new project planning, enhancing the performance of onshore wind turbines, and also the construction and installation of onshore wind power plants and turbines. It has two successful commercial platforms, the 2 MW and 4 MW.

In the **Service** area, VWS' portfolio offerings range include maintenance, parts & repair, fleet optimization, and data & consultancy services. The Group also provides a multibrand service solution for non-VWS fleets, and is set to start maintenance on solar panels.

Additionally, VWS also executes activities in the Offshore wind power area, which include the manufacturing of offshore wind turbines and project execution. This activity is carried out under the joint venture between Mitsubishi Heavy Industries, Ltd. and VWS, **MHI VWS Offshore Wind A/S**.

Figure 6
VWS' presence worldwide



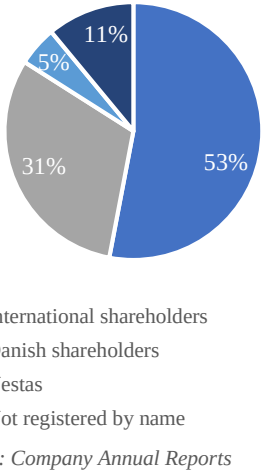
Source: Company Annual Reports

Ownership structure

Figure 7 displays the share capital distribution disclosed by VWS, as of December 31, 2017. Of the portion belonging to VWS, the Board of Directors' hold only 0.4% and Executive Management 0.8%, while the remaining correspond to treasury shares.

VWS has only one share class in which each share grants one vote and permits to attend, propose, have access, submit proposals and speak at the annual general meeting, receive information regarding the company's goals and long-term shareholders' interests, as well as access to VWS' Management and Investor Relations.

Figure 7
Ownership structure



Source: Company Annual Reports

Corporate Governance

Besides complying with the Danish Corporate Governance Recommendations, VWS also complies with Danish and EU laws concerning listed companies. It follows a two-tier management structure, where the members of the Board of Directors are elected by the general meeting of shareholders. The Board of Directors then appoints the Executive Management, and both select the Chief Executive Officer.

The Board of Directors' main responsibility is to oversee the operations of the company as well as the strategic management of the Group, such as the risk management and internal controls, financial reporting, business concept and strategy, among others. Also, jointly with the Executive Management, the board sets up and approves the company's policies, procedures and controls. It has established three committees: Audit; Nomination & Compensation; and Technology & Manufacturing. Bert Nordberg is the Chairman of the Board since 2012.

The Executive Management's responsibilities lie on the everyday running of the company, in accordance to the recommendations made by the Board, proposing VWS' strategies, objectives, and financial planning. The Executive Management is also accountable for the compliance with the legislation and other regulations. Anders Runevad is the Group President and CEO since 2013 and manages the daily work of the Executive Management.

Table 5 shows the main individuals that compose the Board of Directors and Executive Management. As established by the recommendation of Danish Financial Statements Act, almost all members of the Board of Directors are independent and able to represent shareholders' interests (Tables 26 and 27, Appendix I).

For VWS, corporate governance is a continuous process to ensure a fair view of the Group is always transpired, and to face the challenges felt in a fiercely competitive market. Besides this, and its commitment to sustainability, the company emphasizes the importance of having a balanced gender distribution at the management level, as well as engineering diversity, as five companies among the Group's Danish subsidiaries are subject to the reporting the requirement set by the Danish Financial Statements Act[1].

Table 5
Main members of the Board of Directors and Executive Management

Name	Position
Board of Directors	
Bert Nordberg	Chairman of the Board
Lars Josefsson	Deputy Chairman
Henrik Andersen	Chairman
Executive Management	
Anders Runevad	Group President & CEO
Anders Vedel	CTO
Jean-Marc Lechêne	COO
Juan Araluce	CSO
Marika Fredriksson	CFO

Source: Company Annual Report

Compensation & Remuneration

The remuneration of the Board of Directors is approved at the general meeting by the shareholders and is displayed in Table 6. No incentive plans are outlined for the Board.

For the members of the Executive Management, the Board has decided on the remuneration showed in Table 7. Member of the Executive Management are entitled to participate in a share-based incentive program, where shares can be granted based on a target level for each position.

Table 6
Remuneration of the Board of Directors

€	FY17A	FY16A
Fixed remuneration	806,956	804,282
Committee remuneration:		
Audit	127,711	160,858
Nomination & Compensation	161,319	160,858
Technology & Manufacturing	161,319	160,858

Source: Company Annual Report

Table 7
Remuneration of the Executive Management

€	FY17A	FY16A
Fixed salary	4,466,736	4,338,163
Cash bonus from previous years	3,085,366	3,082,664

Source: Company Annual Report

[1] Section 99b for the under-requirement gender.

VWS Competitive Position

Table 8
SWOT analysis

Strenghts	Weaknesses
▪ Global leader; ▪ A century of expertise; ▪ Sturdy record on safety and social responsibility; ▪ Leader in R&D and strong innovative positioning; ▪ Provides solutions at a low energy cost.	▪ Still has dependence on subsidies; ▪ High production and operational costs; ▪ Small home market.
Opportunities	**Threats**
▪ Growth in offshore market; ▪ Rising prices of non-renewable energy sources; ▪ Increasing concerns regarding the environment.	▪ High competition; ▪ Dependence on traditional energy sources; ▪ Some still perceive wind power as an expensive source of energy.

Source: Author analysis

Porter's Five Forces

Industry rivalry | **High**

Competition in the wind power industry has been growing and becoming fiercer, with VWS at the top position. Major players have been able to secure its market share, but with the transition to an auction-based market along with a decreasing levelized cost of energy, wind farm developers and manufacturers are bidding on the promise of the cheapest electricity their projects have to offer, which is possible, especially for big manufacturers, who are able to spread their costs across higher sales volumes.

Threat of new entrants | **Moderate**

Pioneers in the modern wind power industry have been around since late 1970s, and they have the technological knowledge and experience required to deliver a competitive product. Most existing companies, such as VWS, protect this expertise through patents, thus creating a first barrier to new competitors.

While the interest in the wind energy, as well as other renewables, has been rising, new possible entrants have to consider that it involves very high costs, which might hinder some attempts of starting a new business. Furthermore, there is also the fact that most companies in this market are partly financially supported by the government, and there is no certainty that national governments could provide subsidies and other grants to new businesses.

However, since policy makers are starting to cease aids to this sector, it is possible that in the near future new businesses might see this as an opportunity rather than a threat.

Figure 8
Porter's five forces

Source: Author analysis

Threat of substitutes | **High**

From other renewables – e.g., solar, hydro, geothermal – to more conventional energy sources, i.e., gas, oil, and, coal, wind power faces several substitutes. Wind and solar seem to be the most popular alternative forms of energy power, and while currently wind has the advantage of being the cheapest source, there are several other renewables sources of energy to choose from, some of them gaining more importance and a promise for the future. These days, wind power is still confronted with heavily oil-dependent industries and private consumers that see fossil fuel as the most convenient source of energy, since setting up a new power plant or changing from one source to another involves high investment costs, but that are worth in the long-term.

Moreover, VWS has also to take into account other competitors in the same industry.

Bargaining power of suppliers | **Moderate to Low**

VWS, like most companies, manufactures their own core components, to ensure the safeguard of product differentiation. But wind turbines are made of several components, each with a specific supplier. VWS also considers each region construction sites, entering in agreements with different suppliers in each region, thus engendering a complex and broad supply chain.

VWS works in a close partnership with suppliers of non-core components and raw materials, to ensure it remains competitive while delivering high quality products, and to improve its operations and the sustainability of its products, and expects its suppliers to comply with the Business Partner Code of Conduct, taking action when needed.

VWS then believes it has cemented a strong supplier portfolio, and for these reasons we believe the bargaining power of suppliers to be reduced.

Bargaining power of customers | **Moderate**

Wind power is a market where almost every aspect is becoming larger, including customers. With the transition to large-scale auctions and tenders, the market's competitiveness is increasing, putting pressure on energy prices throughout the value chain.

VWS ambition is to offer solutions at the lowest cost of energy to its customers, and to respond to each customer's requests and needs, by optimizing and tailoring accordingly. Reliability is a key factor that leads customers to collaborate with VWS, and VWS aims to deliver the highest returns on investment in the industry to its customers. By working closely with its customers, and having had an advantage of expertise for over 30 years with successful achievements, VWS feels that it differentiates itself from other competitors, making it a preferred partner.

Macroeconomic Outlook

Global

The world economy has been growing at a slower pace since the economic crisis, but is slowly gaining strength. At 3.8% in 2017, it grew the strongest since 2011, and in 2018 and 2019, world GDP should see an increase of 3.9%, remaining close to 3.7% until 2023, as projected by IMF World Economic Outlook April 2018 (Figures 9 to 12). The main drivers for this recovery are emerging markets and developing economies, such as China and India, which will continue with strong economic growth.

Even though the outlook for the United States and European countries is favorable due to expansionary policies, growth will be more modest, with rates close to 2% per year.

Despite the optimistic prospects for the upcoming years, there are still some concerns that could threaten global outlook, such as climate changes, geopolitical tensions, and protectionism.

USA

The United States economic outlook is promising for 2018 and 2019, with an expected real GDP growth rate of 2.9% and 2.7%, respectively, from the 2.3% in 2017, mainly due to the loosening of the fiscal policy, but remaining below 2% from 2020 onwards. Unemployment rate is forecasted to drop to 3.9% in 2018 and continue to lower until 2020, contributing to consumer growth. Inflation will rise to 2.7% in 2018, from the 2.1% in 2017, and stay around at the ideal growth rate of 2%.

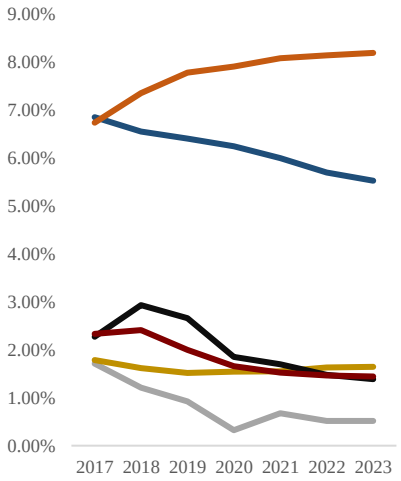
With the tax reform and increases in expenditure, government deficit will rise and debt levels, already above 100% of GDP, are anticipated to increase from 107.79% in 2017 to over 116% in 2022.

Europe

In the Euro Area, real GDP is expected to continue to grow at a rate above 2%, in 2018 and 2019, remaining around 1.5% per year until 2023, as projected by IMF. Inflation is anticipated to strengthen gradually and return to ECB's target of close, but below 2%. Labour market conditions will keep improving, with unemployment rate falling, below 10% in 2017, a new low since almost a decade, and will continue to lower, but still remaining high. Public debt-to-GDP is estimated to decrease steadily, from 87% in 2017 to roughly 72% by 2023, with only Portugal, Greece, and Italy surpassing the 100% mark.

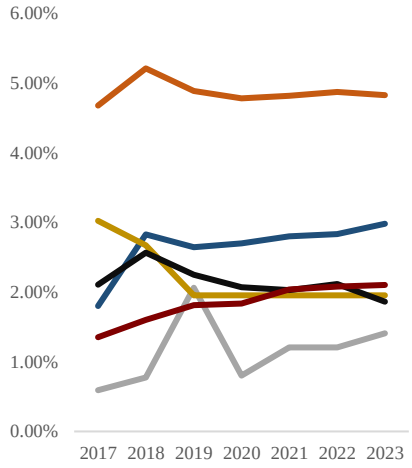
In the UK, projections are set for a slowdown of the economy, with real GDP growth rate decreasing from 1.8% in 2017 to 1.5% in 2019, but estimated to increase to 1.6% by 2023. Inflation is expected to decrease but stabilize throughout 2019-2023 period. Given the economic and financial ties, it is anticipated that the economic growth of the countries in the euro area will be affected by the Brexit decision, since the obstacles related to the trade of goods and services can negatively impact potential growth.

Figure 9
Real GDP growth, by country



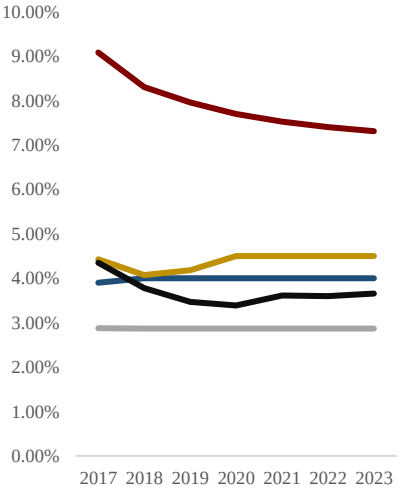
Source: IMF

Figure 10
Year-end inflation rate, by country



Source: IMF

Figure 11
Unemployment rate, by country



Source: IMF

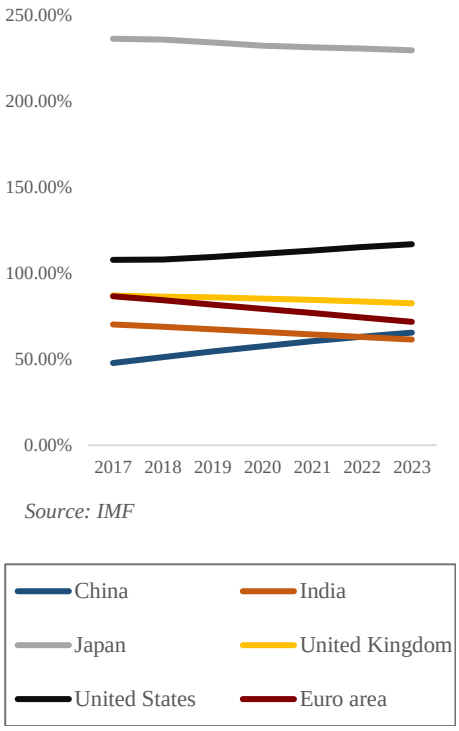
Asia

The Japanese debt-to-GDP has been considered the highest recorded in the OECD area, with 236.4% in 2017, and despite the fact that it is anticipated to decrease, it will remain over 200%. GDP will have a modest growth rate and inflation is projected to continue under 2%, except in 2019.

China's GDP is expected to slow down, but still growing at above 6% per year at least until 2021, with inflation rising to values close to 3%. Government debt is expected to be 65% of GDP by 2023, from the 48% in 2017.

While China's economy seems to be deaccelerating, India's is picking up even more, and is set to achieve a real growth rate of 8.2% by 2023, with inflation decreasing but remaining close to 5%, and a declining debt-to GDP ratio, to levels around 60%.

Figure 12
Debt-to-GDP, by country



Source: IMF

Business Segment's Industry Outlook

Onshore & Offshore

Our stance for the Onshore & Offshore sector (Power Solutions) stands for **positive** (Figure 13).

The wind power market has been maturing and its importance has been growing in recent years because not only it is inexhaustible but also a clean source of energy. In 2017, a threshold was crossed where onshore wind power is now the lowest cost of energy in several parts of the world, with a global benchmark of levelized cost of energy[2] of $55 per MWh, and in countries such as India, it can come down to just $39 per MWh.

The wind industry has been recently undergoing imperative changes, as it is becoming an unsubsidized technology, and the market is transitioning to an auctions mechanism, turning the competition fiercer than ever, as this new scheme is forcing developers and manufacturers to lower costs of providing wind energy. This adjustment has led to "policy gaps", leaving governments and other institutions to revise the regulatory framework, which might result in a slight struggle, but still the industry will strive to meet the targets set by the Paris Agreement.

Worldwide, total installations of both onshore and offshore energy achieved 52,492 MW in 2017, amounting to a total investment of $107bn, and bringing global cumulative installed wind capacity to 539,123 MW, with China at the top of installations. These numbers are expected to grow, with offshore wind showing more technological advancements, as global demand for electricity is rising, mainly due to developing economies, and the need to shift to renewable energy sources is becoming a priority.

Asia has the highest cumulative wind power capacity, as well as the highest number of installations per year, and is expected to maintain this tendency, with China remaining as the main growth driver, and set to achieve its 200 GW goal before 2020. India is also playing a significant role, ranking 4th in what concerns cumulative wind power, with high targets established until 2022, hoping to increase its installations by more than 80%.

Europe, the second largest wind energy market, had a record year in 2017 in terms of annual capacity installations, with an increase of 21% relative to 2016, led by Germany. It generated around 336 TWh of electricity, corresponding to almost 12% of power demand in EU. If new targets are to be agreed by the EU, in a best-case scenario wind capacity in Europe may reach close to 400 GW by 2030, representing 38% of EU's power demand, as perceived by WindEurope.

In North America, almost 8 GW of additional wind capacity were installed. According to the CEO of AWEA (Tom Kiernan, 2018), developments are already lined that far surpasses the installations in 2017 in the US. However, the market is expected to stabilize after 2022 until 2027. Offshore wind is starting to pick up and is expected to represent about 25% of wind energy growth, although still relatively behind than offshore leaders.

Figure 13
Onshore & Offshore industry degree of rivalry

Source: Author analysis

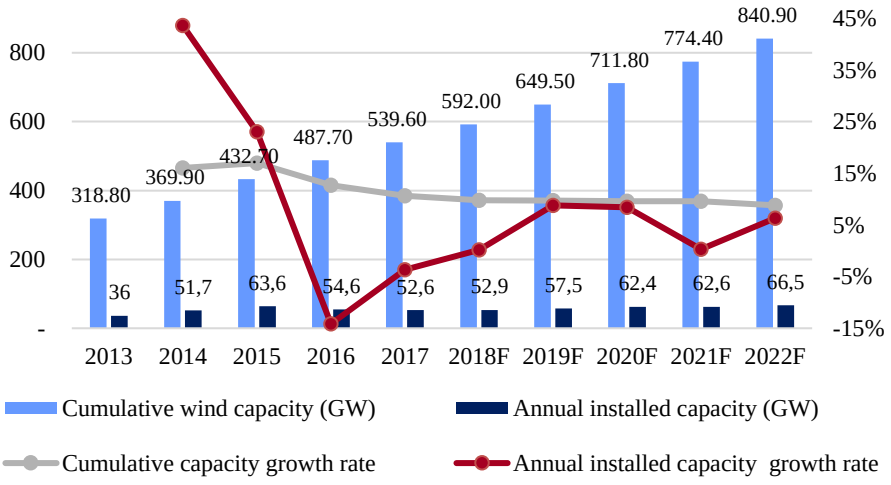
[2] Levelized cost of energy corresponds to the cost of installing a renewable energy system over its energy output expectancy.

In what concerns the rest of the world, Brazil is the country that mostly stands out. It overtook Canada in 2017, and is now the 8th largest wind power market, with optimistic prospects for the future, aiming for a minimum 2 GW of installations per year.

Offshore wind will be responsible for part of this growth, with an open market for business expansion, strategies, and development, among others. In 2017 it accounted for 18.8 GW of total capacity, and it is expected to reach 71 GW by 2025, with installations mainly driven by Germany, UK, the Netherlands, and China.

2015 has experienced the highest annual capacity installed so far, and despite the reduction in annual installed capacity in 2016 and 2017, industry projections for global wind power market are very positive and show the trend is to grow for the next few years, as presented in Figure 14, with a CAGR between 3-5% for the onshore market and 15-20% for the offshore segment, from the 2017 base.

Figure 14
Global wind market forecasts 2018F-2022F



Source: GWEC

Service

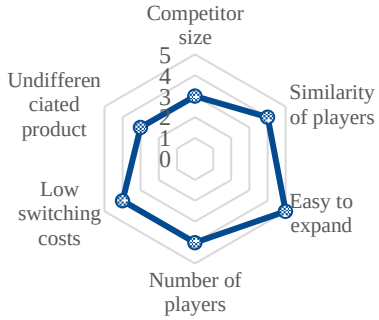
We have a **positive** outlook for the future of Service segment (Figure 15).

With the intense competition in the wind power market combined with developments in technology, putting downward pressure on prices and margins, companies in the industry are looking into the operations and maintenance market as an opportunity to increase their revenues.

In 2016, market size for the global wind turbine O&M reached $13.7bn, and according to reports from GlobalData (2017), forecasts show this market is expected to grow from $15.1bn to $27.4bn during 2017-2025, at a CAGR between 8-9%.

Growth in the O&M is mostly driven by increasing installations, as well as aging wind turbines that entail high replacement costs given that they involve significant logistical costs. Additionally, the offshore wind power draws in high O&M costs, due to the complexity it encompasses, and as a segment that will continue to grow, it is estimated that its share will account for over 18% of the O&M market.

Figure 15
Service industry degree of rivalry



Source: Author analysis

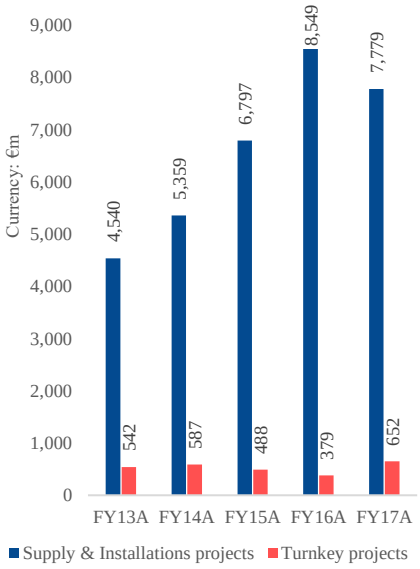
Business Segment's Historical Performance

Power Solutions

Power Solutions' revenue (Figure 16) overall presents an upward drift, reaching €8.4bn in FY17, from the €5bn in FY13. After a three-year increase in revenues of 76%, FY17 saw a decrease of 6% in this segment when compared to FY16, driven by supply-only and supply-and-installations projects. Despite the higher levels of production and shipping in FY17, the declining in revenue was due to lower deliveries to customers, combined with negative impacts from currency effects, as well as lower project margins.

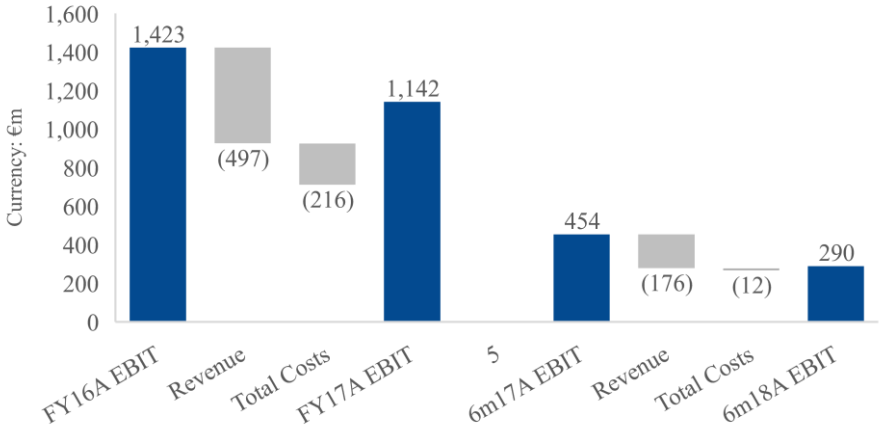
Following the revenue trend, along with an improved cost management, EBIT had an impressive increase of 102% between FY14[3] and FY17, from €566m to €1.1bn. Notwithstanding, operating profit dropped from €1.4bn in FY16 to €1.1bn in FY17, and from €454m in 6m17 to €290m in 6m18, as a consequence of lower revenue.

Figure 16
Power Solutions revenue, by source



Source: Company Annual Reports

Figure 17
Power Solutions bridge FY16A-FY17A and 6m17A-6m18A



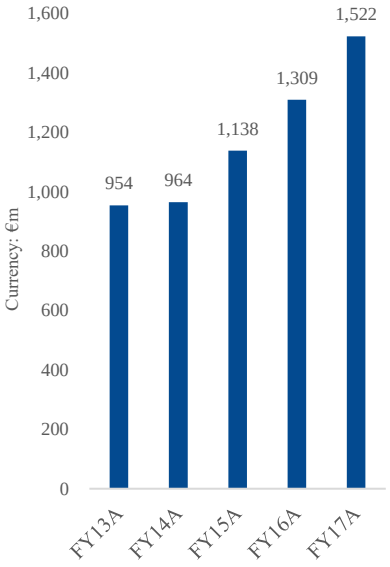
Source: Company Annual Reports

Service

Revenues from the Service segment (Figure 18) have also grown significantly in the period FY13-FY17, from €954m to €1.5bn, respectively. The revenue growth, as per statutory accounts, arises from a combined number of reasons, such as new orders coming with a service agreement, high renewal of existing service agreements, and recapture of previously lost contracts, while simultaneously broadening the portfolio of offerings. This allowed for a fast growth stream of revenue from this segment.

Additionally, as a matter to improve profitability, VWS focused on cost optimization as well as reinforcing regional service sales. We also emphasize the successful integration of VWS acquisitions[4] on playing an important part on the strong development of the Service business. As a result, on FY17 EBIT grew to €306m, from the €225m in FY16, and the trend seems to linger, going from €143m in 6m17 to €202m in 6m18.

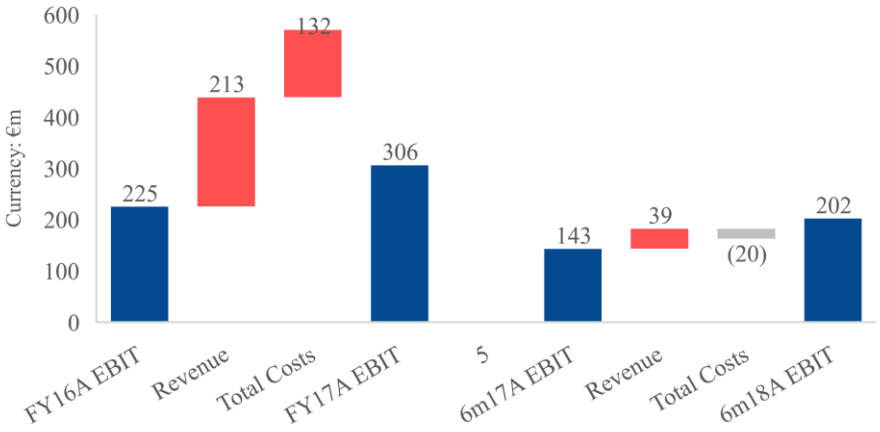
Figure 18
Service revenue



Source: Company Annual Reports

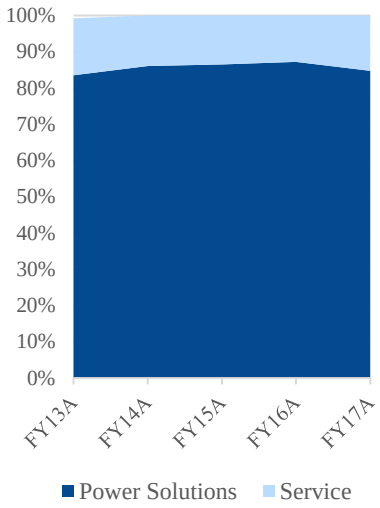
[3] Segment information for FY13 not disclosed by Vestas Wind Systems, apart from segment total revenue.
[4] Acquisition of independent service providers UpWind Solutions Inc. in 2015, and Availon Holding GmBH in 2016.

Figure 19
Service bridge FY16A-FY17A and 6m17A-6m18A



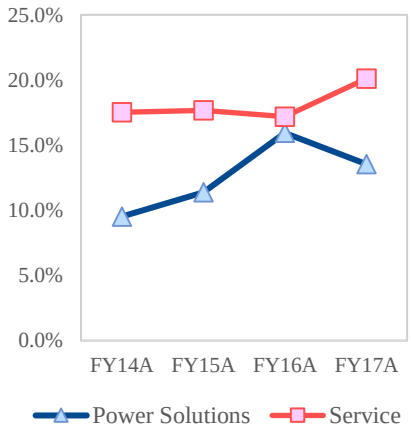
Source: Company Annual Reports

Figure 20
Consolidated revenue, by segment



Source: Company Annual Reports

Figure 21
EBIT Margin, by source



Source: Company Annual Reports

Financial Analysis: VWS Consolidated

Profit & Loss

Total revenue registered both in the periods FY16A-FY17A and 6m17A-6m18A a decline of 3%, €10.2bn to €9.9bn, and €4.1bn to €3.9bn, respectively (Figures 22 and 23). These decreases are mainly explained by a negative currency effect, primarily in the EUR/USD currency, as well as a fall in deliveries to customers in the Power Solutions segment, which are partly offset by a growth in the Service revenue of 16% in FY17 and 5.3% in 6m18. Revenue from Power Solutions accounted for 87% in FY16, 85% in FY17, 82% in 6m17, and 80% 6m18, of VWS's total revenue. It seems to be a trend that Service segment has been gaining weight in the consolidated revenue of the business.

Gross profit margin exhibits a small decrease of 1.1% in FY17, and a further decrease of 3.4% from 6m17 to 6m18. Gross profit decreased by just slightly over €160m in both periods, a result of lower volumes and lower average project margins in the Power Solutions segment due to the competitive atmosphere, which were once again partly offset by the improved performance of the Service segment.

Distribution costs, however the smallest component of operating expenses and dependable of revenues, reported an increase of 21%, due to doubtful receivables and marketing costs. With R&D costs also rising, despite the slump in revenue, operating expenses increased by €28m to €733m in FY17, from the €705m in FY16. When comparing the first half of 2017 and 2018, we observe a decrease in operating expenses of €59m, accompanying the revenue decrease.

Following the gross profit decrease and together with operating expenses, VWS consolidated EBIT in FY17 amounted to €1.2bn, declining from €1.4bn in FY16. In 6m18 EBIT fell 78%, from €490m to €385m.

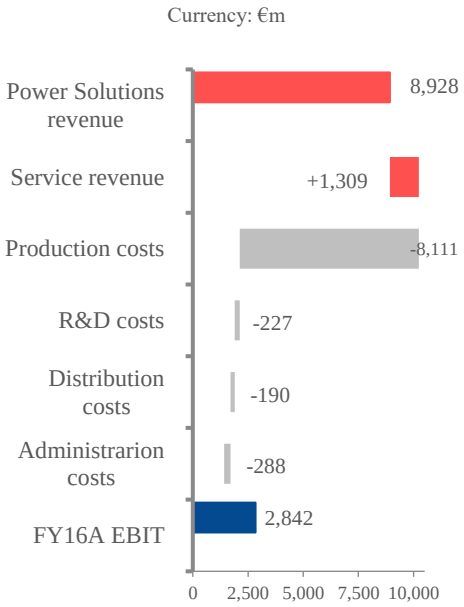
Balance Sheet

FY17 closed with €10.9bn in total assets, an increase of 9.5% from the €9.9bn in FY16. Cash and cash equivalents grew €0.1bn, in spite of the lower net increase in cash (€509m) when compared to FY16 and negative impact from exchange rate adjustments. Cash flow from operating activities was €1.6bn in FY17, a reduction of €556m instigated mainly by the lower profit for the year. Financing activities also provided a further negative cash flow in FY17, decreasing €363m from (€611m), triggered by the acquisition of treasury shares. However, this is partly offset by the cash flow from investing activities, which amounted to (€407m), from the previous (€817m), as in FY17 there was no purchases of marketable securities. The most significant change in assets was however an increase of inventories from €2bn to €2.9bn.

Liabilities have also increased in FY17, by 15%, amounting to €7.7bn. The main items that contributed to this increase were: (i) rise of 60% in payables; (ii) increase of non-current tax payables of €129m to €166m; and (iii) increase of construction contracts in progress of €86m.

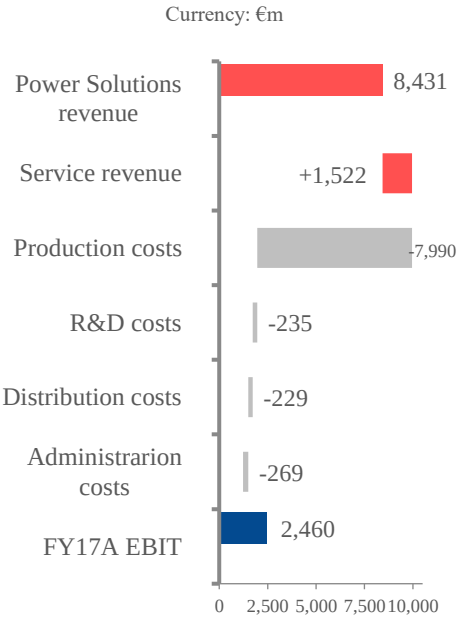
Total shareholder's equity presented just a slight decrease of 2% in FY17, to €3.1bn. Share capital remained stable, similar to previous years. The main component of shareholder's equity is retained earnings, which showed a decrease of 1.7% to €3bn, as result of the lower profit for the year.

Figure 22
Consolidated EBIT bridge FY16A



Source: Company Annual Reports

Figure 23
Consolidated EBIT bridge FY17A



Source: Company Annual Reports

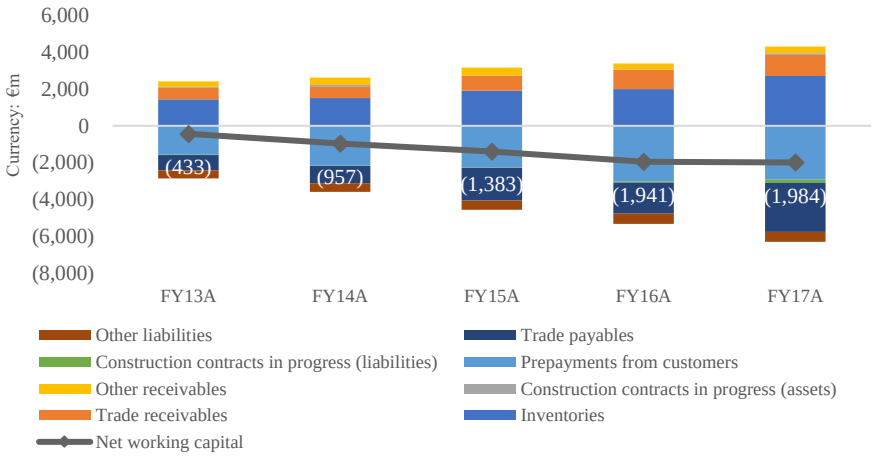
When comparing total assets between 6m17 and 6m18, we observe an increase from €10.2bn to €11.3bn. This improvement was driven primarily by an increase of 20.7% of intangible assets to €1bn. On the liabilities side, prepayments from customers rose €1.2bn, which explains in grand part the increase in liabilities from €5.9bn in 6m17 to €7.2bn in 6m18. On the other hand, shareholder's equity declined by €223m, as a result of the lower profit for the period, which is reflected in retained earnings.

Working Capital

Net working capital amounted to (€2bn) in FY17, which is on par with FY16 (Figure 24). This level was mainly impacted, however offset, by: (i) trade payables, which increased by almost €1bn in FY17; (ii) an increase in inventories of 36%, due to a rise of €0.5bn in finished goods, which is the main component of inventories (57% in FY17); (iii) trade receivables, that rose by 10% to 1.1bn€. Construction contracts in progress encompass agreements with a great degree of customization, also displayed a significant increase from the reported in FY16, with assets more than doubling, but this is mostly offset by the contracts on the liabilities side.

In 6m18, net working capital amounted to (€1.1bn), an increase of almost €1bn from FY17. This development is primarily driven by an upsurge of over 55% in inventory build-up for deliveries occurring in the second half of 2018, that amount to €4.2bn. This is being majorly funded by prepayments from customers, which have increased from €2.9bn in FY17 to €3.6bn. Prepayments from customers respects essentially to wind power plants and services ordered. Other liabilities and trade payables combined have decreased 9%, and other receivables increase 34%.

Figure 24
Working capital analysis

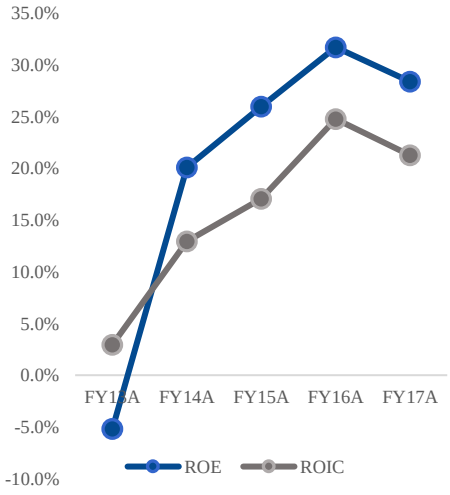


Source: Company Annual Reports

ROIC & ROE

Return on Invested Capital has been increasing since FY13A (Figure 25), only suffering a decline in FY17 as a result of a lower EBIT than in FY16A, aligned with an increase in capital invested, but still showing VWS' ability in generating returns for its investors. VWS has also increased its profitability performance in terms of ROE, rising up until FY16A, but with a lower return in FY17A due to lower net income, and was able to generate a 28% profit per euro of equity invested to its shareholders.

Figure 25
Return on Equity and Return on Invested Capital



Source: Company Annual Reports

Forecast Procedures: key valuation drivers

Revenue

We estimated revenue separately for each segment, and then consolidating them in order to gauge total revenues. Our estimates were based on market forecasts, taking in consideration management predictions.

With the "policy gaps" and movement towards an auction-based market and tender schemes, the market as whole is expected to be more or less flat in 2018, with a faster paced growth in the upcoming years. Already familiar with this transition and given their position as a global leader and its reach, VWS believes they can benefit with these new market mechanisms, by exploring new technologies and adjusting its strategies. Hence, VWS priority is to grow faster than the market, but for the **Power Solutions** segment we forecast a more conservative growth of 3% in FY18F, in line with the market, and 3.5% between FY19F and FY23F (Figure 26).

VWS ambition for the **Service** area is to increase by at least 50% their FY16 revenue for this activity by 2020. The Group plans to expand its multibrand capabilities, as well as keep their renewal rates at a stable high level. Also, with the expected growth of new wind turbine installations, both onshore and offshore, the service area will be vital for a stronger portfolio offering. Additionally, the revenues from the acquisition of Utopus Insights[5] in 2018 will be allocated to the Service segment. Although VWS expects to perform better and grow faster than the market, we are more modest in our forecast than VWS, projecting a growth of 8% from FY18F until FY23F (Figure 27).

Production costs and operating expenses

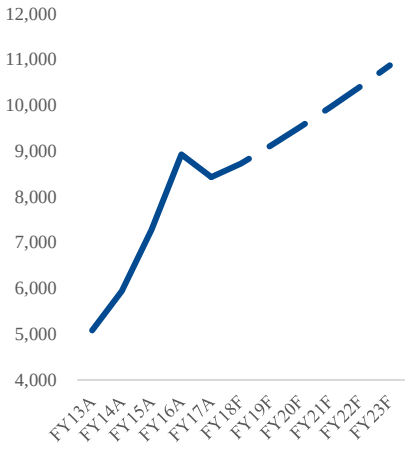
Production costs, which make up most of total costs, comprise the costs incurred to attain the year's revenue. Since it is reliant on revenue, for our estimations we considered the average of production costs as a percentage of revenues, we project them to increase at a CAGR of 4.3% in throughout the valuation period.

Distribution costs are also dependent on revenue, thus we also projected their evolution based on the historical average as a percentage of revenues. We also forecast administration costs taking in account its historical trend as an average of revenue. We estimate a growth at a CAGR of 1.5% and 3.4% for distribution and administration costs, respectively, between FY18F and FY23F.

We estimate R&D to increase at 7.5% based its average as a percentage of revenues and historical growth while also considering VWS ambition of sustaining leadership in this department and delivering innovative technologies.

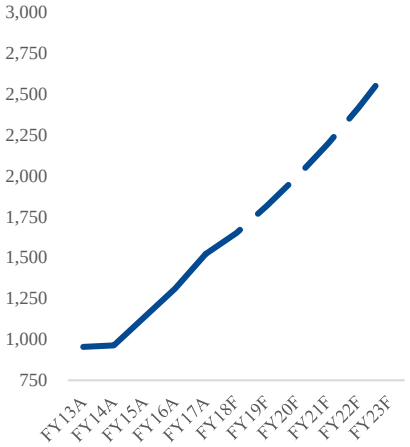
All forecasts assumptions can be seen in Appendix E.

Figure 26
Power Solutions revenue forecast



Source: Company Annual Reports and author analysis

Figure 27
Service revenue forecast



Source: Company Annual Reports and author analysis

[5] Acquisition price for Utopus amounted to EUR 65m, paid in cash, accounted for in the Cash Flow Statement, under Acquisition of subsidiaries (Appendix C).

Valuation

For VWS's valuation we followed two different approaches, an absolute and a relative valuation model, the former being the Economic Value Added (EVA) approach, and the later the multiples method.

EVA is used to measure whether a firm is creating or destroying value for its shareholders and concentrates on three significant aspects of the business: (i) the capital invested in the business; (ii) the cost of capital; and (iii) the operational results that reflect the employment of the resources.

The relative valuation consists of deriving the value of VWS through information from publicly traded companies that are deemed comparable. The fact that applying this method is relatively easy and simple, given that it requires less data and it is readily available, makes this a frequently used method and it should be implemented as a complementary method.

Economic Value Added

EVA is an estimate of economic profit, focusing on efficiency performance in order to create value required by the firm's investors. EVA's principle it that a company's value increases when it is able to generate a surplus over its interest cost, in case of creditors, and the opportunity costs for shareholders. The computation of EVA is a straightforward one, by subtracting the required profit by investors to the NOPAT:

$$EVA_t = NOPAT_t - C_t * Cost\ of\ capital_t$$

where NOPAT corresponds to the Net Operating Profit After Tax, and C is the capital invested.

To the discounted EVA at the cost of capital, which is best known as market value added, we sum the total invested capital, and then by subtracting the firm's debt, we arrive at the intrinsic equity value (Appendix G).

Methodology for the computation of the discount rate

The discount rate applied not only must reflect the time value of money but should also consider the fact that the total value of the firm is estimated. Since we follow an entity approach and contemplate total invested capital, it only makes sense that the discount rate is one that results from VWS' weighted average cost of capital (Appendix F). For this we've used the current capital structure of the company. The Enterprise Value then results from the sum of EVA, discounted at the WACC rate.

$$WACC = W_E * R_E + W_D * R_D * (1 - T_C)$$

Cost of equity

To determine the cost of equity (R_E), it was used the Capital Asset Pricing Model (CAPM), which assumes that the cost of equity is equal to the riskless rate plus a risk premium. The risk premium is composed by the company's systematic risk (β) multiplied by the market risk premium (R_m-R_f):

$$R_E = R_f + \beta * (R_m - R_f)$$

- Risk-free rate (R_f): Is the rate of return of an investment with zero risk, and the minimum rate of return an investor expects from any given investment. Since VWS main installations are proceeded in USA and Germany, we used the weighted average of the rates referent to the 10-year US Treasury bond and 10-year German bond yields. Both rates are considered AAA rating, making them a reasonable proxy for the risk-free rate. The rate observed at October 26, 2018 was therefore 2.01% (Source: Bloomberg).

- Beta: The systematic risk of any asset, measured by the covariance of its returns with the returns of a market index, is known as an asset's beta, and it measures the sensitivity of a security's returns in relation to the market's. We considered a beta of 1.11, taken from Reuters, as of October 26, 2018.

- Market risk premium: Corresponds to the excess expected return of the market over the risk-free rate. According to Damodaran's database, the total equity risk premium is the market risk premium for a mature market, obtained by looking at the implied premium for the S&P 500. The current rate is then 5.38%, as of October 2018.

Effective tax rate

Having a global business, VWS is subject to income taxes worldwide with different jurisdictions. Thus, rather than using the Danish corporate tax income, we used the effective tax rate of 2017 applied by VWS (25%) to ensure compliance with national and international tax laws.

Cost of debt

VWS financial debt consists of a green corporate bond, issued on March 2015, and maturing on March 2022, with an interest rate of 2.88% (Table 9). According to Reuters, VWS implied interest rate of this corporate bond is 6% (Table 10). However, as we believe neither these rates reflect the real cost of debt of the firm, we used the ratio of total financial costs over average debt, taken from VWS consolidated statements, as an estimation for the cost of debt. The after-tax cost of debt is therefore 2.76%.

Terminal Value

The terminal value represents the future cash flows of a business in a valuation model that allows to estimate the value of a firm beyond that of the valuation period until perpetuity, which is then brought to present value at the estimated discount rate.

We assumed a terminal growth rate of 1.29% in perpetuity, based on IMF's forecasts for the main countries where VWS is present. This growth rate is more conservative than the 2% used by VWS in their impairment test model in FY17A.

Valuation period

Theoretically, the valuation period would be infinite given the longevity of the industry in which the company operates. However, due to the difficulty and unfeasibility of forecasting the necessary parameters for extended periods, we considered a limited explicit projection period of five years that goes from the base date December 31, 2018 to December 31,2023. The terminal value is added at the end of the forecasted period to the intrinsic equity value obtained with the EVA approach.

Table 9
EVA Valuation, R_D=2.88%

in €m		
Enterprise Value		**14,585**
Debt		1,251
Equity Value		13,334
Number of shares outstanding (mil)		201.4
YE18 Price Target	**€**	**66.32**
Price at October 26th, 2018	€	54.96
Upside potential		**20.68%**

Source: Author analysis

Table 10
EVA Valuation, R_D=6.00%

in €m		
Enterprise Value		**13,576**
Debt		1,251
Equity Value		12,325
Number of shares outstanding (mil)		201.4
YE18 Price Target	**€**	**61.30**
Price at October 26th, 2018	€	54.96
Upside potential		**11.54%**

Source: Author analysis

Discount period

In what concerns the present value calculation, we assumed the mid-year discount convention. This convention states that cash-flows occur in the middle of the year rather than at end of each year. This convention is a reasonable approximation to continuous discounting, and commonly accepted among financial analyst practitioners.

Multiples

The comparable firms were selected based on an initial sample of 2,910 companies in the energy sector. This sample was retrieved from Reuters, and outliers were removed. Additionally, in order to reach a final sufficiently similar set of comparable firms, we defined other criteria in choosing peer companies, as follows:

- Its activity must be classified as Wind Systems & Equipment, and preferably it manufactures wind turbines and blades. As VWS also provides services in the O&M, this was also a relevant criterion in the selection of the comparables;
- Presence in the same regions as VWS, in order to capture the same risks and prospects;
- Metrics applied with the intention of reducing the sample without compromising the valuation accuracy, such as eliminating inactive securities and companies that do not display all the required data for a precise valuation;
- Market capitalization higher than €100m, to ensure that the comparable companies have a significant size and avoid large discrepancies that may occur in the analysis.

To value VWS through market approach, the ratios considered were EV/Total revenues, EV/EBITDA, EV/EBIT, EV/Forward total revenues, EV/Forward EBITDA, and EV/Forward EBIT. In our view, these ratios allow for a proper analysis as they are valuation indicators of the overall company, both the peers and VWS itself (Appendix H).

Investment Risks

Market Risk | Credit risk (**MR1**, Figure 28)

Credit risk arises from cash and cash equivalents, investments in marketable securities, derivative financial instruments, and trade and other receivables. For the trading of derivatives, VWS has netting agreements with the financial institutions counterparties which limits the credit risk to the net assets per counterparty. Other counterparties consist of companies in the energy sector, and risk is dependent on the industry developments. Maximum credit risk is attributed to financial institution counterparties.

VWS investments in marketable securities comprise in its majority highly liquid AAA rated Danish mortgages and sovereign bonds, therefore it poses very low risk. Credit exposure to customers is also deemed to be low, as historically VWS has not incurred in significant losses on its receivables.

Market Risk | Foreign currency risk (**MR2**, Figure 28)

As an international business, VWS' activities involve currency risks, meaning that its financial statements are exposed to exchange rates risks. VWS' manages this by balancing different currencies to the greatest extent as well as hedging its exposure through mainly foreign currency forward contracts. Due to a substantial high activity in USA, the Group's primarily foreign exposure is to the USD currency. Nonetheless, VWS is able to mitigate part of this risk given the geographical areas and ongoing projects from one year to another.

Market Risk | Interest rate risk (**MR3**, Figure 28)

VWS has investments in cash and cash equivalents and marketable securities with floating interest rates, exposing the Group to inverse interest rate risk. Inverse interest rate risk also arises from the fair value of investments in marketable securities. With no floating interest rate on interest-bearing debt, and no further information, the assessment for interest rate risk for VWS is low.

Economic Risk | Competition (**ER1**, Figure 28)

With the new transition to an auction-based market, as well as decreasing support from governments in order to fully compete in the market, this is creating an intensive competitive environment, and putting pressure on prices and on lowering the cost of energy. This new market dynamic might affect not only VWS' revenue and profitability but also its market share, although the Group believes to be fully prepared to take on new challenges.

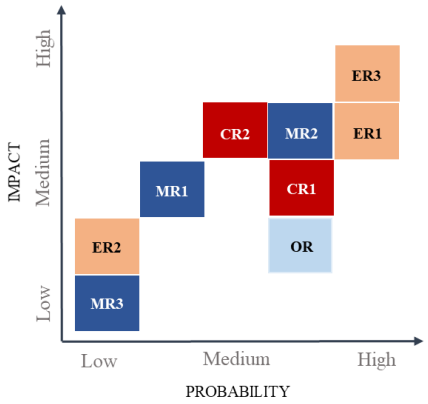
Economic Risk | Political challenges (**ER2**, Figure 28)

The President of USA continues with the advances on proposals to cut funding for clean energy researching and projects, while supporting fossil fuel energy. However unlikely for the Congress to approve these cuts, the President is still determined to suppress the growing demand for renewable energy, specially wind and solar. We perceive this risk to be low.

Economic Risk | Levelized cost of energy (**ER3**, Figure 28)

Today's goal of both manufacturers and project developers is to reduce the levelized cost of energy. With an auction-based market, manufacturers search for selling their products at the lowest possible price. But without compromising revenues this might come as a challenge for most. VWS has the advantage of being a large-scale manufacturer and spread costs across high sales volumes, but still this poses a threat to revenue growth.

Figure 28
VWS risk matrix



Source: Author analysis

Operational Risk | Cyber risk (**OR**, Figure 28)

Experience and knowledge are two of the reasons that made VWS a leader in the wind power energy and is highly dependent on its technologies. Cyber risks pose a highly threat to the Group that may result in losses in business opportunities and on a monetary level. VWS continuously works on improving its technological infrastructure to prevent any attacks.

Corporate Risk | Capital Structure (**CR1**, Figure 28)

Currently VWS' financial debt consists of a long-term corporate green bond. However, with the phasing out of government grants this might mean VWS will need to take on more financial debt in order to support its technological development, as VWS aims to keep leadership in R&D as a response to market demands.

Corporate Risk | Safety risk (**CR2**, Figure 28)

VWS line of work involve safety dangers whether in manufacturing, installation or in the maintenance process. Not only that, but to achieve the best project-tailored requirements VWS' employees are exposed to site-specific weather conditions, which lays a risk on their safety. VWS mitigates the occurrence of injuries through a training safety program currently available in only 13 factories and all service sites in New Zealand and Australia, to be applied in all factories and sites where the Group operates.

Risks to Price Target Analysis

Sensitivity analysis

With the intention of determining possible changes in the YE18 target price as a result of changes in critical variables, we performed a sensitivity analysis. These variables were determined recurring to the Crystal Ball software by analyzing which model's variables have the greatest impact in the target price, had the base assumptions not been observed. We then conducted a simulation of 100,000 possible scenarios, testing different combinations of those variables.

Among the tested variables, we concluded that the variables that should be subject of a more comprehensive analysis were the market risk premium and the beta (Figure 29). Both MRP and beta changes impact VWS' cost of equity. Through Tables 11 and 12 we see evidence that the regions of the sensitivity analysis mostly support our Buy recommendation.

Table 12: VWS' valuation sensitivity analysis

Source: Author analysis

Beta \ Market Risk Premium	3.88%	4.38%	4.88%	5.38%	5.88%	6.38%	6.88%
0.81	€ 121.87	€ 109.40	€ 98.96	€ 90.09	€ 82.47	€ 75.85	€ 70.05
0.91	€ 109.88	€ 98.19	€ 88.44	€ 80.20	€ 73.14	€ 67.03	€ 61.69
1.01	€ 99.77	€ 88.77	€ 79.65	€ 71.96	€ 65.39	€ 59.72	€ 54.78
1.11	€ 91.14	€ 80.77	€ 72.20	€ 65.00	€ 58.87	€ 53.59	€ 48.99
1.21	€ 83.68	€ 73.88	€ 65.80	€ 59.04	€ 53.29	€ 48.36	€ 44.07
1.31	€ 77.17	€ 67.89	€ 60.26	€ 53.89	€ 48.49	€ 43.85	€ 39.84
1.41	€ 71.44	€ 62.63	€ 55.41	€ 49.39	€ 44.30	€ 39.93	€ 36.16

Table 13: VWS' valuation sensitivity analysis

Source: Author analysis

Beta \ Market Risk Premium	3.88%	4.38%	4.88%	5.38%	5.88%	6.38%	6.88%
0.81	122%	99%	80%	64%	50%	38%	27%
0.91	100%	79%	61%	46%	33%	22%	12%
1.01	82%	62%	45%	31%	19%	9%	0%
1.11	66%	47%	31%	18%	7%	-3%	-11%
1.21	52%	34%	20%	7%	-3%	-12%	-20%
1.31	40%	24%	10%	-2%	-12%	-20%	-28%
1.41	30%	14%	1%	-10%	-19%	-27%	-34%

Note to table: Green, grey, yellow, and red correspond respectively to buy, neutral, reduce, and sell

Monte Carlo simulation

In addition to the sensitivity analysis, and using the Crystal Ball software, we ran a Monte Carlo simulation, with 100,000 trials, to test the YE18 price target to the previously identified key variables.

With a confidence interval of 95%, we achieved a mean price target of €67.24, a median of €65.33, and an associated standard deviation of €14.11. The results obtained point out that there is a 95% probability of our YE18 price target for VWS is in a range between €45.54 and €100.14, which means there is a 5% chance of the identifiable variables triggering a change in our recommendation, with the assumptions made.

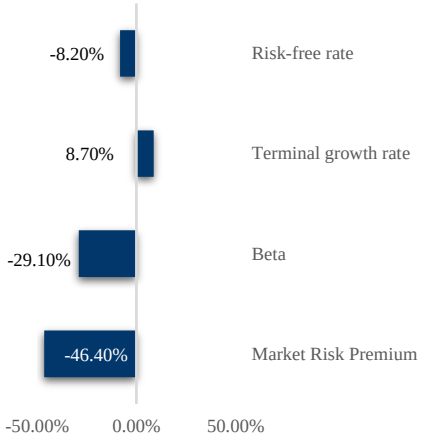
To perform Monte Carlo simulation, we assumed a normal distribution for the variables, with respective standard deviations of 0.32% for the risk-free rate, 0.11 for the beta, 0.68% for the market risk premium, and 0.59% for the terminal growth rate. The standard deviations were derived as the following: STD of the historical 10-year Treasury bond's yield; 10% of beta value; STD of the historical risk premium values; and historical STD of GDP growth rate.

Table 11
Investment rating and risk classification

	Low risk	Medium risk	High Risk
Buy	>15%	>20%	>30%
Neutral	>5% and < 15%	>10% and < 20%	>15% and < 30%
Reduce	>-10% and < 5%	>-10% and < 10%	>-10% and < 15%
Sell	<-10%	<-10%	<-10%

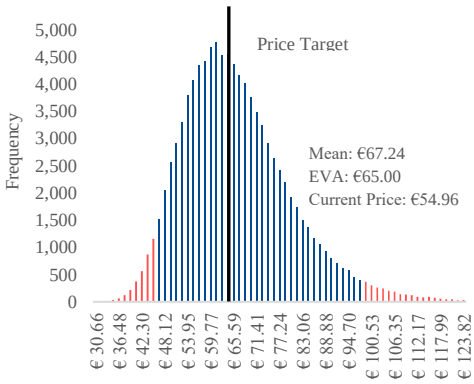
Source: BPI rating scheme

Figure 29
YE18 Price Target variables sensitivity



Source: Crystal Ball software and author analysis

Figure 30
Monte Carlo Simulation



Source: Crystal Ball software and author analysis

Table 14
Monte Carlo price percentiles

Percentiles	Forecast Values	Upside potential
0%	€ 30.68	(44.18%)
10%	€ 51.29	(6.68%)
20%	€ 55.58	1.1%
30%	€ 59.00	7.4%
40%	€ 62.14	13.1%
50%	€ 65.33	18.9%
60%	€ 68.73	25.0%
70%	€ 72.60	32.1%
80%	€ 77.57	41.1%
90%	€ 85.41	55.4%
100%	€ 248.98	353.0%

Source: Crystal Ball software and author analysis

Appendix A – Statement of Financial Position

Table 15

VWS' Statement of Financial Position (consolidated)

million €	FY13A	FY14A	FY15A	FY16A	FY17A	FY18F	FY19F	FY20F	FY21F	FY22F	FY23F
Intangible assets	741	658	687	828	901	982	1,076	1,185	1,310	1,453	1,614
Property, plant and equipment	1,221	1,132	1,279	1,329	1,247	1,259	1,292	1,349	1,431	1,541	1,683
Investments in joint ventures and associates	1	188	225	201	150	150	150	150	150	150	150
Other investments	-	14	20	26	30	30	30	30	30	30	30
Tax receivables	-	-	109	49	51	53	55	57	60	63	65
Deferred tax	155	170	149	208	218	226	236	246	256	267	279
Other receivables	34	36	39	55	72	75	78	81	85	88	92
Marketable securities	-	-	-	190	196	196	196	196	196	196	196
Total non-current assets	**2,152**	**2,198**	**2,508**	**2,886**	**2,865**	**2,971**	**3,113**	**3,294**	**3,518**	**3,788**	**4,109**
Inventories	1,425	1,509	1,899	1,985	2,696	2,797	2,915	3,039	3,169	3,305	3,448
Trade receivables	626	598	795	1,038	1,144	1,187	1,237	1,290	1,345	1,402	1,463
Construction contracts in progress	47	104	15	19	82	85	89	92	96	101	105
Tax receivables	57	65	60	25	53	55	57	60	62	65	68
Other receivables	307	402	442	322	371	385	401	418	436	455	474
Marketable securities	-	-	-	11	7	7	7	7	7	7	7
Cash and cash equivalents	694	2,018	2,765	3,550	3,653	4,230	4,838	5,415	5,437	6,430	6,925
Total current assets	**3,156**	**4,696**	**5,976**	**6,950**	**8,006**	**8,746**	**9,545**	**10,321**	**10,552**	**11,765**	**12,490**
Assets held for sale	332	103	103	95	-	-	-	-	-	-	-
Total assets	**5,640**	**6,997**	**8,587**	**9,931**	**10,871**	**11,717**	**12,658**	**13,615**	**14,070**	**15,553**	**16,599**
Share capital	27	30	30	30	29	29	29	29	29	29	29
Other reserves	(10)	498	138	61	37	37	37	37	37	37	37
Retained earnings	1,507	1,851	2,731	3,099	3,046	3,597	4,196	4,795	4,876	5,988	6,622
Total equity	**1,524**	**2,379**	**2,899**	**3,190**	**3,112**	**3,663**	**4,262**	**4,861**	**4,942**	**6,054**	**6,688**
Provisions	200	231	314	457	483	501	522	544	568	592	618
Deferred tax	21	17	20	34	61	63	66	69	72	75	78
Financial debts	604	3	495	496	497	519	543	567	93	597	624
Tax payables	-	-	44	37	166	172	180	187	195	203	212
Other liabilities	2	10	10	90	19	20	21	21	22	23	24
Total non-current liabilities	**827**	**261**	**883**	**1,114**	**1,226**	**1,276**	**1,331**	**1,389**	**950**	**1,491**	**1,556**
Prepayments from customers	1,568	2,156	2,258	3,002	2,923	3,033	3,161	3,295	3,436	3,583	3,738
Construction contracts in progress	12	12	17	73	159	165	172	179	187	195	203
Trade payables	832	945	1,760	1,666	2,660	2,760	2,877	2,999	3,127	3,261	3,402
Provisions	165	142	124	131	148	154	160	167	174	181	189
Tax payables	39	41	147	191	108	112	117	122	127	132	138
Other liabilities	426	457	499	564	535	555	579	603	629	656	684
Financial debts	4	604	-	-	-	-	-	-	500	-	-
Total current liabilities	**3,046**	**4,357**	**4,805**	**5,627**	**6,533**	**6,779**	**7,065**	**7,364**	**8,179**	**8,009**	**8,355**
Liabilities associated with assets held for sale	243	-	-	-	-	-	-	-	-	-	-
Total liabilites	**4,116**	**4,618**	**5,688**	**6,741**	**7,759**	**8,055**	**8,396**	**8,753**	**9,128**	**9,499**	**9,911**
Total equity and liabilities	**5,640**	**6,997**	**8,587**	**9,931**	**10,871**	**11,717**	**12,658**	**13,615**	**14,070**	**15,553**	**16,599**

Source: Company Annual Reports and author analysis

Table 16

VWS' Common size statement of Financial Position (Consolidated)

million €	FY13A	FY14A	FY15A	FY16A	FY17A	FY18F	FY19F	FY20F	FY21F	FY22F	FY23F
Intangible assets	13.1%	9.4%	8.0%	8.3%	8.3%	8.4%	8.5%	8.7%	9.3%	9.3%	9.7%
Property, plant and equipment	21.6%	16.2%	14.9%	13.4%	11.5%	10.7%	10.2%	9.9%	10.2%	9.9%	10.1%
Investments in joint ventures and associates	0.0%	2.7%	2.6%	2.0%	1.4%	1.3%	1.2%	1.1%	1.1%	1.0%	0.9%
Other investments	0.0%	0.2%	0.2%	0.3%	0.3%	0.3%	0.2%	0.2%	0.2%	0.2%	0.2%
Tax receivables	0.0%	0.0%	1.3%	0.5%	0.5%	0.5%	0.4%	0.4%	0.4%	0.4%	0.4%
Deferred tax	2.7%	2.4%	1.7%	2.1%	2.0%	1.9%	1.9%	1.8%	1.8%	1.7%	1.7%
Other receivables	0.6%	0.5%	0.5%	0.6%	0.7%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%
Marketable securities	0.0%	0.0%	0.0%	1.9%	1.8%	1.7%	1.5%	1.4%	1.4%	1.3%	1.2%
Total non-current assets	**38%**	**31%**	**29%**	**29%**	**26%**	**25%**	**25%**	**24%**	**25%**	**24%**	**25%**
Inventories	25.3%	21.6%	22.1%	20.0%	24.8%	23.9%	23.0%	22.3%	22.5%	21.3%	20.8%
Trade receivables	11.1%	8.5%	9.3%	10.5%	10.5%	10.1%	9.8%	9.5%	9.6%	9.0%	8.8%
Construction contracts in progress	0.8%	1.5%	0.2%	0.2%	0.8%	0.7%	0.7%	0.7%	0.7%	0.6%	0.6%
Tax receivables	1.0%	0.9%	0.7%	0.3%	0.5%	0.5%	0.5%	0.4%	0.4%	0.4%	0.4%
Other receivables	5.4%	5.7%	5.1%	3.2%	3.4%	3.3%	3.2%	3.1%	3.1%	2.9%	2.9%
Marketable securities	0.0%	0.0%	0.0%	0.1%	0.1%	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%
Cash and cash equivalents	12.3%	28.8%	32.2%	35.7%	33.6%	36.1%	38.2%	39.8%	38.6%	41.3%	41.7%
Total current assets	**56%**	**67%**	**70%**	**70%**	**74%**	**75%**	**75%**	**76%**	**75%**	**76%**	**75%**
Assets held for sale	6%	1.5%	1.2%	1.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Total assets	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**
Share capital	0.5%	0.4%	0.3%	0.3%	0.3%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%
Other reserves	-0.2%	7.1%	1.6%	0.6%	0.3%	0.3%	0.3%	0.3%	0.3%	0.2%	0.2%
Retained earnings	27%	26.5%	31.8%	31.2%	28.0%	30.7%	33.1%	35.2%	34.7%	38.5%	39.9%
Total equity	**27%**	**34%**	**34%**	**32%**	**29%**	**31%**	**34%**	**36%**	**35%**	**39%**	**40%**
Provisions	3.5%	3.3%	3.7%	4.6%	4.4%	4.3%	4.1%	4.0%	4.0%	3.8%	3.7%
Deferred tax	0.4%	0.2%	0.2%	0.3%	0.6%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%
Financial debts	10.7%	0.0%	5.8%	5.0%	4.6%	4.4%	4.3%	4.2%	0.7%	3.8%	3.8%
Tax payables	0.0%	0.0%	0.5%	0.4%	1.5%	1.5%	1.4%	1.4%	1.4%	1.3%	1.3%
Other liabilities	0.0%	0.1%	0.1%	0.9%	0.2%	0.2%	0.2%	0.2%	0.2%	0.1%	0.1%
Total non-current liabilities	**15%**	**4%**	**10%**	**11%**	**11%**	**11%**	**11%**	**10%**	**7%**	**10%**	**9%**
Prepayments from customers	27.8%	30.8%	26.3%	30.2%	26.9%	25.9%	25.0%	24.2%	24.4%	23.0%	22.5%
Construction contracts in progress	0.2%	0.2%	0.2%	0.7%	1.5%	1.4%	1.4%	1.3%	1.3%	1.3%	1.2%
Trade payables	14.8%	13.5%	20.5%	16.8%	24.5%	23.6%	22.7%	22.0%	22.2%	21.0%	20.5%
Provisions	2.9%	2.0%	1.4%	1.3%	1.4%	1.3%	1.3%	1.2%	1.2%	1.2%	1.1%
Tax payables	0.7%	0.6%	1.7%	1.9%	1.0%	1.0%	0.9%	0.9%	0.9%	0.9%	0.8%
Other liabilities	7.6%	6.5%	5.8%	5.7%	4.9%	4.7%	4.6%	4.4%	4.5%	4.2%	4.1%
Financial debts	0.1%	8.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	3.6%	0.0%	0.0%
Total current liabilities	**54%**	**62%**	**56%**	**57%**	**60%**	**58%**	**56%**	**54%**	**58%**	**51%**	**50%**
Liabilities associated with assets held for sale	4%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Total liabilites	**73%**	**66%**	**66%**	**68%**	**71%**	**69%**	**66%**	**64%**	**65%**	**61%**	**60%**
Total equity and liabilities	**100%**	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: Company Annual Reports and author analysis

Appendix B – Income Statement

Table 17
VWS' Income Statement (Consolidated)

million €	FY13A	FY14A	FY15A	FY16A	FY17A	FY18F	FY19F	FY20F	FY21F	FY22F	FY23F
Power solutions	5,082	5,946	7,285	8,928	8,431	8,684	8,988	9,302	9,628	9,965	10,314
Service	954	964	1,138	1,309	1,522	1,644	1,775	1,917	2,071	2,236	2,415
Other	48	-	-	-	-	-	-	-	-	-	-
Total revenue	6,084	6,910	8,423	10,237	9,953	10,328	10,763	11,220	11,699	12,201	12,729
Production costs	5,188	5,732	6,918	8,111	7,990	8,319	8,669	9,037	9,423	9,828	10,253
Gross profit	**896**	**1,178**	**1,505**	**2,126**	**1,963**	**2,009**	**2,094**	**2,183**	**2,276**	**2,373**	**2,476**
R&D	246	213	211	227	235	253	272	292	314	337	363
Distribution costs	195	158	186	190	229	219	228	238	248	259	236
Administration costs	244	248	248	288	269	291	304	316	330	337	344
Special items	109	48	46	-	-	-	-	-	-	-	-
Operating profit/(loss)	**102**	**559**	**860**	**1,421**	**1,230**	**1,246**	**1,290**	**1,336**	**1,384**	**1,441**	**1,533**
Income/(loss) from investments in joint ventures and associates	-	(31)	34	(101)	(40)	-	-	-	-	-	-
Financial income	5	50	61	23	45	46	53	55	68	76	80
Financial costs	143	103	76	89	43	47	49	51	53	55	57
Profit before tax	**(36)**	**523**	**925**	**1,287**	**1,192**	**1,245**	**1,295**	**1,340**	**1,398**	**1,461**	**1,556**
Income tax	46	131	240	322	298	311	324	335	350	365	389
Profit for the year	**(82)**	**392**	**685**	**965**	**894**	**934**	**971**	**1,005**	**1,049**	**1,096**	**1,167**

Source: Company Annual Reports and author analysis

Table 18
VWS' Common size Income Statement (Consolidated)

million €	FY13A	FY14A	FY15A	FY16A	FY17A	FY18F	FY19F	FY20F	FY21F	FY22F	FY23F
Power solutions	83.5%	86.0%	86.5%	87.2%	84.7%	84.1%	83.5%	82.9%	82.3%	81.7%	81.0%
Service	15.7%	14.0%	13.5%	12.8%	15.3%	15.9%	16.5%	17.1%	17.7%	18.3%	19.0%
Other	0.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Total revenue	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Production costs	85.3%	83.0%	82.1%	79.2%	80.3%	80.5%	80.5%	80.5%	80.5%	80.5%	80.5%
Gross profit	**14.7%**	**17.0%**	**17.9%**	**20.8%**	**19.7%**	**19.5%**	**19.5%**	**19.5%**	**19.5%**	**19.5%**	**19.5%**
R&D	4.0%	3.1%	2.5%	2.2%	2.4%	2.4%	2.5%	2.6%	2.7%	2.8%	2.8%
Distribution costs	3.2%	2.3%	2.2%	1.9%	2.3%	2.1%	2.1%	2.1%	2.1%	2.1%	1.9%
Administration costs	4.0%	3.6%	2.9%	2.8%	2.7%	2.8%	2.8%	2.8%	2.8%	2.8%	2.7%
Special items	1.8%	0.7%	0.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Operating profit/(loss)	**1.7%**	**8.1%**	**10.2%**	**13.9%**	**12.4%**	**12.1%**	**12.0%**	**11.9%**	**11.8%**	**11.8%**	**12.0%**
Income/(loss) from investments in joint ventures and associates	0.0%	-0.4%	0.4%	-1.0%	-0.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Financial income	0.1%	0.7%	0.7%	0.2%	0.5%	0.4%	0.5%	0.5%	0.6%	0.6%	0.6%
Financial costs	2.4%	1.5%	0.9%	0.9%	0.4%	0.5%	0.5%	0.5%	0.5%	0.4%	0.4%
Profit before tax	**-0.6%**	**7.6%**	**11.0%**	**12.6%**	**12.0%**	**12.1%**	**12.0%**	**11.9%**	**12.0%**	**12.0%**	**12.2%**
Income tax	0.8%	1.9%	2.8%	3.1%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.1%
Profit for the year	**-1.3%**	**5.7%**	**8.1%**	**9.4%**	**9.0%**	**9.0%**	**9.0%**	**9.0%**	**9.0%**	**9.0%**	**9.2%**

Source: Company Annual Reports and author analysis

Appendix C – Statement of Cash Flows

Table 19
VWS' Cash Flow Statement

million €	FY13A	FY14A	FY15A	FY16A	FY17A	FY18F	FY19F	FY20F	FY21F	FY22F	FY23F
Profit for the year	(82)	392	685	965	894	934	971	1,005	1,049	1,096	1,167
Depreciation, Amortization & Impairment	402	377	305	405	421	429	438	447	456	465	474
Other adjustments for non-cash transactions	275	299	298	681	424	424	424	424	424	424	424
Financial interest received	5	8	14	25	17	17	17	17	17	17	17
Financial interest paid	(124)	(62)	(43)	(71)	(33)	(34)	(36)	(38)	(39)	(41)	(43)
Income tax paid	(57)	(148)	(184)	(212)	(262)	(272)	(283)	(295)	(308)	(321)	(335)
Cash flow from operating activities before change in net working	419	866	1,075	1,793	1,461	1,498	1,531	1,560	1,598	1,640	1,704
Change in net working capital	829	260	397	388	164	(82)	(96)	(100)	(105)	(110)	(116)
Cash flow from operating activities	**1,248**	**1,126**	**1,472**	**2,181**	**1,625**	**1,415**	**1,435**	**1,460**	**1,493**	**1,529**	**1,588**
Purchase of intangible assets	(189)	(115)	(148)	(202)	(226)	(242)	(259)	(277)	(296)	(317)	(339)
Purchase of property, plant and equipment	(73)	(163)	(220)	(287)	(268)	(292)	(318)	(347)	(378)	(412)	(449)
Disposal of property, plant and equipment	20	8	1	21	8	12	12	12	12	12	12
Disposal of non-current assets held for sale	3	1	(3)	-	99	-	-	-	-	-	-
Purchase of other non-current assets	-	(16)	-	-	-	-	-	-	-	-	-
Purchase of other financial assets	-	-	-	-	(8)	-	-	-	-	-	-
Purchase of marketable securities	-	-	-	(200)	-	-	-	-	-	-	-
Acquisition of subsidaries, net of cash	-	-	(55)	(83)	-	(65)	-	-	-	-	-
Additions of shares in joint ventures	-	-	-	(66)	(15)	-	-	-	-	-	-
Cash flow from investing activities	**(239)**	**(285)**	**(425)**	**(817)**	**(407)**	**(587)**	**(566)**	**(612)**	**(663)**	**(718)**	**(777)**
Capital increase, net of transaction costs	-	432	-	-	-	-	-	-	-	-	-
Acquisition of treasury shares	(7)	(43)	(176)	(417)	(697)	-	-	-	-	-	-
Disposal of treasury shares	-	-	40	11	1	-	-	-	-	-	-
Dividends paid	-	-	(116)	(201)	(278)	(280)	(291)	(302)	(315)	(329)	(350)
Repayment of financial debts	(1,143)	-	(604)	(4)	-	-	-	-	(500)	-	-
Raising of financial debts	-	-	496	-	-	22	23	24	-	504	27
Cash flows from financing activities	**(1,150)**	**389**	**(360)**	**(611)**	**(974)**	**(258)**	**(268)**	**(277)**	**(815)**	**175**	**(323)**
Net increase in cash and cash equivalents	**(141)**	**1,230**	**687**	**753**	**244**	**570**	**601**	**570**	**15**	**987**	**488**
Cash and cash equivalents as at 1 January	847	690	2,014	2,765	3,550	3,653	4,230	4,838	5,415	5,437	6,430
Exchange rate adjustments on cash and cash equivalents	(16)	94	64	32	(141)	7	7	7	7	7	7
Cash and cash equivalents as at 31 December	**690**	**2,014**	**2,765**	**3,550**	**3,653**	**4,230**	**4,838**	**5,415**	**5,437**	**6,430**	**6,925**

Appendix D – Financial Key Ratios

Table 20
VWS' Key Financial Ratios

	FY13A	FY14A	FY15A	FY16A	FY17A	FY18F	FY19F	FY20F	FY21F	FY22F	FY23F
Liquidity Ratios											
Current Ratio (%)	103.6%	107.8%	124.4%	123.5%	122.5%	129.0%	135.1%	140.1%	129.0%	146.9%	149.5%
Quick Ratio (%)	43.3%	60.0%	74.1%	81.7%	73.5%	80.0%	86.1%	91.1%	83.0%	97.9%	100.5%
Cash Ratio (%)	22.8%	46.3%	57.5%	63.3%	56.0%	62.5%	68.6%	73.6%	66.6%	80.4%	83.0%
Efficiency Ratios											
Receivables Turnover (x)	8.58	11.29	12.09	11.17	9.12	8.86	8.88	8.88	8.88	8.88	8.88
Sales Outstanding (days)	43	32	30	33	40	41	41	41	41	41	41
Inventory Turnover (x)	2.83	3.91	4.06	4.18	3.41	3.03	3.04	3.04	3.04	3.04	3.04
Days in Inventory (days)	129	93	90	87	107	121	120	120	120	120	120
Payables Turnover (x)	4.75	6.55	5.40	4.79	4.02	3.11	3.12	3.12	3.12	3.12	3.12
Days of Payables (days)	77	56	68	76	91	117	117	117	117	117	117
Cash Conversion Cycle (days)	95	70	53	44	56	44	44	44	44	44	44
Profitability Ratios											
Gross Profit Margin (%)	14.7%	17.0%	17.9%	20.8%	19.7%	19.5%	19.5%	19.5%	19.5%	19.5%	19.5%
EBITDA Margin (%)	8.3%	13.5%	13.8%	17.8%	16.6%	16.2%	16.1%	15.9%	15.7%	15.6%	15.8%
EBIT Margin (%)	1.7%	8.1%	10.2%	13.9%	12.4%	12.1%	12.0%	11.9%	11.8%	11.8%	12.0%
Net Profit Margin (%)	(1.3%)	5.7%	8.1%	9.4%	9.0%	9.0%	9.0%	9.0%	9.0%	9.0%	9.2%
ROE (%)	(5.2%)	20.1%	26.0%	31.7%	28.4%	27.6%	24.5%	22.0%	21.4%	19.9%	18.3%
ROIC (%)	2.9%	12.9%	17.1%	24.8%	21.3%	18.9%	17.3%	16.0%	16.2%	14.3%	13.9%
EPS (€)	€ (0.41)	€ 1.79	€ 3.10	€ 4.41	€ 4.23	€ 4.64	€ 4.83	€ 5.00	€ 5.22	€ 5.45	€ 5.81
Solvency Ratios											
Debt to Assets (%)	19.0%	12.4%	10.3%	11.2%	11.3%	10.9%	10.5%	10.2%	10.3%	9.6%	9.4%
Debt to Equity (x)	0.70	0.36	0.30	0.35	0.39	0.35	0.31	0.29	0.29	0.25	0.23
Interest Coverage Ratio (x)	0.71	5.43	11.32	15.97	28.60	26.57	26.37	26.18	25.97	26.30	26.81
Debt to EBITDA (x)	2.13	0.92	0.76	0.61	0.74	0.76	0.77	0.78	0.79	0.78	0.78

Appendix E – Forecasting Assumptions

Table 21
VWS' Forecasting financial statements assumptions

	2018F	2019F	2020F	2021F	2022F	2023F	Assumption made
Income Statement							
Power solutions	3.0%	3.5%	3.5%	3.5%	3.5%	3.5%	Based on market forecasts and managements predictions.
Service	8.0%	8.0%	8.0%	8.0%	8.0%	8.0%	Based on market forecasts and managements predictions.
Others	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	Projected to be equal to 2017.
Production costs	4.3%	4.3%	4.3%	4.3%	4.3%	4.3%	CAGR projected based on a 5-year historical average as a percentage of revenues.
R&D	7.5%	7.5%	7.5%	7.5%	7.5%	7.5%	Projected based on a 5-year historical average as a percentage of revenues, and Vestas ambition of sustaining leadership in R&D.
Distribution costs	4.4%	4.6%	4.6%	4.6%	4.6%	4.6%	CAGR projected based on a 5-year historical average as a percentage of revenues.
Administration costs	4.5%	4.5%	4.5%	4.5%	4.5%	4.5%	CAGR projected based on a 5-year historical average as a percentage of revenues.
Financial income	4.1%	4.1%	4.1%	4.1%	4.1%	4.1%	CAGR projected based on a 5-year historical average.
Financial costs	4.1%	4.1%	4.1%	4.1%	4.1%	4.1%	CAGR projected according to the cost of debt of VWS.
Balance Sheet							
Assets							
Investments in joint ventures and associates	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	Vestas owns 50% of MHI Vestas Offshore and of Roaring Fork Wind, both accounted using the equity method. We estimate this item to be equal to 2017 value.
Other investments	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	Projected to be equal to 2017.
Deferred tax	3.8%	4.2%	4.2%	4.3%	4.3%	4.3%	Projected based on sales growth rate.
Inventories	3.8%	4.2%	4.2%	4.3%	4.3%	4.3%	Projected based on sales growth rate.
Trade receivables	3.8%	4.2%	4.2%	4.3%	4.3%	4.3%	Projected based on sales growth rate.
Construction contracts in progress	3.8%	4.2%	4.2%	4.3%	4.3%	4.3%	Projected based on sales growth rate.
Tax receivables	3.8%	4.2%	4.2%	4.3%	4.3%	4.3%	Projected based on sales growth rate.
Other receivables	3.8%	4.2%	4.2%	4.3%	4.3%	4.3%	Projected based on sales growth rate.
Marketable securities	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	Projected to be equal to 2017.
Equity							
Share capital	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	Projected to be equal to 2017.
Other reserves	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	Projected to be equal to 2017.

	2018F	2019F	2020F	2021F	2022F	2023F	Assumption made
Liabilities							
Provisions	3.8%	4.2%	4.2%	4.3%	4.3%	4.3%	Provisions for legal disputes and product warranties. Additionally, Vestas also makes provisions for upgrades of wind turbines. Projected based on sales growth rate.
Deferred tax	3.8%	4.2%	4.2%	4.3%	4.3%	4.3%	Projected based on sales growth rate.
Financial debts	4.5%	4.5%	4.5%	4.5%	4.5%	4.5%	This item consists of a green corporate eurobond. With the phasing out of subsidies from governments, Vestas will need to use long-term financing to follow its growth. We project financial debt based on a 5-year historical average as a percentage of revenues.
Prepayments from customers	3.8%	4.2%	4.2%	4.3%	4.3%	4.3%	Projected based on sales growth rate.
Construction contracts in progress	3.8%	4.2%	4.2%	4.3%	4.3%	4.3%	Projected based on sales growth rate.
Trade payables	3.8%	4.2%	4.2%	4.3%	4.3%	4.3%	Projected based on sales growth rate.
Tax payables	3.8%	4.2%	4.2%	4.3%	4.3%	4.3%	Projected based on sales growth rate.
Other liabilities	3.8%	4.2%	4.2%	4.3%	4.3%	4.3%	Projected based on sales growth rate.
Liabilities associated with assets held for sale	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	Projected to be equal to 2017.
Cash Flow Statement							
Operating activities							
Depreciation, Amortization & Impairment	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	Projected based on a 5-year historical average.
Other adjustments for non-cash transactions	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	Projected to be equal to 2017.
Financial interest received	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	Projected based on a 5-year historical average.
Financial interest paid	4.5%	4.5%	4.5%	4.5%	4.5%	4.5%	To be in line with the increase in financial debt, we estimate this item to grow at 4.5%.
Income tax paid	3.8%	4.2%	4.2%	4.3%	4.3%	4.3%	Projected based on sales growth rate.
Investing activities							
Purchase of intangible assets	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	Projected based on a 5-year historical average and revenue growth.
Purchase of property, plant and equipment	9.0%	9.0%	9.0%	9.0%	9.0%	9.0%	Projected based on a 5-year historical average and revenue growth.
Financing activities	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	Projected to be equal to 2017.
Capital increase, net of transaction costs	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	Projected to be equal to 2017.
Acquisition of treasury shares	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	Projected to be equal to 2017.
Disposal of treasury shares	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	Projected to be equal to 2017.
Dividends paid	4.6%	4.6%	4.6%	4.6%	4.6%	4.6%	CAGR estimated according to the Board of Directors dividend policy.

Appendix F – Weighted Average Cost of Capital

Table 22
VWS' WACC

	2018F	2019F	2020F	2021F	2022F	2023F
Risk free rate (Rf)	2.01%	2.01%	2.01%	2.01%	2.01%	2.01%
Beta levered	1.11	1.11	1.11	1.11	1.11	1.11
Market Risk Premium (Rm-Rf)	5.38%	5.38%	5.38%	5.38%	5.38%	5.38%
RE = Rf + β*(Rm - Rf)	7.98%	7.98%	7.98%	7.98%	7.98%	7.98%
Pre-tax cost of debt (RD)	3.68%	3.68%	3.68%	3.68%	3.68%	3.68%
Corporate income tax (TC)	25%	25%	25%	25%	25%	25%
RD after tax (RD*(1-TC))	2.76%	2.76%	2.76%	2.76%	2.76%	2.76%
Equity (E/(E+D))	74%	76%	78%	77%	80%	81%
Debt (D/(E+D))	26%	24%	22%	23%	20%	19%
WACC	6.6%	6.7%	6.8%	6.8%	6.9%	7.0%

Appendix G – Economic Value Added Valuation

Table 23
VWS' Economic Value Added

million €	2018F	2019F	2020F	2021F	2022F	2023F
Capital	4,938	5,593	6,250	6,391	7,544	8,244
WACC	6.63%	6.74%	6.82%	6.80%	6.95%	7.00%
Required profit by investors	327	377	426	434	524	577
EBIT	1,246	1,290	1,336	1,384	1,441	1,533
EBIT (1-T_C)	935	968	1,002	1,038	1,081	1,150
EVA	**607**	**591**	**576**	**603**	**556**	**573**
PV EVA	607	554	505	496	427	411

Source: Author analysis

Table 24
VWS' Enterprise Value Calculation and Target Price

in m€	
NPV of EVA	2,213
Terminal growth rate	1.29%
Terminal Value	10,042
PV of Terminal Value	7,467
Value added	9,680
Invested Capital	4,638
Enterprise value	**14,318**
Debt	1,251
Equity value	13,067
Shares outstanding (mil)	201.04
Target Price	**€ 65.00**

Source: Author analysis

Appendix H – Multiples Valuation

Table 25
VWS' Multiples Valuation

Company Name	EV/Revenues	EV/EBITDA	EV/EBIT	EV/Forward Revenue	EV/Forward EBITDA	EV/Forward EBIT
Goldwind Co Ltd	2.1	9.7	12.2	1.7	9.1	12.3
Inox Wind Ltd	5.8	-49.0	-20.7	0.7	6.0	5.7
Nordex SE	0.3	4.1	11.6	0.4	3.1	-160.4
Senvion SA	0.1	1.8	3.1	0.1	2.5	8.9
Siemens Gamesa Renewable Energy SA	0.6	-	8.7	0.7	6.6	10.3
Suzlon Energy Ltd	1.9	15.5	23.6	1.3	9.1	12.3
TPI Composites Inc	0.9	8.4	11.8	0.8	10.4	21.0
Unison Co Ltd	4.8	-65.1	-25.8	1.4	11.6	15.7

Company Name	Revenue FY17	EBITDA FY17	EBIT FY17	Revenue FY18	EBITDA FY18	EBIT FY18
Vestas Wind Systems	9,953	1,651	1,230	10,328	1,675	1,246

Total Enterprise Value Multiples	Revenues	EBITDA	EBIT	Forward Revenue	Forward EBITDA	Forward EBIT
Min	0.1	1.8	8.7	0.1	2.5	5.7
Max	5.8	15.5	12.2	1.7	11.6	21.0
Average	2.1	7.9	11.1	0.9	7.3	12.3
Median	1.4	8.4	11.7	0.8	7.8	12.3

Implied Enterprise Value					
Min	1,411	2,918	10,741	1,504	4,235	7,164
Max	57,870	25,651	15,067	17,437	19,394	26,148
Average	20,621	13,039	13,664	9,212	12,223	15,358
Median	13,823	13,897	14,425	8,022	13,136	15,326

Mean EV across multiples	Enterprise Value
Min	4,662
Max	26,928
Average	14,000
Median	13,105

VWS EV by peer estimate		14,000
Debt		1,251
Cash and cash equivalents		4,237
VWS Equity by peer estimate		16,986
Shares outstanding (mil)		201.04
Target Price	**€**	**84.49**

Source: Author analysis

Appendix I – Corporate Governance

Table 26: Board of Directors of Vestas Wind Systems A/S

Source: Company Annual Report and website

Name	Director since	Independent	Role
Bert Nordberg	2012	Yes	Chairman of the Board of Directors and of the Nomination & Compensation Committee
Lars Josefsson	2012	Yes	Deputy Chairman, Chairman of the Technology & Manufacturing Committee and member of the Nomination & Compensation Committee
Carsten Bjerg	2011	Yes	Member of the Technology & Manufacturing and Audit Committees
Eija Pitkänen	2012	Yes	Member of the Technology & Manufacturing Committee and Sustainability, Ethics & Compliance Officer, Risk Officer
Henry Sténson	2013	Yes	Director
Peter Lindholst	2016		Director and Vice President
Michael Lisbjerg	2008		Director
Henrik Andersen	2013	Yes	Chairman of the Audit Committee and member of the Nomination & Compensation Committee
Jens Lund	2018	Yes	Member of the Audit Committee
Kim Thomsen	1996		Member of the Technology & Manufacturing Committee and Human Resources Business Partner
Sussie Agerbo	2005		Management Assistant
Torben Ballegaard	2015	Yes	Member of the Audit Committee

Table 27: Executive Officers of Vestas Wind Systems A/S

Source: Company Annual Report and website

Name	Member since	Role
Anders Runevad	2013	Group President and Chief Executive Officer
Anders Vedel	2012	Executive Vice President and Chief Technology Officer
Jean-Marc Lechêne	2012	Executive Vice President and Chief Operating Officer
Juan Araluce	2012	Executive Vice President and Chief Security Officer
Marika Fredriksson	2013	Executive Vice President and Chief Financial Officer

Figure 31: Vestas' Management Structure

Source: Company Annual Report and website

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Abbreviations

$	United States Dollars
$...bn	Billion U.S. Dollars
$…m	Million U.S. Dollars
€	Euros
€...bn	Billion Euros
€…m	Million Euros
6mxxA	Actual figures as at 30 June 20xx
β	Beta
A	Actual
AWEA	American Wind Energy Association
CAGR	Compounded Annual Growth Rate
CAPM	Capital Asset Pricing Model
CEO	Chief Executive Officer
CFO	Chief Financial Officer
COO	Chief Operating Officer
CSO	Chief Security Officer
CTO	Chief Technology Officer
D	Debt
D&A	Depreciations and Amortizations
E	Equity
EBIT	Earnings Before Interest and Tax
EBITDA	Earnings Before Interest, Tax, Depreciation and Amortization
ECB	European Central Bank
EMEA	Europe, Middle East and Africa
EPS	Earnings per Share
E.U.	European Union
EUR	Euro
EV	Enterprise Value
EVA	Economic Value Added
FY	Fiscal Year
FYxxA	Fiscal Year Ended as at 31 December 20xx
FYxxF	Fiscal Year Forecasted for 31 December 20xx
GDP	Gross Domestic Product
GW	Gigawatts
GWEC	Global Wind Energy Council
IMF	International Monetary Fund
ISEG	Lisbon School of Economics & Management
MHI	Mitsubishi Heavy Industries
MRP	Market Risk Premium
MW	Megawatt
MWh	Megawatt-hour
NOPAT	Net Operating Profit After Tax
NPV	Net Present Value
NWC	Net Working Capital
O&M	Operations and Maintenance
OECD	Organization for Economic Co-operation and Development
PV	Present Value

R&D	Research and Development
R_D	Cost of debt
R_E	Cost of equity
R_f	Risk-free rate
R_m	Market Return
ROA	Return on Assets
ROCE	Return on Capital Employed
ROE	Return on Equity
ROIC	Return on Invested Capital
S&P	Standard & Poor's
STD	Standard Deviation
SWOT	Strenghts, Weaknesses, Opportunities, and Threats
T_C	Corporate Tax
TV	Terminal Value
TWh	Terawatt-hour
U.K.	United Kingdom
U.S.A.	United States of America
USD	United States Dollars
VWS	Vestas Wind Systems A/S
WACC	Weighted Average Cost of Capital
W_D	Weight of debt
W_E	Weight of equity
YE	Year Ended