Lisbon School of Economics & Management
Universidade de Lisboa

MASTERS IN
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MASTERS FINAL WORK
PROJECT

EQUITY RESEARCH:
VESTAS WIND SYSTEMS

MARGARIDA DUARTE PEREIRA

JUNE 2023

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SUPERVISOR: JOSÉ AFONSO MARTINS ALMEIDA

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Abstract

The present document is the report of an Equity Research of Vestas Wind Systems A/S according to the recommended format by the CFA Institute. Vestas is a Danish manufacturer and service provider of wind turbines, and a global leader in sustainable energy solutions. Given the growing awareness of the importance of environmental sustainability, the transition to renewable energy sources has become a plan on the world's agenda. Therefore, performing an analysis of an industry-leading company contributes to a greater understanding of this key topic and, particularly, of how the shift in the global energy system can unfold. The analysis performed provides in-depth coverage of the business description, management, and ESG of Vestas Wind Systems A/S, and an industry overview. In terms of valuation, the integrated DCF approach was the preferred method, but complemented with other methods.

This report issues a BUY recommendation for Vestas Wind Systems, with a price target of 26.59€/share for 2023YE, representing an upside potential of 18% against the closing price of 24.36€/share, as of June 30th, 2023, with medium risk.

The recommendation is mainly based on: i) Forefront innovative technology which unlocks higher output capacity, putting Vestas ahead of its competitors; ii) Strong offshore expansion beginning in 2025F, that along with higher power solutions revenues, will also increase the service segment revenue; and, iii) Uncertain Energy Transition and Bureaucratic Processes that slow down wind farms construction.

The company valuation is subject to significant risks. Supply chain disruptions and commodity prices were the main risks that affected the company in 2022, and must be taken into consideration for future years, as it led to negative results. Furthermore, technological advancements and higher competition, due to the entry of oil and gas companies into the renewables industry, can threat Vestas' market share.

JEL classification: G10, G30, G32, G35.

Keywords: Equity Research, Valuation, Renewables, Vestas.

Resumo

O presente documento consiste num relatório de *Equity Research* sobre a *Vestas Wind Systems A/S* de acordo com o formato recomendado pelo *CFA Institute*. Vestas, uma empresa dinamarquesa que produz e instala turbinas eólicas e providencia serviço pós-venda, é líder global em soluções de energia sustentável. Perante a crescente conscientização sobre a importância da sustentabilidade ambiental, a transição para fontes de energia renováveis tornou-se um plano na agenda mundial. Assim, realizar uma análise sobre uma empresa líder no setor contribui para uma maior compreensão sobre este tópico e, particularmente, sobre o desenvolvimento da mudança do sistema de energia global. A análise feita providencia uma descrição detalhada do negócio, da gestão e dos fatores de ESG da empresa, assim como uma análise da indústria. Em termos de avaliação da empresa, o método dos *cash flows* descontados foi considerado como principal, mas complementado com outros métodos.

Neste relatório é emitida uma recomendação de COMPRAR para a *Vestas Wind Systems,* com um preço alvo de 26.59€/ação no final de 2023, o que representa uma valorização de 18% face ao preço de fecho de 24.36€/ação, a 30 de Junho de 2023, com um risco moderado.

A recomendação é baseada em: i) Inovação tecnológica que permite uma maior capacidade, colocando a empresa à frente dos concorrentes; ii) Forte expansão das turbinas *offshore,* com início em 2025 e que, juntamente com um aumento das vendas para o segmento de *power solutions*, também aumenta as vendas no segmento de serviço; e iii) Continuação de incerteza relativamente à transição energética, assim como processos burocráticos lentos, levando a uma diminuição da capacidade de construção de parques eólicos.

A avaliação da empresa encontra-se sujeita a vários riscos. Instabilidade na cadeia de abastecimento e nos preços dos materiais foram os principais riscos que afetaram a empresa em 2022, por isso, é necessário tê-los em conta, uma vez que levaram a resultados negativos. Adicionalmente, a inovação tecnológica e maior competição, com a entrada de empresas de óleo e gás na indústria dos renováveis, pode afetar a quota de mercado da Vestas.

Classificação JEL: G10, G30, G32, G35.

Palavras-Chave: *Equity Research*, Avaliação de Empresas, Renováveis, Vestas.

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This report represents the end of the master's course, and the accomplishment of a big goal. ISEG was the home for my educational journey of five years that is coming to an end, and I could not be prouder. It represents hard-work, useful insights, and a lot of dedication. Along with the ones that were already with me, people that I met along this journey, made this challenge so much easier.

To my mom, my deepest thanks, since none of this would be possible without her. To my sister, and cousin, thank you for supporting me and for every useful suggestion.

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Glossary

€ or EUR	Euro
$ or USD	United States Dollar
ASP	Average Selling Price
APV	Adjusted Present Value
BNEF	BloombergNEF
Bn	Billions
BoD	Board of Directors
CAGR	Compound Annual Growth Rate
CAPEX	Capital Expenditure
CAPM	Capital Asset Pricing Model
CDP	Carbon Disclosure Project
CEO	Chief Executive Officer
CFO	Chief Financial Officer
CO_2	Carbon Dioxide
CO_2e	Carbon Dioxide equivalent
COP	Conference of the Parties
CTV	Crew Transfer Vessel
D	Debt
DCF	Discounted Cash Flow
DKK	Danish Krones
DPS	Dividend per Share
E	Equity
EBIT	Earnings before Interest, and Taxes
EBITDA	Earnings before Interest, Taxes, Depreciation, and Amortization
EMEA	Europe, Middle East, and Africa
EPS	Earnings per Share
ESG	Environmental, Social and Governance
EU	European Union
F	Forecast
FCFE	Free Cash Flow to Equity
FCFF	Free Cash Flow to the Firm
FY	Full Year
g	Grams
GDP	Gross Domestic Product
Gt	Gigatons
GW	Gigawatt
GWEC	Global Wind Energy Council
IEA	International Energy Agency
IMF	International Monetary Fund
IRA	Inflation Reduction Act
IRENA	International Renewable Energy Agency
kWh	Kilowatt-hour
LCA	Life-Cycle Assessment
LCOE	Levelised Cost of Energy
LPF	Lost Production Factor
LTI	Long Term Incentive
LTIR	Lost Time Injury Rate
m	Meters
M(n)	Million
M&A	Mergers and Acquisitions
MMBtu	Million British Thermal Units
Mt	Million Tons
MW(h)	Megawatt (hour)
MSCI	Morgan Stanley Capital International
NCC	Nomination and Compensation Committee
OEM	Original Equipment Manufacturer
PPA	Power Purchase Agreement
PV	Photovoltaics
R&D	Research and Development
RES	Renewable Energy Sources
ROA	Return on Assets
ROE	Return on Equity
ROIC	Return on Invested Capital
SARD	Sum of the Absolute Rank Differences
SDD	Social Due Diligence
SG&A	Selling, General, and Administrative Expenses
Sh	Share
STI	Short Term Incentive
SWOT	Strengths, Weaknesses, Opportunities, Threats
TRIR	Total Recordable Injury Rate
TJ	Terajoule
TW(h)	Terawatt (hour)
UN	United Nations
US	United States
USA	United States of America
WACC	Weighted Average Cost of Capital
WEF	World Economic Forum
YE	Year End
YoY	Year-on-Year

Vestas Wind Systems A/S: A Global Sustainable Leader

1. Research Snapshot

BUY is the recommendation for Vestas Wind Systems with a price target of **€26.59/share** for 2023YE using a **DCF approach**. The forecasted price implies a **18% upside potential** from the June 30th, 2023 closing price of **€24.36/share**, with a **medium risk** (Table 1). Therefore, the recommendation is based on three main pillars:

1. Forefront innovative technology unlocks higher output capacity

Vestas' consistent **investment in R&D** allows it to be ahead of competitors. As renewable energy becomes more important to help decarbonization, it is mandatory for OEMs to re-invent their products to be able to comply with market demands rapidly. **Modularization** enables a **competitive advantage** for Vestas, as it establishes commonality between onshore and offshore turbines, making it easier and faster to develop both types of turbines. Also, this takes on more potential to reduce the LCOE[1], putting Vestas at the front of its peers. Their highly integrated supply chain and strategic partnerships also help the company to produce and deliver turbine components at a lower cost but with superior quality.

2. Higher Profitability through Offshore Expansion

Vestas expects to **increase offshore revenue by 2025,** as their new 15MW turbine takes place in the market. With higher offshore deliveries, the service segment will also increase. Offshore weather conditions require more frequent turbine maintenance, making it a higher proportion of services' volume. In addition, despite initial higher costs, as **modularization** takes place, Vestas can reduce costs in the long-term, by experiencing economies of scale. Consequently, offshore will be, in the long-term, a determinant segment for the company, and it is estimated to grow at c.33% CAGR between 2023F and 2027F (Figure 1), whereas onshore is expected to grow only half of it (15% CAGR).

3. Uncertain Energy Transition and Bureaucratic Processes make Wind Prospects Slow Down

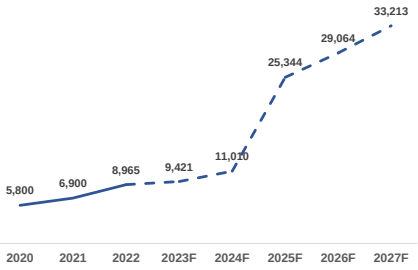
Storage solutions and smarter grid systems must be developed as soon as possible to increase renewables capacity. According to McKinsey, c.$300m should be spent in cumulative CAPEX by 2030, to comply with targets for decarbonization. Furthermore, collaboration among all players is required. Lengthy and complicated **permitting processes** are one of the main challenges to faster deployment of wind power plants in many parts of the world, especially in Europe. For instance, Europe has more than 80GW of wind energy projects currently stuck in permitting processes, which **slows down the installation of new wind farms**. Consequently, by 2022, worldwide new installed capacity decreased c.17%YoY, both for onshore and offshore (Figure 2).

Table 1: Investment Recommendation

Investment Recommendation	BUY
Date	30/06/2023
Closing Price	24.36 €
DCF Target Price	26.59 €
Exchange Rate at June 30, 2023	0.13
Upside/Downside	18%
Level of Risk	Medium
Industry	Renewable Energy
Ticker	VWS.CO
Stock Exchange	Nasdaq Copenhagen
Shares Outstanding	1 Billion
Market Capitalization	27 Billion
Free Float	100%

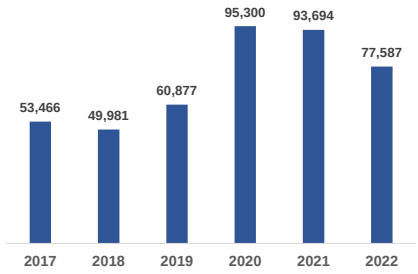
Source: Author Analysis

Figure 1: Vestas' Offshore Cumulative Wind Capacity (MW)



Source: Company Data and Author Analysis

Figure 2: Worldwide New Installed Capacity (MW)



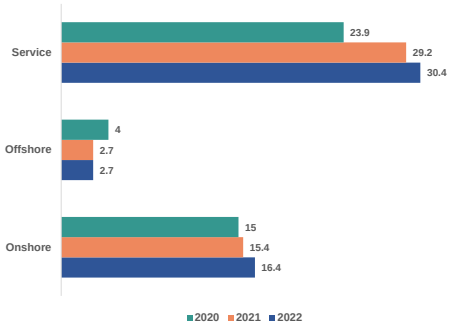
Source: GWEC - Global Wind Energy Report 2023

[1] For key definitions, please refer to Appendix 1

2. Business Description

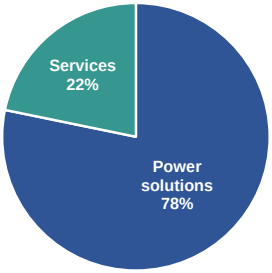
Vestas Wind Systems A/S ("Vestas"), a global leader in **sustainable energy solutions**, is a Danish wind turbine manufacturer and service provider, headquartered in Aarhus. The business began in 1898 when Hans Søren Hansen acquired a local blacksmith shop in Denmark. In 1945, his son founded Vestjysk Stålteknin A/S, later Vestas, and entered multiple businesses henceforward, including turbine production in 1979. By 1985, the shipping company goes bankrupt, and Vestas misses the deadline to deliver its products. When the turbines finally arrive, the client refuses to accept them and does not pay. At this point, the company finds itself with a huge stockpile of turbines with no investor in sight, leading Vestas to bankruptcy. Consequently, in 1987, a majority of the group was sold, creating **Vestas Wind Systems A/S**. Vestas turned public in 1998 on the Copenhagen Stock Exchange. At that time, Vestas was the industry's dominant player with a market share of 22.1% of the world's wind power (measured in installed MW). In 2004, Vestas and NEG Micon (Danish competitor) merge becoming the undisputed world leader in modern wind energy, with a 32% market share. Now, Vestas has offices in more than 30 countries and over 29k employees. By 2022YE, the company had **over 164GW of wind turbines installed,** more than **144GW under service** (c.55k turbines), and an all-time high total **order backlog of €49.5bn**, corresponding to an 8% increase YoY (Figure 3). The total order intake was 11.2MW with an average selling price (ASP) of 1.07M per MW. Despite a decrease of 19% in the total order intake in MW, it increased c.3% in value (bnEUR) due to strong price increases.

Figure 3: Total Order Backlog (€Bn)



Source: Company Data

Figure 4: Revenue per Segment (%)



Source: Company Data

2.1. Business Segments

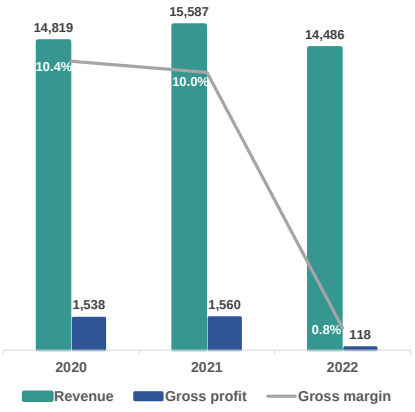
The company operates through two reportable segments: **Power Solutions** (covering revenue derived from 3 business areas: Onshore wind, Offshore wind, and Development) and **Service** (sale of service contracts, spare parts, etc.).

As observed in Figure 4, the Power Solutions segment account for the majority of the company's FY2022 revenues. In 2021, the firm achieved record revenue of €16bn, which decreased by roughly €1bn by 2022, a 7.1% YoY decrease, due mainly to the **Russo-Ukrainian war, transportation, and project execution delays.** Despite the total revenue decrease, the service segment experienced a 27% increase, reaching a value of €3.2bn, partly offsetting the Power Solutions revenue decrease. For 2022YE, gross margin decreased 9.2 percentage points (Figure 5), due to continued external cost inflation and supply chain disruptions in the Power Solutions segment, as well as increased warranty provisions.

Revenue for FY2023 is expected to range between €14bn and €15.5bn, with the service segment growing, at minimum, 5%. For 2023, offshore is expected to be stable, but for the foreseeable future, especially from 2025 onwards, it will be heavily developed.

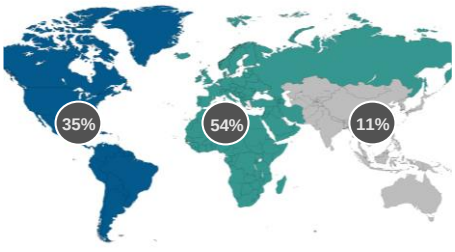
Moreover, an extensive turbine portfolio, addressing specific environmental conditions, is available in **Europe, Middle East and Africa** (EMEA), the **Americas**, and **Asia Pacific** regions. EMEA accounts for 54% of FY2022 revenue, followed by Americas, which saw their revenue percentage increase by 4% in 2022, driven by higher service activity, and finally, Asia Pacific, representing 11% of revenue in 2022 (Figure 6). More specifically, Vestas' top three markets are present in the Americas and EMEA. The USA stands out with 2,275MW of deliveries in 2022, followed by Brazil with 1,528MW and Finland with 1,185MW (Figure 7). The company experienced diminished deliveries from all regions in 2022, but Asia Pacific had the

Figure 5: Key Financial Figures (€M)



Source: Company Data

Figure 6: Revenue by Geography



Source: Company Data

highest drop YoY – 40%. This geographical diversity allowed Vestas to install turbines in more than 87 countries around the world, operating in sites from high altitude to extreme weather conditions.

The company distinguishes itself by having a highly integrated value chain and offering end-to-end solutions, starting from the turbine design, installation, and operation to service and maintenance. This provides Vestas with total control of each supply chain phase. For instance, the product quality, and delivery time are assured, meeting with the company's objective of providing the best capability of their products. Moreover, the company is able to reduce its dependence on suppliers.

The entire life cycle of a wind plant can be separated into: i) Manufacturing, ii) Wind plant set up, iii) Site operation, and iv) End of life (Appendix 2).

Onshore | The Onshore segment is comprised of three different types of turbines, each made for a specific land environment: **EnVentus, 2MW and 4MW**. EnVentus turbine connects the designs from the 2MW, 4MW and 9MW technology, delivering higher performance and allowing for project customization. The 2MW and 4MW turbines, were introduced in 2000 and 2010, respectively, and are the most popular in Vestas' portfolio (Figure 8), covering all wind segments. Onshore turbines have an energy payback period of c.8 months, and an energy return of c.40x (onshore turbines return 40 times more energy to society than it consumed) and their 4.4 to 9.7 g/kWh CO_2 emissions are much lower than for coal power plants - 1002 g/kWh (Figure 9).

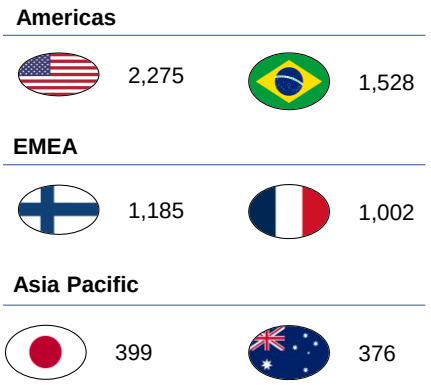
Offshore | Committed to harnessing the full potential of offshore wind, Vestas is continuously setting new technology standards to help drive down the cost of sustainable energy and meet the planet's energy needs. In that way, besides the 9MW turbine launched in 2014, Vestas' portfolio was recently increased with the addition of the **15MW turbine** with a capacity factor of c.60%, and the highest rotor diameter of 236m (It is 36% bigger than the second largest rotor diameter – Table 2). It already counts with more than 8.5GW of globally installed capacity.

Development | The Development segment aims to expand the project pipeline, in order to accelerate the energy transition. It goes through the initial planning of a power plant until installation – securing land rights and appropriate permits, designing sites, ensuring grid connection, and securing project offtake agreements, including financing.

Service | The service offering is based on the optimization of the energy produced and risk reduction over the lifecycle of the power plant project and is structured around three areas: **i) Maintenance; ii) Parts and Repair; and, iii) Fleet Optimization.** Besides providing services for its turbines, Vestas also offers services for competitors' turbines. Maintenance is offered through tailored packages, which are called Active Output Management (Appendix 3), allowing to increase the efficiency of each specific site. The Parts & Repair segment covers most major turbine platforms, with more than 100k spare parts, making Vestas' website one of the largest spare parts shops. When at the site, turbines can still be optimized, whether by more intelligent software algorithms, rotor upgrades or improved turbine efficiency – Fleet Optimization. Vestas' service contract length lasts on average, 11 years, and is consistently increasing throughout the years.

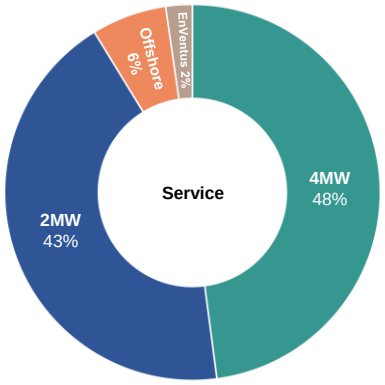
Vestas is the wind industry's largest service provider, with more than 144GW under service, including more than 8.5GW of competitors' turbines, which is c.6% of the total GW under service. The turbines capture c.98% of the available energy, restricting the lost production factor (LPF) to 2.4%.

Figure 7: Deliveries (MW)



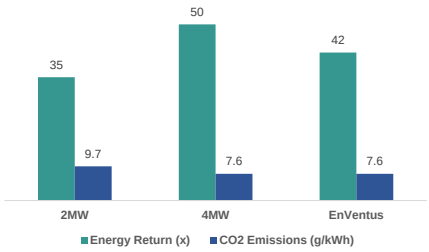
Source: Company Data

Figure 8: Installed Capacity



Source: Company Data

Figure 9: Energy Return and CO_2 Emissions



Source: Company Data

Table 2: Rotor diameter

Turbine Name	Meters
2MW	90-120
4MW	105-163
EnVentus	150-172
9MW	164-174
15MW	236

Source: Company Data

2.2. Key Drivers of Profitability

Increasing average selling price | Increased pricing is key to value creation, so that the company can mitigate cost inflation. Due to commercial discipline, Vestas rose its ASP by 45% since 2020 (Figure 10).

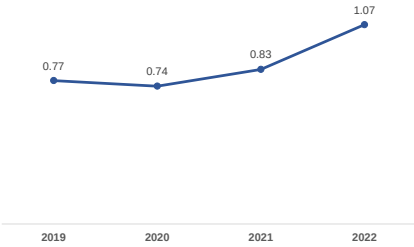
LCOE | As technology progress, the LCOE decreases and, thereby, competition increases against other energy solutions. According to IRENA, the global weighted average **cost of electricity** in 2021 from **onshore wind fell by 15%** and from **offshore wind fell by 13% YoY**. However, it is not expected that this decline repeats in 2022, as supply chain constraints have been having an impact since late 2020, while the rise of commodity prices accelerated in late 2021. High coal and fossil gas prices in 2021 and 2022 have deteriorated the competitiveness of fossil fuels and made solar and wind the most sustainable and cost-efficient energy sources available. The levelized cost of energy for onshore and offshore wind ranges between $19-205 and $52-289 per MWh, respectively, whilst coal ranges between $39-289 per MWh (Figure 11).

Favourable Government Policies | Growing concerns with environmental sustainability pushed forward the transition to renewable energy sources to achieve carbon neutrality globally. Therefore, **new policies** and measures are being **conducted worldwide**. For instance, the Inflation Reduction Act in the USA, Fit for 55 in the EU, Climate Change Bill in Australia, and GX Green Transformation in Japan. According to BloombergNEF, wind will account for 36% of the power sector by 2050, followed by 29% of solar energy, supplying nearly two-thirds of the world's electricity demand (Figure 12).

Innovative Technology | **Technology** plays a key role in increasing the capacity of production, either by higher hub heights, adaptations for installations in areas of low or high-speed wind, or better software to track turbines efficiency. As a leader in technology, Vestas can obtain competitive advantages, which puts them at the front of the competitors.

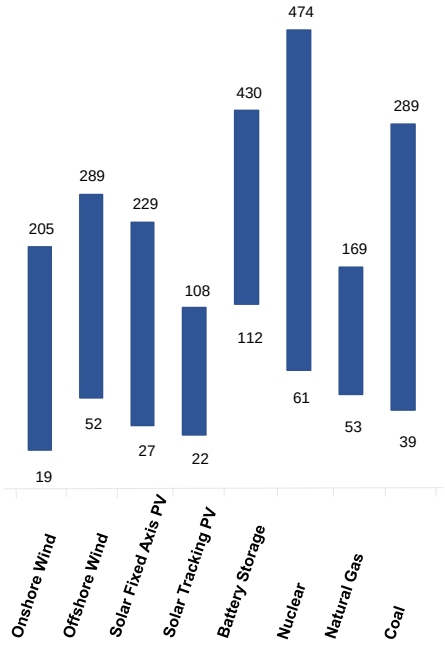
Integrative and vertical supply chain | Fewer and larger partnerships play an integral role in operations. A highly integrated and vertical supply chain allows Vestas to offer superior components through in-house expertise.

Figure 10: Average Selling Price (€M/MW)



Source: Company Data

Figure 11: LCOE by source (USD/MWh)



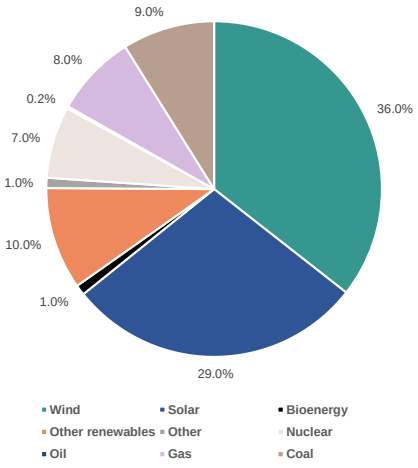
Source: Company Data and BloombergNEF

2.3. Company Strategy

To maintain global leadership in sustainable energy and transform the global energy system with wind solutions, Vestas plans to invest in competitive technology to continuously innovate its product offering, while optimizing operations and establishing partnerships to mitigate supply chain disruptions.

Global leader in sustainable energy manufacturer | Vestas aims to be a global leader in wind manufacturing while creating sustainable and resilient energy systems. **Carbon-neutral factories, circular blades, zero-waste turbines, and an inclusive culture** are the goals of the company to reach a net-zero future. By 2022, c.55% of turbines were made with recycled materials, a 10% YoY increase, verifying the objective of reaching more than 94% by 2030. Additionally, the 2030 target of refurbished component utilization within their turbines of 55% is being attained with an increase of c.13% YoY.

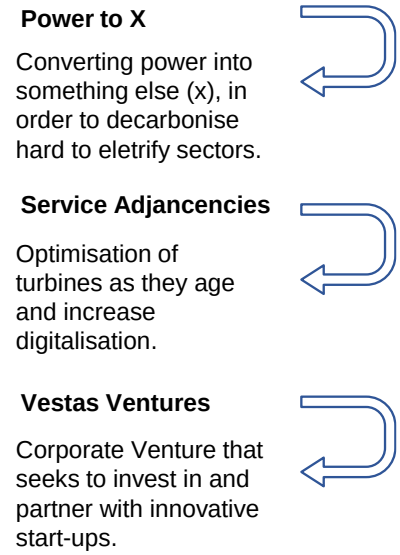
Figure 12: Electricity generation by technology by 2050F



Source: BloombergNEF

Additionally, Vestas has developed three strategic enablers to ensure that the core business stays fully sustainable: Power-to-X, Service adjacencies, and Vestas Ventures (Figure 13).

Figure 13: 3 Sustainability Strategic Enablers



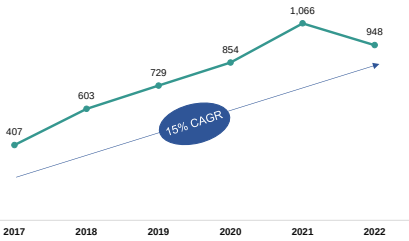
Source: Company Data

Support the transition from fossil-based to renewable energy | Countries are implementing climate targets, as well as other policy targets like the Inflation Reduction Act (IRA) in the USA and the Fit-for-55 package in the EU. Consequently, the installation of renewables is expected to continue to increase, despite the 1.5ºC scenario being far from being achieved. By replacing fossil fuel power plants with wind energy solutions, Vestas is able to accelerate the deployment of renewables to increase the share of the electricity system, drive direct electrification, and develop and implement solutions for indirect electrification.

Strengthen value chain | Partnerships with companies that share the same ambitions **mitigate supply chain disruptions** and **provide benefits for both parties**, while strengthening commercial discipline, and creating an industry where risk and reward are shared across the value chain. More specifically, this enables Vestas to optimize and modularize new and existing products, develop safety improvements, and address the quality challenges that impacted operations and results - delays.

Investment in innovative technology | Vestas' investments have been increasing for the past few years to c.€1bn/year (Figure 14). Staying at the **technological forefront** allows the company to be a global leader in sustainable energy and remain ahead of its competitors (Figure 15).

Figure 14: Total Investments (€M)



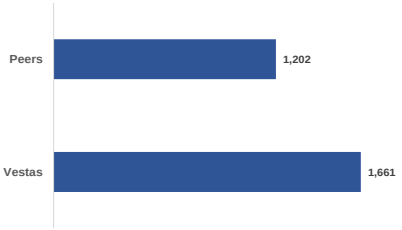
Source: Company Data

Attract the right talent | As renewable energy gains importance all over the world, more organizations are starting to settle in this industry. Therefore, more jobs will be created. A diverse workforce is believed to be essential to pursue an efficient energy transition. However, the talent search becomes even harder, as there are more offers available.

2.4. Shareholder Structure

Vestas has c.1bn common shares outstanding for 2022YE. All shares are free float and each carry 20 votes. The company had c.200k shareholders, with 80% institutional investors. BlackRock is one of the largest shareholders, owning c.5.36% (Figure 16). The dispersed ownership structure ensures diversity, reducing the possibility of big price changes from sudden sell-offs.

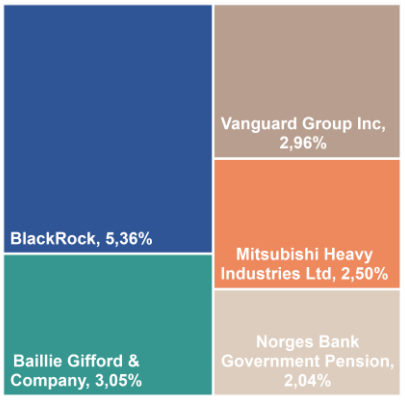
Figure 15: R&D Expenditures (€M)



Source: Companies' Data

Dividend Policy | Despite turning public in 1998, Vestas only started to distribute dividends by 2014, with a value of 0.52€/sh. The **payout ratio** was constantly kept stable, at around 30%. By 2021, the company performed a share split at a ratio of 1:5, which pushed the value of dividends down, to about €0.05/share (Figure 17). By 2022, the company had negative financial results, not being able to comply with the same level of dividend payment for the following year.

Figure 16: Top 5 Holders

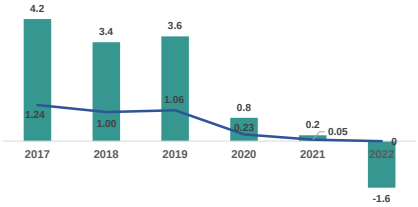


Source: Bloomberg

Board of Directors | In 2022, the BoD (Appendix 4) was composed of 11 members, with 4 non-executive Vestas employees, 1 non-independent member, and the remaining 6 all independent, elected at the Annual General Meeting by shareholders. From the total of members, 6 are Danish, 3 are Swedish, 1 is American, and 1 is Japanese. This diversity of nationalities represents Vestas' global presence and its ambition to expand. Also, in terms of gender, there are currently 37.5% of women and 62.5% of men on the board, thereby **fulfilling the gender distribution target**. Board members receive a fixed payment, which was increased by 2% to match the remuneration levels in comparable companies.

The Board's most important duties are: i) Appointing the Executive Management Team and lay down guidelines and oversee their work; ii) Ensure professional and adequate organization of the company's business; iii) Define the company's corporate and sustainability strategies; iv) Ensure satisfactory financial organization and reporting; v) Ensure the necessary procedures for risk management and internal controls; and vi) Ensure an adequate capital and share structure.

Figure 17: DPS and EPS (€)



Source: Company Data

3. Management and ESG

Major companies are shifting their energy mix towards more sustainable solutions, as ESG standards compliance is becoming crucial for regulatory reasons and from an investment attractiveness perspective.

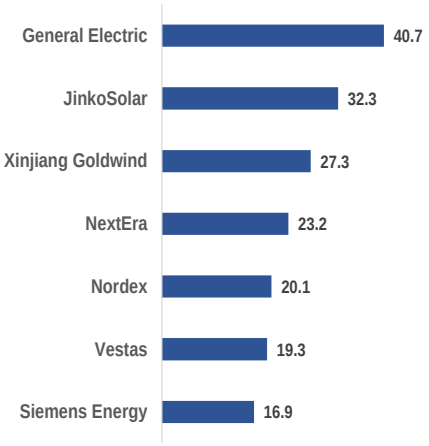
Vestas' Management and ESG performance (Table 3 and Appendix 5) seems to be quite strong. It was ranked the **most sustainable company in the world in Corporate Knights' Global 100 ranking in 2021**, the second one in 2022, received an "AAA" rating by MSCI Rating, an "A" rating on clime by CDP, and is part of the Dow Jones Sustainability Index. When compared with peers (Figure 18), Vestas is notably one of the best companies according to ESG Risk Rating. Of six competitors, Vestas stands out in second place with low risk.

Table 3: Vestas' ESG Ratings

Sustainalytics	19.3
MSCI	AAA
Refinitiv	72
S&P	93

Source: Sustainalytics, Bloomberg, MSCI, and Refinitiv

Figure 18: ESG Risk Rating



Source: Sustainalytics

3.1. Management

Henrik Andersen, CEO and Group President, and Hans Martin Smith, CFO and Executive Vice President, are the Executive Management. The Executive Management Team (Appendix 6) consists of the Executive Management and 6 Executive Vice Presidents. Each of them is responsible for an important area of the company, namely, Finance, Power Solutions, Manufacturing & Global Procurement, Sales, Service, People & Culture, and Digital Solutions & Development (Table 4). Their responsibilities include managing the overall day-to-day operations, presenting budgets, proposals for the company's objectives and action plans to the Board, and monitoring compliance with legislation. The team meets at least once a month and often invites other members of management, depending on the topics being discussed.

Table 4: Vestas' Executive Management Team

Name	Function
Henrik Andersen	Group President & CEO
Hans Martin Smith	Executive Vice President & CFO
Javier Rodriguez Diez	Sales
Christian Venderby	Service
Tommy Rahbek Nielsen	Manufacturing & Global Procurement
Anders Nielsen	Power Solutions
Kerstin Knapp	People & Culture
Thomas Alsbjerg	Digital Solutions & Development

Source: Company Data

Remuneration | The Executive Management's terms of employment and remuneration are agreed between the individual executive and the Board following the Remuneration Policy. The base pay is then reviewed by the Nomination and Compensation Committee (NCC) annually and assessed against similar roles in comparable companies.

Remuneration is composed of fixed – Base Salary – and variable components – Benefits, ST Incentives (STI), LT Incentives (LTI), and Shareholding Obligations – reflecting individual and Vestas' overall performance (Figure 19). The short- and long-term incentive programs (Cash Bonus and Performance Share Incentive Program, for instance) are **linked directly to the financial targets in Vestas' strategy**, being obliged to meet with certain Key Performance Indicators (Appendix 7 and Appendix 8).

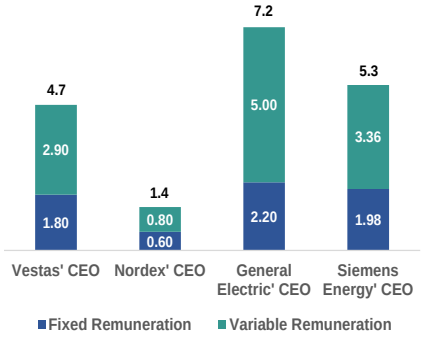
Indeed, for the last 4 years, only in 2019 a bonus of €0.59Million was paid-out to the CEO and CFO. In 2022, CEO's salary increased by 4.2%, while overall Vestas' salaries increased on average by 9.6%, due to the scarcity of talent in the job market.

3.2. Environmental

Global energy-related emissions of **carbon dioxide reached a new high value of over 36.8 Gt in 2022**, according to IEA. Electricity and heat sector emissions increased by 1.8%, reaching an all-time high of 14.7Gt (Figure 20). The increased deployment of clean energy technologies such as renewables – solar and wind - helped prevent an additional 465Mt in power sector emissions.

Due to its operations, Vestas is by default contributing to a more sustainable environment (Figure 21). In addition, the company invested €514M in green energy R&D, and also has multiple objectives (Appendix 9) concerning its carbon footprint.

Figure 19: 2022 Annual Remuneration (€M)

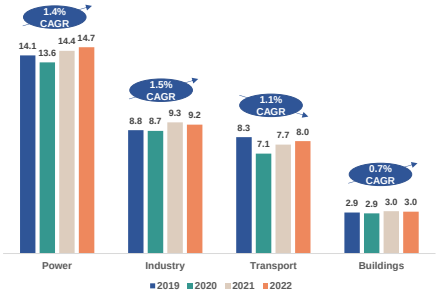


Source: Companies' Data

Carbon Neutrality | Vestas aims to be **carbon neutral in its operations**, without using carbon offsets, and to **reduce the emissions intensity of their supply chain**. The firm has already prevented 1.9bn tons of CO_2 emissions (408M tons in 2022) (Figure 22) and intends to reduce its carbon emissions by 55% by 2025, and 100% by 2030, from a 2019 baseline (Scope 1 & 2) (Appendix 10). Additionally, Vestas' turbines are expected to avoid nearly fifty times more emissions over their lifetime than the amount emitted during their creation. From 2019 until 2022, Vestas has already reduced emissions by 12%. Since 2013, the company has been fully or almost entirely powered by renewable electricity, continuously reaching 100% for the last 3 years.

With long-term objectives in mind, the company must pursue innovative opportunities to enable a complete green transition by 2030. In December 2022, Vestas signed contracts to launch the first offshore CTV Vessel powered by methanol, which will enter operation in 2023.

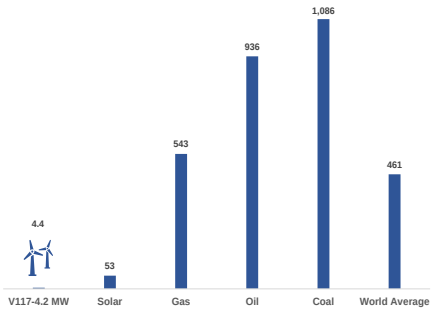
Figure 20: Global CO_2 Emissions by sector (Gt)



Source: IEA - CO_2 Emissions in 2022

When it comes to its strategic suppliers, 46 out of 50 have already committed to set targets for reduced CO_2 emissions in their operations (Scope 3). Indeed, more than 98% of the total carbon footprint comes from suppliers' operations (Table 5), so Vestas is determined to work collaboratively towards greening the supply chain. In 2022, supply chain CO_2e emissions amounted to 8.18M tons, decreasing 5% from 2019 values. However, the long-term target (2030) is to reduce CO_2e emissions in the supply chain by 45% per MWh generated.

Figure 21: Kg of CO_2 Emissions per MWh

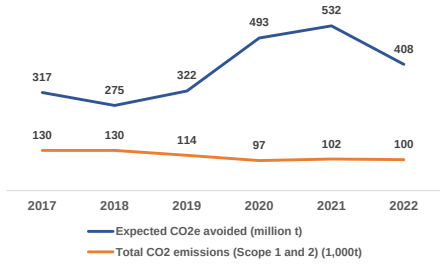


Source: Company Data

Zero-waste wind turbines | In 2021, Vestas launched the **Circularity Roadmap** (Appendix 11) and recycled 285 end-of-life blades. In 2022, the number of blades recycled had a 66.7% YoY increase, amounting to 475 blades. This higher value was due to internal waste programs implemented by Vestas to increase the recyclability of its turbines. The roadmap includes three main areas: i) Design for circularity; ii) Operational circularity; iii) Material recovery; and is expected to achieve its objectives by 2040. For 2022, **material efficiency improved by 20% YoY**, from 2.0 to 1.6 tons of non-recycled waste per MW produced and shipped (Figure 23). At the same time, **materials recycled increased by 5%.** The improved numbers are still not enough for total decarbonization, but the company seems to be making its best effort to achieve the 2040 targets.

As in the previous topic, Vestas is also committed to reducing 50% of the waste intensity of the supply chain until 2030. At 2022YE, 40 out of 48 suppliers had officially contributed to circularity commitments and were awarded a Vestas Supplier Certificate of Circularity Commitment.

Figure 22: CO_2 Emissions Avoided vs Total CO_2 Emissions



Source: Company Data

Life Cycle Assessment | To develop increasingly energy-efficient products, Vestas developed Life Cycle Assessments (LCA) (Appendix 2). The LCA provide an evaluation of the environmental impact of Vestas' products and activities, including

the electricity grid, the wind turbine itself, the foundation, the site cabling, and the transformer station.

Location Impact | Wind farms can have direct or indirect impacts on the environment, so the planning process of a wind plant must always include a location impact assessment. Those impacts can include: i) Landscape and visual impressions; ii) Flora; iii) Fauna (either birds, mammals or fish); iv) Noise; v) Shadows. Usually, those assessments are required by law. However, if that is not the case, Vestas or its customers have the responsibility of undertaking environmental assessments for their wind plants.

Biodiversity Preservation | Wind energy can negatively impact local biodiversity. Up until now, biodiversity was not a topic on the company's agenda. However, from 2023 onwards, Vestas plans to conduct a full biodiversity impact assessment of its operations and supply chain and create a designated biodiversity policy and monitoring program. By working with local agencies and regulations, Vestas intends to ensure new wind farms do not contribute to habitat loss or endanger threatened species. The largest impact on avifauna, is related to turbine construction. The direct collision of birds and bats with turbine blades can also occur, which can be reduced by sitting outside major migration corridors. In contrast, offshore wind turbines can help protect marine areas and the foundations can create artificial reefs, creating new habitats for marine species to colonize, and helping to restore the ecosystem.

3.3. Social

Vestas' social responsibility commitment is to become the safest, most inclusive, and most socially responsible company in the energy industry, while creating long-term shareholder returns.

Suppliers | The company **prioritizes local customers and suppliers** while **investing in local communities**, ensuring cultural diversity and allowing the company to support an extensive supply chain and customer network. As a pre-requisite for transaction with Vestas, and to keep up with the high quality of partnership with suppliers, new suppliers must commit to Vestas Supplier Code of Conduct (Appendix 12), which outlines expectations to suppliers in four main areas: i) Human Rights; ii) Working with Integrity; iii) Respecting the Environment; iv) Fair Business Practices. In 2022, Vestas conducted more than 3,200 due diligence assessments for potential suppliers, 28 sustainability audits and 55 onsite supplier assessments.

Communities | It is essential to build a foundation of community acceptance, and trust across operations, in order to prevent and agree on the most effective mitigation measures for the social impacts of the project. In 2022, 65% of qualifying projects have undergone Social Due Diligence (SDD), while the **number of beneficiaries reached 7,572**, a slight decrease compared to 7,977 in 2021. Vestas' projects focus on skills training, installing solar panels, repairing schools, and providing locals with cooking appliances (Appendix 13).

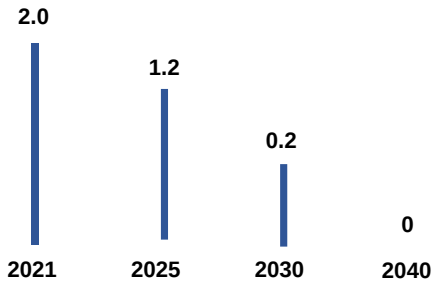
EthicsLine | Vestas has a global platform where employees, partners, or anyone associated with the company can report violations of laws, unethical behaviour or practices observed at work. Treated as strictly confidential and according to applicable laws, all matters are investigated thoroughly. In 2022, a total of **539 EthicsLine cases** were raised, leading to a 33% CAGR since 2018, with a value of 173 cases (Figure 24). On the one hand, this huge increase can negatively impact Vestas' ESG score, given that more violations are being performed daily. On the

Table 5: Supply Chain CO2e emissions in 2022

Description	2022 CO_2e emissions (1,000t)
Purchased goods and services	7,100
Capital goods	106
Fuel and energy related activities	25
Upstream transport and distribution	835
Waste generated in operations	15
Business travel	15
Employee commuting	66
End of life of sold products	15
Total	8,177

Source: Company Data

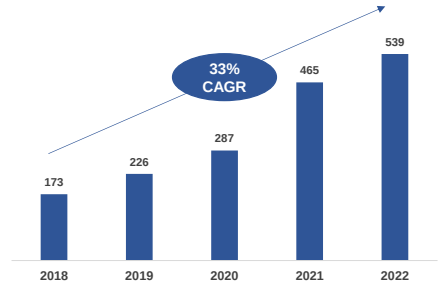
Figure 23: Material Efficiency Strategy



Metric: Tons of waste/MW produced and shipped

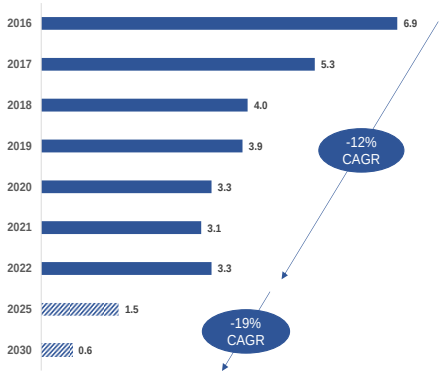
Source: Company Data

Figure 24: Number of EthicsLine cases



Source: Company Data

Figure 25: TRIR Evolution (per million working hours)



Source: Company Data

other hand, this higher value can also be perceived as a positive sign that employees and partners are aware of the platform, find it easy to use, and are not afraid to report non-compliant behaviour.

TRIR | Vestas' employees operate under the principle of safety first and the firm is committed to **reducing the Total Recordable Injury Rate (TRIR) to 0.6 by 2030**, leading to -19% CAGR since 2022 (Figure 25). Despite an increase in TRIR from 3.1 to 3.3 injuries per million working hours, in 2022, Vestas reduced its value by c.69% in the past decade and is committed to maintaining its progress and meeting the 2030 target. Also, in **Lost Time Injury Rate (LTIR) per million working hours, there was a slight increase from 1.0 to 1.2 injuries** (Figure 26). However, there were no employee fatalities. As a measure to prevent injuries, since 2007, Vestas runs a **safety awareness program** for employees and managers and has a **mandatory safety training** as part of the onboarding processes. Furthermore, the company has two programs – My Team My Responsibility and Vestas Behavioural Change – that encourage workers to identify problems and solve them as a team (employees, supervisors, and frontline managers).

Diversity, Equity, Inclusion, and Belonging | Concerning gender representation, Vestas has a **minority female gender ratio of 16%,** which has been steady throughout the years (Figure 27). In 2017, Vestas set a target to reach equal gender distribution in the BoD by 2021, which was not fulfilled. However, the percentage of women in leadership positions was already at 23% in 2022YE, turning its new targets viable to be achieved - 30% female representation in leadership positions by 2030, and 25% by 2025. **Vestas' employees represent 105 nationalities,** which has increased by 7% since 2021 (Figure 28). As ethnicity targets cannot be set, Vestas raises awareness through campaigns and initiatives that focus on ethnicity. For instance, they have partnered with The Professional Women of Colour Network, which is a non-profit organization that offers career and personal development opportunities for women of colour seeking to increase their visibility and impact in Denmark.

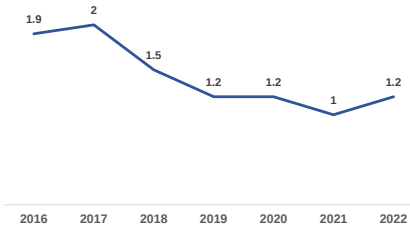
3.4. Governance

The company is regulated according to **Danish law**, and it is structured based on a two-tier BoD and executive management (Figure 29). This structure provides a clear, transparent, and effective separation between the responsibilities of the Board and the Executive Management Team. These bodies are responsible for the company's management, which is governed by the company's Articles of Association and the Danish Companies Act.

Vestas' global operating model (Appendix 14) is structured in a two-dimensional matrix. On one side, the global functions, each headed by a member of the Executive Management Team, and on the other side, Vestas Regions - Mediterranean, Latin America, North America, Northern & Central Europe, and Asia Pacific. The decentralized structure with regional teams helps create a globally aligned organization, which can meet the requirements of local and global customers.

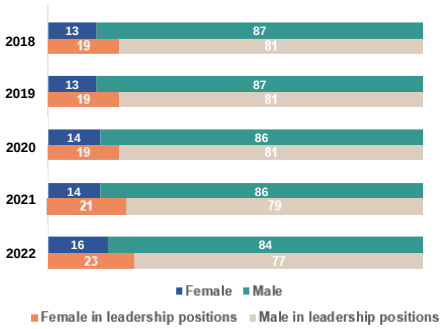
Culture of Integrity | Audit Committee is responsible for monitoring, promoting, and assessing the culture of integrity. Vestas has an Anti-Bribery and Corruption Compliance Program to ensure the implementation of necessary actions when deficiencies are identified.

Figure 26: LTIR Evolution (per million working hours)



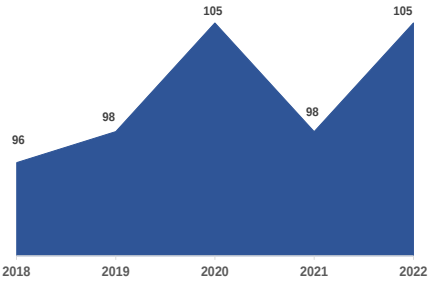
Source: Company Data

Figure 27: Gender Diversity (%)



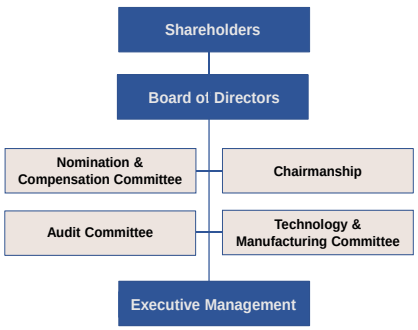
Source: Company Data

Figure 28: Number of Nationalities



Source: Company Data

Figure 29: Corporate Governance Structure



Source: Company Data

4. Industry Overview and Competitive Positioning

4.1. Global Economic Outlook

The past 4 years have been characterized by two major shocks in the global economy. The economic fallout from **Russia's invasion of Ukraine** was a massive setback, not only to Ukraine, but to the global economy. It led to an energy crisis, record-high commodity prices, weaker economic growth, and high inflation (Appendix 15) in a world that was still recovering from the **COVID-19 pandemic**. The average global cost of living has risen more in the 18 months since the beginning of 2021 than it did during the preceding 5 years combined (IMF). **Food and energy were the main drivers of this inflation.** However, the components of inflation have slightly changed, with food's share increasing significantly while energy-related categories decreased.

Market Overview

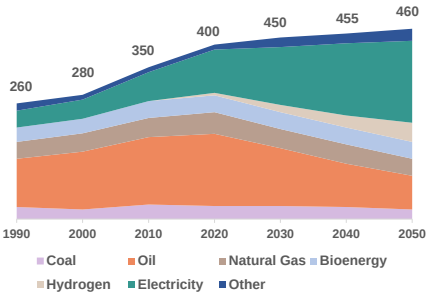
The world is in the midst of an **energy transition** that continues to accelerate. Despite the rapid population growth, energy consumption is projected to grow by only 14% by 2050, when compared with 2019 levels. Global fossil-fuel consumption is projected to peak in the next decade (Figure 30), as renewable electricity and hydrogen replace coal, oil, and gas in the mix.

Electricity Demand | Despite the global energy crisis triggered by Russia's invasion of Ukraine, world electricity demand remained resilient in 2022. It rose almost 2% compared with the 2.4% average growth rate seen over the period 2015-19. That increase was mainly led by the rapid spread of electrification of the transport and heating sectors, with record numbers of electric vehicles and heat pumps sold. Nonetheless, in **the EU, as it was particularly hard hit by energy prices, electricity consumption recorded a sharp decline of 3.5% YoY in 2022.** According to IEA, as the energy crisis abates, global electricity demand growth is set to rise from 2.6% in 2023 to an average of 3.2% in 2024-25. However, more than half will come from China, followed by India and Southeast Asia – together will account for more than 70% of the growth in global electricity demand in 2025. In the EU, demand is forecasted to grow by c.1.4% in 2023-25, while in the USA it's going to grow less 20bps than in the EU (Figure 31).

Global Energy Mix | In 2022, renewables rose 5.7% YoY, making up almost 30% of the energy generation mix. **According to IEA, renewables are projected to reach over one-third of the global mix by 2025** (Figure 32), a 9% annualized growth, **with most of the increase coming from solar and onshore wind** (Figure 33), due to competitive costs and government pledges to increase spending on renewables as part of economic recovery plans. Along with renewables, hydrogen demand is projected to grow fivefold by 2050, driven primarily by road transport, maritime, and aviation. Nuclear output is expected to grow by 3.6%/year until 2025, making low-carbon generation sources (renewables and nuclear) account for more than 90% of the additional electricity demand over the next 3 years. When it comes to fossil fuels, oil and coal demand is projected to peak in the next 5 years, and gas remains the most resilient fossil fuel.

CO2 emissions | The energy sector is one of the largest contributors to carbon dioxide emissions. In Figure 34, it is possible to notice an increasing trend of CO_2

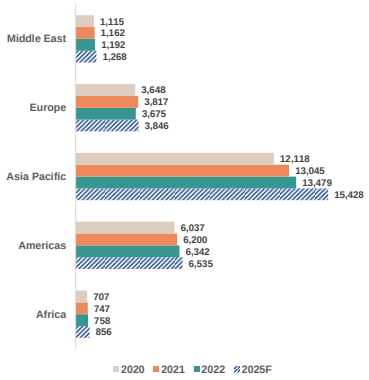
Figure 30: Final Energy Consumption by fuel (Mn TJ)



Source: McKinsey

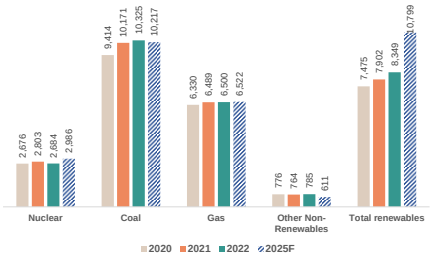
Note: Not at scale.

Figure 31: Electricity Demand by Region (TWh)



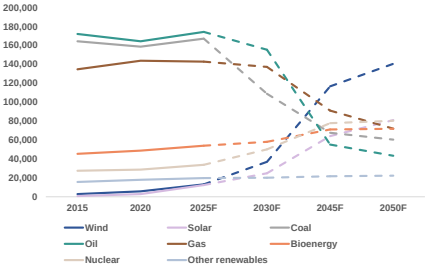
Source: IEA - Electricity Market Report 2023

Figure 32: Electricity Generation by Source (TWh)



Source: IEA - Electricity Market Report 2023

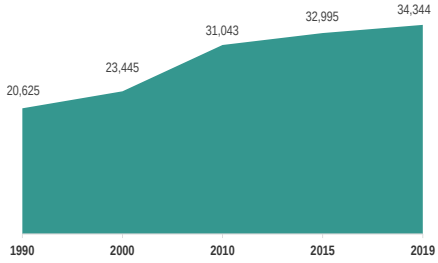
Figure 33: Primary Energy Consumption by Fuel (TJ) – Net Zero Scenario



Source: BNEF – New Energy Outlook 2022

emissions from 1990 to 2019, giving a +1.77% CAGR through this period. With COVID-19, global CO_2 emissions dropped c.5% in 2020. However, emissions have already rebounded – increased by 4% – and are back to pre-COVID-19 levels. It was mainly due to the growth in fossil-fired generation in the Asia Pacific region. Indeed, IEA estimates that **Asia Pacific will account for 67% of global power sector emissions in 2025**, and the CO_2 intensity of global power generation will decline on average by 3% per year. Nonetheless, the decline is not sufficient, remaining far from the required to achieve the 1.5ºC Pathway, as was seen at COP27, even if all countries deliver on their current commitments. Major economies are implementing new policies and regulations to mitigate the energy crisis, with a total of 68 countries (88% of global emissions) committed to net-zero plans. By 2050, McKinsey projects emissions to be 30 to 70% below those in 2019.

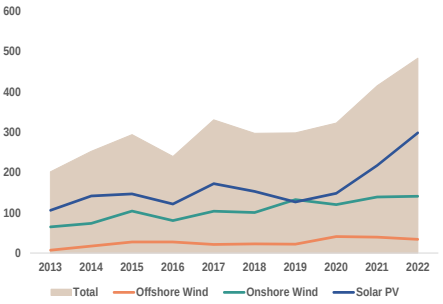
Figure 34: Global Historical CO2 Emissions (Mt)



Source: World Bank

Global Investments | During 2013-2022, **solar PV and onshore wind** attracted, respectively, **46% and 32% of global renewable energy investments** (Figure 35). By 2022, solar and wind technologies increased their proportion of investments to 95%. Indeed, BNEF estimated that the need to accelerate green power deployment has attracted solid investments of $3.1-5.8tn/year over the subsequent 30 years from both corporations and governments. Additionally, the volume of corporate PPAs for renewable solutions increased to 31.1GW in 2021 (+49% CAGR in 2017-21FY), with 65% of this activity in the Americas. In Europe, prices have increased 7.2% on average since 2H 2021 (Figure 36).

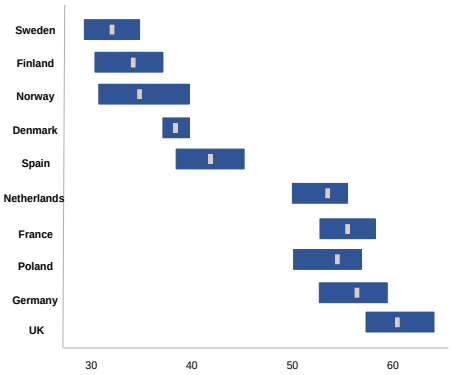
Figure 35: Global Annual Investments in Renewable Energy ($Bn)



Source: IRENA

M&A Trend | Renewable energy **M&A activity** has maintained a **steady rise in volume since 2010** (Figure 37). Much of it is being driven by traditional energy businesses that want to acquire new capabilities. However, new players **like oil and gas companies** are also starting to **get into renewables** to pursue new capabilities and expand their value chain positions. Europe is the region where a higher number of deals is occurring, with about 40% of them happening over the past 4 years. Due to the clear signs of imminent recession, high inflation and overall geopolitical uncertainty, M&A activity experienced a decrease in 2021. Nevertheless, as decarbonization becomes increasingly urgent, the players which intend to increase their installed capacity in the following years, must add M&A activity to their strategy so that the carbon neutrality targets are achievable. As a result, robust M&A activity appears to be here to stay for the foreseeable future.

Figure 36: Onshore Wind Pricing by Country, H1 2022 (EUR/MWh)

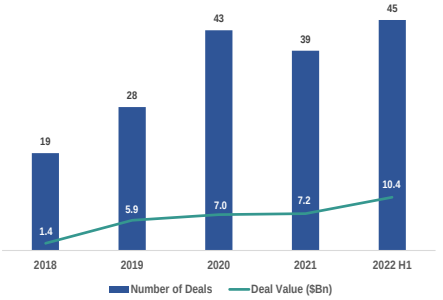


Source: BNEF
Note: Not at scale.

Industry Structure | The market structure is characterized by an **oligopoly**, composed of a small group of large players. None of them has more than 20% production market share, so no player is capable of influencing energy prices (Figure 38). However, among the top ten, Vestas stands out in second place, with 12.3GW of commissioned projects in 2022, with just 0.4GW separating it from the player in the first place.

4.2. Demand Drivers

Figure 37: Acquisitions of Wind and Solar Developers



Source: McKinsey

Worldwide Green Trends | The current commitments between countries to the Paris Agreement and legislation pushing for carbon neutrality and energy transition set a very good perspective for the renewable energy sector in the long term. Creating a sustainable world requires a shift to zero-carbon energy sources in energy system sectors – power, industry, transport, and buildings – and special incentives for major electricity consumers. The US Inflation Reduction Act approved $430bn new green energy subsidy package and offered tax breaks for components used in renewable energy technologies. **In the EU, subsidies for renewables rose by 15%, reaching €81bn in 2020.** However**, in 2021, it fell to €78bn, a -3.5% rate,**

owing to increasing wholesale electricity prices (Figure 39). At UN Climate Change Conference COP27, all countries were required to make an extra effort to address the climate crisis, despite the difficult job of reaching 1.5ºC.

Declining Costs | Amid the energy crisis and rising commodity prices in 2021, the cost of clean energy continues to fall significantly (despite a temporary increase in 1H22 due to the inflation experienced). Indeed, the projected growth in global installed capacity combined with technological development, supply chain integration, and economies of scale is positively impacting the cost of onshore wind and solar PV, the cheapest forms of electricity generation (Figure 40). The global weighted average **LCOE of these technologies dropped by 88% and 68%, respectively, between 2010-21FY.** The emerging offshore wind sector is currently costlier. However, as it expands, it must become cost-competitive with both previous alternatives over the next decade. In parallel with a complex energy market, RES auctions (conducted by multiple players) continue to reveal a competitive price **and renewables hybridization seems to be a long-term key to cost efficiency, promoting a steady electricity supply.** For instance, wind and solar strongly depend on weather conditions, which makes them almost mutually exclusive, since both need a specific climate to reach their maximum potential. Furthermore, their combination could reduce quarterly volatility by more than 50%, according to WEF.

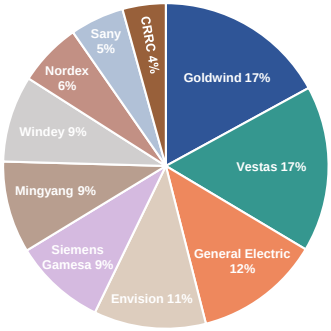
Offshore Expansion | Despite **offshore wind turbines** facing more problems – requires higher durability, energy transportation, and installation costs – they also **provide faster long-term returns** as they have a bigger turbine size and higher wind speeds than onshore. Due to its potential, more companies have targeted offshore turbines to invest in. According to GWEC, offshore wind annual installed capacity is expected to reach 36GW in 2027 (Figure 41). **Technological progress is boosting the outlook for offshore wind** since there are newer turbines that can be installed in floating foundations and for water depths of 1,000 meters and beyond. This advancement increases the viable sea areas for offshore by a factor of 5. Additionally, excess offshore wind capacity can also serve as an alternative fuel source for hydrogen electrolysis. In Denmark, a project to construct an offshore hub with up to 10GW of capacity that, using on-site electrolyzers, can store electricity and produce green hydrogen was approved. As a result of these advancements, its LCOE is falling substantially, from €150/MWh in 2015 to a projected less than €50/MWh in 2024 (Figure 42).

4.3. Supply Drivers

Wind Capacity | In 2021, wind electricity generation reached the highest growth among all renewable power technologies – 17% YoY. **The total installed wind capacity in 2022 was 906GW,** with 9% YoY growth. According to GWEC, **onshore** will increase its capacity by **12% CAGR** in the next five years, with average annual installations of 110GW. The **offshore** wind market is expected to grow from 8.8GW in 2022 to 35.5GW in 2027, adding **130GW of cumulative wind** in the next five years worldwide. By 2025, offshore wind will install more than 25GW in a single year, and will increase rapidly after that, due to green energy and climate targets (Figure 43). In Denmark, wind and solar PV make up more than 60% of the total generation capacity, whereas in the world, it remains below 25%.

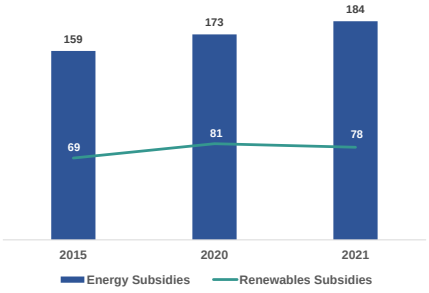
Innovative Technology | The renewables sector is heavily dependent on the efficiency of production equipment, such as wind turbines and solar PV's. **Technological improvements and investment** will play a very important role in the next years in order to achieve **more efficient farms** and a larger energy output,

Figure 38: 2022 Top 10 Global Wind Turbine Manufacturers



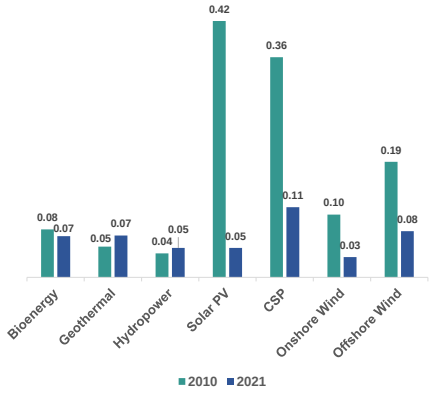
Source: BNEF

Figure 39: Energy Subsidies in the EU (€Bn)



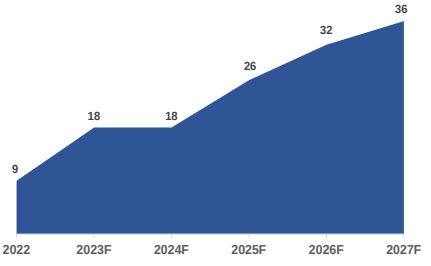
Source: European Commission

Figure 40: LCOE by Technology ($/kWh)



Source: IRENA - Renewable Power Generation Costs in 2021

Figure 41: Annual Offshore Wind Installations (GW)



Source: GWEC - Global Wind Report 2023

increasing cash flows for the players and the weight of renewable energy consumed worldwide. Most technological advancements come from increasing the rotor diameter and hub height of the turbines. Repowering old wind farms is an effective method of replacing old technology in sites with above-average wind resources, effectively increasing operating margins. The service segment is also becoming increasingly reliant on technology and predictive analytics to lower maintenance costs and increase turbine availability.

Barriers to Entry | The **large investment**, as well as the specialization required to enter the turbine manufacturing industry make it unfavourable for new competitors to enter. Also, inflation and the effects of the Russo-Ukrainian war have pushed up prices for key raw materials like steel, increasing turbine manufacturing costs. However, the industry's growth prospects are attracting more companies with adjacent capabilities, like **utilities, oil majors,** and other large capital project developers. According to BNEF, oil and gas companies are expected to engage in more joint ventures and acquisitions in the offshore wind market, due to the pressure to decarbonize. Also, offshore wind allows those companies to contribute with GW of clean energy with a single project, at the same time that leverage their expertise in maritime development.

4.4. Competitive Positioning

Peers Identification | According to BNEF, the top three spots by commissioned wind capacity in 2022 are filled by companies from **China, Europe, and the USA**, namely **Goldwind, Vestas and General Electric**, respectively (Figure 44). However, to conduct a deeper analysis and selection of peers, the Sum of Absolute Rank Differences (SARD) approach (Appendix 16) was followed. Vestas' peer group includes Nordex, Siemens Energy, First Solar, General Electric, and finally, Goldwind. (Figure 45).

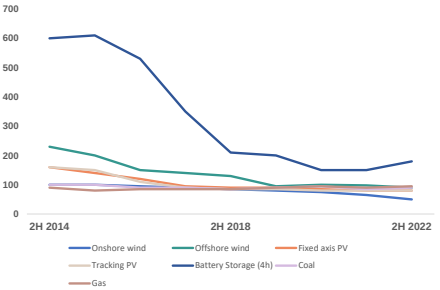
Porter's 5 Forces

Bargaining Power of Suppliers - Medium (3) | To become a Global Leader in Sustainable Solutions, it is crucial to have a professional supplier network that delivers on time and with the right quality standards. Having this in mind, suppliers are a key area for success, so despite the existence of many supplier options, the company intends to **establish long partnerships with suppliers** that share the same objectives and values, which reduces its exposition to suppliers bargaining power (Figure 46). For instance, in August 2022, Vestas signed a contract with KK Wind Solutions that will exclusively supply converters and control panels to Vestas.

Bargaining Power of Customers – Low (2) | As there are **few wind turbines original equipment manufacturers**, and **service contract lengths lock in customers**, their bargaining power seems to be reduced. Also, Power Purchase Agreements (PPAs) fix contracts for the long-term, also reducing consumers' power (Figure 47). Furthermore, Vestas' **superior technology** can make customers prefer Vestas' products rather than competitors.

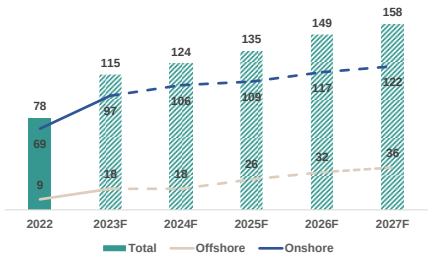
Rivalry among competitors – Medium (3) | In the renewable industry, there are five major players (by capacity): Vestas, Siemens Gamesa, General Electric Renewable Energy, Goldwind, and Nordex. Therefore, the number of competitors is relatively small, and each company has already their market share established within the market. Nevertheless, it makes sense to consider competitors producing other energy sources like oil and gas companies, as renewables are still in a development phase and cannot be used exclusively to power an entire country. This way, fossil

Figure 42: Global LCOE Benchmarks ($/MWh)



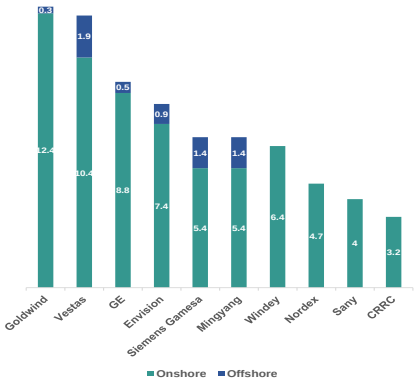
Source: BNEF

Figure 43: Wind Installed Capacity (GW)



Source: GWEC - Global Wind Energy Report 2023

Figure 44: 2022 Wind Installed Capacity by Company



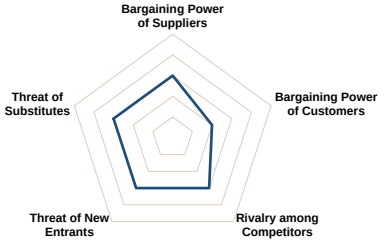
Source: BNEF

Figure 45: Peers according to SARD

Company Name	SARD	Rank
Vestas Wind Systems A/S	0	0
Nordex SE	16	1
Siemens Energy AG	17	2
First Solar	17	2
General Electric	18	4
GoldWind	21	5

Source: Companies' Data and Author Analysis

Figure 46: Porter's 5 Forces



Source: Company Data and Author Analysis

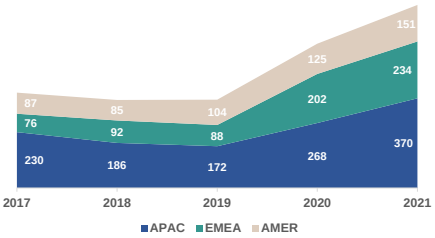
fuels are going to be part of energy generation for the foreseeable future, threatening renewable sources and increasing the intensity of rivalry while these do not fully develop.

Threat of new entrants – Medium (3) | High investments in technology and R&D and the consequent **high capital requirements** make energy generation a business where the threat of new entrants is relatively low. Additionally, there's the need for highly specialized employees, engineers and specially trained technicians, not only to deliver the best products and service, but also to prevent injuries. However, not only are there **more incentives and subsidies** to participate in the industry, but **oil and gas companies** are compromised to reduce their polluting activities and diversify to the renewable sector. As the latter already have incurred high initial investments, it makes it easier to bet on renewable products.

Threat of Substitutes – Medium (3) | Wind energy has direct competition with solar, natural gas, and nuclear power, leading to competition for the lowest LCOE among the different sources. However, as the world urges for decarbonization, those sources will be needed as **hybrid solutions** to allow a more consistent and predictable power production. Moreover, on 1H 2022, two-thirds of the global population lives in a country where either onshore wind or solar is the cheapest source of electricity generation (Figure 48).

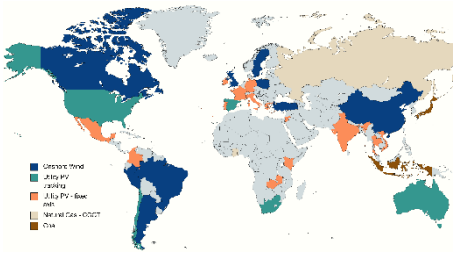
To further enrich the analysis, SWOT is presented below (Figure 49), and PESTEL can be found in Appendix 17.

Figure 47: Global Corporate PPA Volume (GW)



Source: BNEF

Figure 48: Lowest LCOE per Country (1H 2022)



Source: BNEF

Figure 49: SWOT Analysis

Strengths	Weaknesses	Opportunities	Threats
• Strong Global Presence (88 countries) • Superior Technology (R&D) and solutions that provide a lower Cost of Energy, and modularization • Strong customer and supplier relationship • Strict Pricing Discipline • Integrated Supply Chain • Strategic Agreements and partnerships with suppliers • Low CO_2 Emissions	• Limited spatial opportunities • Impact on wildlife and humans • Energy Production is heavily reliant on weather conditions	• Technological developments in the storage sector • Decarbonization targets increase demand for renewable solutions • Investors place more emphasis on ESG standards • Coal and nuclear phase-out	• Other renewable substitute products – increasing competition • Prices Volatility • Protests in certain areas against onshore and offshore wind farm buildings • Complicated and lengthy bureaucratic procedures • Difficult to enter the Chinese Market • Wind OEM still look for government incentives

Source: Author Analysis

5. Investment Summary

Vestas' recommendation is to **BUY**, with a price target of 26.59€/share for 2023YE, according to DCF Method. With **medium risk**, Vestas' recommendation represents an upside potential of 18% from the June 30th, 2023, closing price of 24.36€/share (Figure 50).

Vestas is the industry's global leader in sustainable energy solutions. The company focuses on two segments: Power Solutions and Service. By default, it is already contributing to a sustainable world. Nonetheless, the company looks for improvements in its own sustainability performance, by using its technological expertise to increase its capabilities around recycling turbines, or even using electrical vehicles for the Service segment, as well as sustainably fueled offshore service vessels. Nowadays, Vestas uses **100% of renewable electricity for their activities.**

In terms of financials, **2022 was a challenging year for Vestas** (Figure 51). High commodity prices, high inflation and supply chain disruptions led **Vestas' results to negative values.** The service segment had 27% revenue growth, offsetting partly the power solutions decrease. As a measure to mitigate the geo-political uncertainty, and consequently, the impact it had on both deliveries and order intake, Vestas increased its average selling price. To reduce costs, and being able to have better results, the board decided not to propose any dividends for 2023F.

Vestas is characterized by its **highly integrated supply chain, innovative technology** that keeps the company ahead of competitors, and **offshore expansion** that is expected to materialize by 2025F, reducing long-term costs, and increasing capacity output and profits. Nevertheless, despite fast progress over the past few years, renewables are still an emerging industry, that needs a rapid maturation to face a growing demand. Heavy investment is still needed so that renewables can become a major source of power generation. In particular, smarter grids, and power storage require further developments to meet the high demand that the climate crisis created for sustainable sources. In addition, governments, and countries, must make it easier and faster to deal with procedures. Currently, permitting processes take a long time, delaying the construction of wind farms.

For the forecasted period (2023-2027), it is expected that revenues will increase by almost double what it had in the period 2017-2022, with a particular emphasis on offshore expansion. The new 15MW turbine (implemented in 2022) is expected to be commercially attractive for customers, due to its innovative characteristics. Therefore, it is expected positive results for Vestas' profitability during the forecasted period, even with slow but consistent increases in net income.

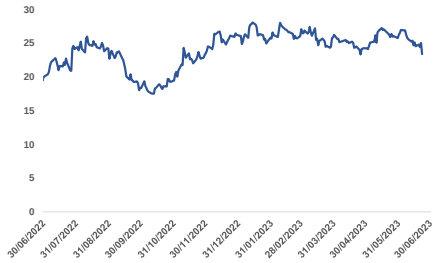
Valuation Methods

The **DCF Model** was chosen has the **principal method**, reaching a value per share of 26.59€ (Figure 52), by discounting the integrated FCFF at the Weighted Average Cost of Capital rate. However, other absolute methodologies were computed, including **Flow to Equity, and APV.** In terms of relative valuation, the **multiples approach** was also computed to further enrich the analysis.

Investment Risks

Buying Vestas carries different risks that investors should be aware of (Figure 53). As oil & gas majors start to take on renewable projects, competition increases, and **OEMs must develop themselves** and present **innovative products** and **services**. The stock price is very sensitive to commodity prices and supply chain disruptions, as it can dictate negative results for the company.

Figure 50: 52-Week Stock Price (€)



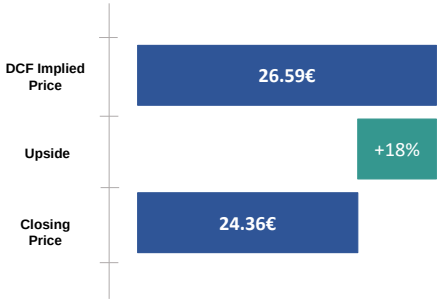
Source: Yahoo Finance

Figure 51: Key Financial Figures

Key Financial Figures (mEUR)	2021	2022	2023F	2027F
Revenue	15,587	14,486	15,702	28,701
EBIT	289	-1,596	951	1,739
Net Income	143	-1,572	648	1,305
CAPEX	1,006	948	989	1,586
Depreciation & Amortisation	921	899	953	1,155
Net Interest Bearing Debt	1,200	46	920	2,641
EPS (EUR)	0.2	-1.6	0.6	1.29
DPS (EUR)	0.05	0	0.2	0.32
Number of Shares		1,009,867,260		

Source: Company Data and Author Analysis

Figure 52: Vestas' 2023YE Price Target



Source: Author Analysis

Figure 53: Investment Risks Summary

Investment Risks	Classification
Operational Risks	
Supply Chain Disruptions	High
Cyber Risks	Low
People Risks	Low
Health Risks	High
Technological Advacements	Medium
Social and Environmental Risks	
Climate Risks	Low
Pandemic Crisis	Low
Regulatory and Political Risks	
Regulatory Pace Risk	Medium
Geopolitical Environment	Medium
Market Risks	
Currency Exchange Rate Fluctuations	Medium
Commodity Prices	Medium

Source: Author Analysis

6. Valuation

To perform Vestas Wind Systems Valuation, the **Discounted Cash Flow (DCF)** Model was followed, as it incorporates the high future growth prospects that the company, and the overall renewable energy industry face, regardless of its capital structure. In addition, to complement DCF, other methods like the adjusted present value (APV) approach, flow to equity, and relative valuation were performed. To confirm the robustness of the DCF and to incorporate risks in the analysis, it was elaborated a sensitivity analysis, scenario analysis and a Monte Carlo Simulation – more information in Investment Risks Section.

Revenue Forecast

Vestas' **power solutions revenues** forecast is based on a top-down approach. Firstly, forecasts on global wind capacity were taken from the Global Wind Energy Council, both for cumulative wind capacity based on current growth rates and based on the Net Zero Scenario by 2050 (Figure 54). It is relevant to use both projections as it is likely that neither forecast is completely accurate. Then, it was considered the company's market share on that global average capacity, which is expected to remain stable for 2023F-27F, as in previous years. Using that percentage, c.18%, it is possible to obtain the value of **deliveries** of the company, both for onshore and offshore and multiply those values by its respective average selling prices (ASP). Vestas recently launched a new offshore turbine, that is expected to gain traction in the market by 2025, leading to a higher percentage of offshore in that time and onwards.

According to Fitch Ratings, the **ASP** is not expected to have significant increases further in 2023, as inflation moderates. Also, renewables, especially wind and solar, are expected to see a decline in their prices so that they can become even more cost competitive, as well as be able to face the prices of Chinese OEMs. Furthermore, it should be noticed that Vestas' ASP has been quite steady throughout the years. However, in 2021 and 2022, it became more volatile, as external conditions also impacted the company unexpectedly. Consequently, as there was not enough evidence about how prices would fluctuate in the future, it was assumed that the average selling price of both offshore and onshore should decrease to the lowest value already practised by Vestas, returning to a stable trend (Figure 55).

The **service segment revenue** was forecasted with its **MW under service** (volume) and the historical ASP of the service segment (0.02€/MW) as well as a **static rate for competitors' turbines** (Figure 56). The price is based on historic revenue/MW under service, as it was stable throughout 2017-2022.

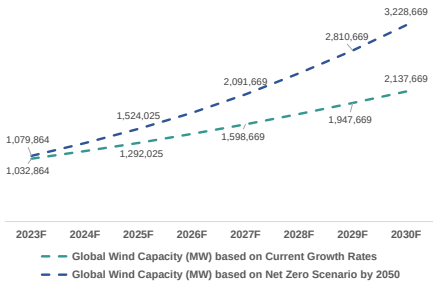
Revenue is expected to grow at c.16.2% CAGR between 2023F and 2027F, mainly due to offshore expansion worldwide (Figure 57).

CAPEX

Renewables are a capital-intensive industry, so it is worth noticing that expected CAPEX must increase as sales and output increase. Therefore, the forecasted **CAPEX is in line with the forecasted Power Solutions Deliveries** (Figure 58). For 2023F, capital expenditure is €989M, verifying Vestas' expectation of spending c.€1Bn in Total Investments (note that it excludes acquisitions of subsidiaries, joint ventures and associates, and financial investments).

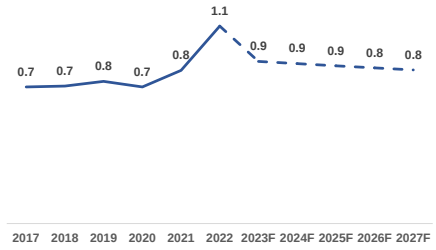
For more information on valuation, please refer to Appendix 18, as there is an explanation of the assumptions for relevant variables. For financial statements

Figure 54: Global Cumulative Wind Capacity (MW)



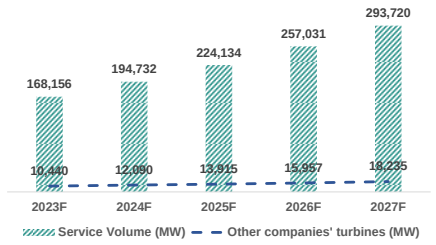
Source: GWEC - Global Wind Energy Report 2023

Figure 55: ASP (€M/MW)



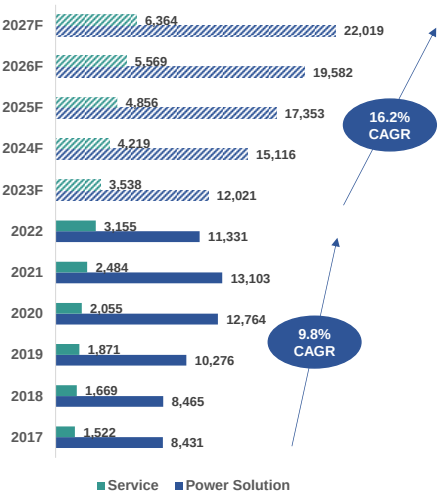
Source: Company Data and Author Analysis

Figure 56: Service Volume (MW)



Source: Company Data and Author Analysis

Figure 57: Revenue Projections (€M)



Source: Company Data and Author Analysis

forecast and common-size, please refer to Appendix 19, Appendix 20, Appendix 21, Appendix 22, and Appendix 23.

Discounted Cash Flow Valuation

DCF methodology was the principal model to arrive at the intrinsic value of the company, with a forecast period of 2023 until 2027. As Vestas does not disclose financial information for each segment (only revenues), a simple DCF was preferred to the sum of the parts approach. The target price is 26.59€, leading to a BUY recommendation (Appendix 24).

WACC | Vestas estimated **WACC** is 6.8% (Figure 59), with a target capital structure for the forecasted period of 30% debt and 70% equity. The **cost of equity** (8.2%) was calculated with the CAPM formula, reflecting Denmark's equity risk premium (5.94%), the country's risk-free rate, and the Blume adjusted levered beta (0.97). The latter was performed through a linear regression between the weekly returns for 5 years of Vestas and the returns on the STOXX Europe 600 index, of which Vestas is part of (Appendix 25). Furthermore, it was also performed the pure-play method (Appendix 26), validating the chosen beta for Vestas. Following the rationale of Damodaran and correcting beta for cash, we get a levered beta of 0.96.

As the company reports on Euro currency, the risk-free rate was estimated by taking the lowest yield on 10-year government bonds of euro-currency countries, arriving at a value of 2.40%, according to 10Y Bund. The **cost of debt** was achieved by adding Vestas' debt rating implied corporate spread to the risk-free rate, achieving a value of 4.4%.

Terminal Growth Rate | According to real GDP growth and long-term inflation objectives in Vestas' core markets, the terminal growth rate should stabilize at 2.2% after 2027. Nevertheless, renewables seem to be at the early start of their expansion, which can lead to an upside value for the growth rate, and consequently, to appreciate share price.

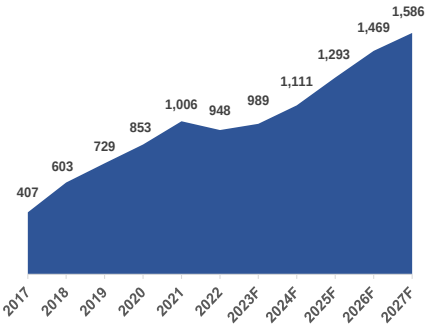
Other Methods

Flow to Equity | Flow to Equity approach was conducted, using the cost of equity and FCFF computed for the DCF. This model results in a price target of **25.97€/share** (Figure 60), providing a hold recommendation (Appendix 27). Due to the high cost of equity (8.2%), the price target according to FCFE is lower than in the FCFF method.

Adjusted Present Value (APV) | After prior years with stable D/E values (Figure 61) in 2022, this ratio had a significant increase. This way, APV turns out to be a relevant method as it considers the benefits of raising debt. Discounting both FCFF and Interest Tax Shield with unlevered cost of capital, APV points to a price target of **25.72€/share**, resulting in a hold recommendation (Appendix 28).

Multiples Valuation | The relative valuation was conducted with similar listed companies according to their business characteristics, despite some of them delivering different products from Vestas. For instance, solar photovoltaics panels and green technology companies were considered, as Vestas is an industry leader in technological capacity and innovation. As the recommendation stands for 2023F, Price and Enterprise Value Multiples were performed for that date. EV/EBITDA, EV/EBIT, EV/Sales, Price/Earnings, Price/Sales, and Price/Book Value of Equity were the ratios performed to evaluate Vestas (Appendix 29). Between those multiples, it was chosen the ones that had a ratio value closer to Vestas. EV/Sales and Price/Sales were the ones closer, implying an average target price of 25.69€. Therefore, multiples approach also produces a hold recommendation.

Figure 58: CAPEX (€M)



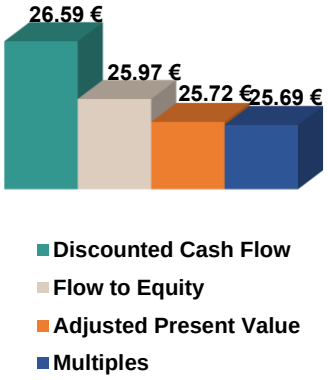
Source: Company Data and Author Analysis

Figure 59: WACC Inputs

WACC Inputs		
Input	**Rate**	**Source**
Risk free Rate	2.4%	10y Germany Government Bonds
Beta	0.97	Blume-adjusted
Market Risk Premium	5.9%	Denmark (Damodaran)
Cost of Equity	8.2%	CAPM
Cost of Debt	4.4%	Corporate bond spread+risk free rate
Tax Rate	22%	Denmark Statuatory Tax
D/E Ratio	30%	Target Level
WACC	**6.76%**	

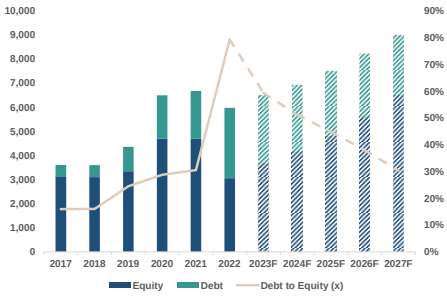
Source: Author Analysis

Figure 60: Valuation Methods Implied Price



Source: Author Analysis

Figure 61: Vestas' Capital Structure (€M)



Source: Company Data and Author Analysis

Author vs Consensus

Consensus' average target price stands at 29.34€. However, the average target price for a buy recommendation is 34.54€ with an annualized upside of 83%. (Appendix 30). This means that the author's recommendation is aligned with 13 out of 34 analysts (Figure 62).

Figure 62: Analysts' Consensus

Recommendation	# of Analysts	Average Price (EUR)
Buy	13	34.54 €
Hold	15	27.48 €
Reduce	3	23.91 €
Sell	3	21.50 €

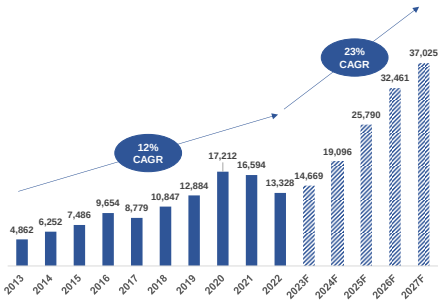
Source: Bloomberg and Refinitiv

7. Financial Analysis

For more information, please refer to Appendix 31

2021 and 2022 were years characterized by **lower economic activity, geo-political uncertainty, and an increase in inflation**. COVID-19 and the Russia-Ukraine war impacted the global economy and several enterprises around the world. The wind energy industry is still recovering after a drop of about 15% in global capacity (Figure 63). Developers added 80GW of wind turbines globally last year compared to almost 100GW in 2020 and 2021. Therefore, Vestas' performance was negatively impacted. That decline is visible on the 2022 company's ratios when comparing values prior to 2021.

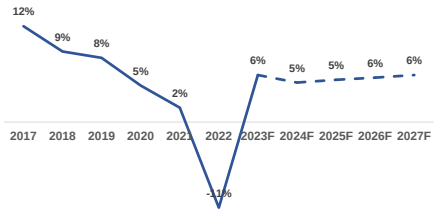
Figure 63: Deliveries (MW)



Source: Company Data and Author Analysis

2022 Weak Profitability | **Power Solutions Revenue saw a 14% YoY decrease**, mainly due to offshore project delays. Nevertheless, service revenues partly offset that decrease by experiencing a higher value of about 27%, driven by onshore activity including transactional sales and indexation uplifts. In 2019 and 2020, Vestas outperformed its competitors in most operational margins – EBITDA Margin, EBIT Margin, and Net Income Margin. Nonetheless, by 2022, those margins significantly decreased, as Vestas' deliveries saw a 20% YoY decrease, corresponding to -7.1%YoY on revenues. At the same time, they were hit by inflation, and rising costs of shipping and key materials. **EBIT Margin**, for instance, had a **sharp decline to -11% in 2022**, as SG&A costs increased, and higher warranty provisions and offshore impairments took place. However, for the foreseeable future, it is expected to stabilize at pre-pandemic levels, recovering to 6% in 2027F (Figure 64), as **modularization synergies with offshore and onshore materialize and the world tensions start to calm down**. In fact, for Q1 2023, Vestas already achieved a positive EBIT of €66m, after €-894m in Q1 2022.

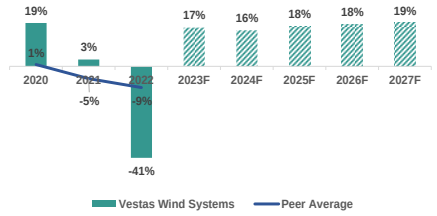
Figure 64: EBIT Margin (%)



Source: Company Data and Author Analysis

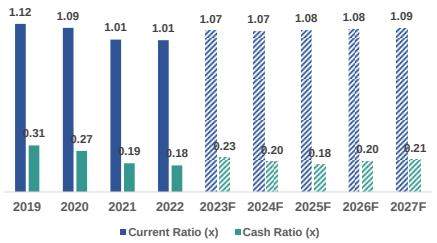
Historically Higher Value Creation than Peers | Historically, **ROE and ROA** had the same trend as profitability ratios. Despite strong ratios historically, in 2021, a decrease of 84% YoY for both ratios was driven by higher R&D and SG&A costs of the inclusion and integration of the Offshore business. By 2022, a reduction was again observed, reaching a negative value on net profit, despite higher electricity prices and wind turbines' output (Figure 65), emphasizing again the impact of economic disruptions on Vestas' business. Nevertheless, in Q1 2023, Vestas is already proving its capacity of recovering, so it is **expected both ratios to turn again to positive values, with the highest increase YoY in 2025**, **as offshore gets a higher share in the company's revenues.** Even though Vestas experienced a high decrease in 2021, the company was still able to be above its peers' average (3% vs -5%), as most showed a negative net income. Also, according to **ROIC**, Vestas consistently showed **better results than its competitors**. In 2019, Vestas had a value of 19% (vs 2% peer average), significantly higher than WACC, showing its capacity to **allocate capital to profitable investments** – innovative technology. These high and persistent levels of ROIC show Vestas' ability to build a competitive advantage, namely the modularization of turbines.

Figure 65: ROE (%)



Source: Companies' Data and Author Analysis

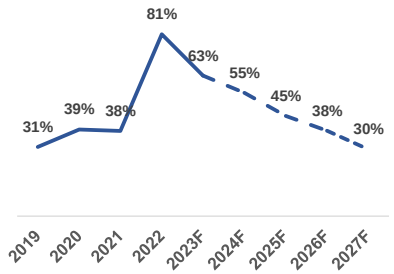
Figure 66: Current and Cash Ratio (x)



Source: Company Data and Author Analysis

Low Liquidity Levels | **Vestas has been historically below its peers' average, either for current, quick, or cash ratio**, and decreases its values on -3%, -8%, and -17% CAGR, respectively, from 2019 until 2022. However, for the **current ratio**, Vestas still maintained a **value higher than 1**, which is a positive sign regarding Vestas' liquidity (Figure 66). Nevertheless, Vestas' ability to pay its short-term liabilities does not seem to be on the right track, when observing both the stand-alone value of its ratios, and in comparison with competitors, which have been increasing their ratio values. For example, the cash ratio saw a decline of 0.31 in 2019 to 0.18 in 2022, whereas the peers' average increased from 0.50 to 0.98 in the same period.

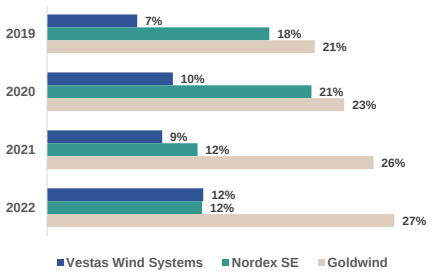
Figure 67: Debt-to-Equity Ratio (%)



Source: Company Data and Author Analysis

Stronger Ability on Leveraging | Wind turbine manufacturers require heavy investments. Nonetheless, **Vestas' capital structure has been very robust historically** (2019-2021), with an average **Debt-to-Equity Ratio** of c.36% vs peers' average of c. 79%. In 2022, the company's leverage increased significantly to 81%, due to the issuance of **sustainability-linked bonds**. In H1 2022, Vestas secured €1.5bn of LT funding by issuing two €500m sustainability-linked bonds and a €475m green loan with the European Investment Bank (EIB) – Highlighting Vestas' vision of integrating sustainability in everything. However, Vestas should not take on much additional debt, especially from 2025 onwards, which is when the offshore business will start to expand, and the new turbine platforms begin their operations (Figure 67). **Net Debt to EBITDA** was negative through 2019-21, due to negative net debt, which supports the company's leverage ability. **Total Debt to Total Assets Ratio** has been quite stable throughout the historical period, with an average of 10%, showing a strong capacity of the company to fund its assets and repay creditors (Figure 68).

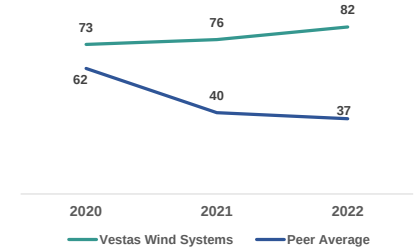
Figure 68: Total Debt to Total Assets (%)



Source: Companies' Data

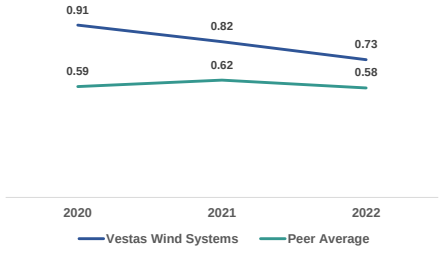
Activity Levels on the Podium | While Vestas has been consistently decreasing its **days of sales outstanding**, its peers' average shows the opposite. At the same time, **Vestas' payables days increased**, indicating a stronger capacity of the company to receive from their customers and pay to their suppliers. Despite the peers' average recording a decrease, Vestas' **days of inventory on hand** increased, displaying lower efficiency in selling their stock. However, the EU has more than 80GW of wind energy projects currently stuck in permitting processes, which does not help to reduce the number of inventories that the company has on hand. Overall, the cash conversion cycle is higher for Vestas than for peers (Figure 69). According to the **asset turnover**, Vestas is on the podium, with values consistently higher than the peers' average through 2019-22, having a better efficiency in generating sales either from total or fixed assets (Figure 70).

Figure 69: Cash Conversion Cycle (Days)



Source: Companies' Data

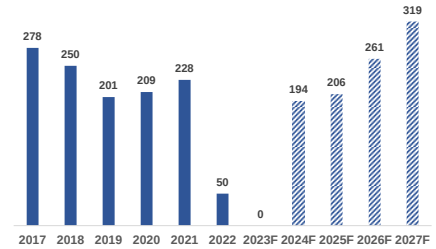
Figure 70: Total Asset Turnover (x)



Source: Companies' Data

Stable Dividend Policy | Historically, the company compromised with the **same level of dividend payment to its shareholders**, with a value of **payout ratio of 30%** from 2014 until 2020. In 2021, the company carried out a **share split** at a ratio of 1:5, increasing the number of shares outstanding to 1,009,867,260 shares of nominally DKK0.20. **For 2023, Vestas had not proposed any dividend due to negative earnings.** From 2024 onwards, as the company recovers, dividends are expected to follow the same payout ratio of 30% (Figure 71). Although only Siemens Energy, Goldwind and General Electric have distributed dividends, these companies distribute, on average, higher dividends per share than Vestas.

Figure 71: Dividends Paid (€m)

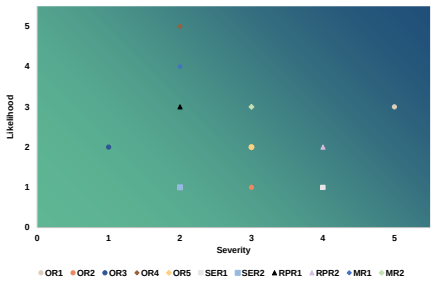


Source: Company Data and Author Analysis

8. Investment Risks

As a global company, Vestas faces various risks inherent to the industry and countries in which they operate. In order to manage those risks, support operational and strategic objectives, and protect and create shareholder value, there is the Enterprise Risk Management (ERM) framework. It provides a transparent view of the strategic and operational risk position, continuously assessing and adjusting overall risk exposure. The risks can potentially impact Vestas' long-term vision and objectives and are divided into the following categories: i) Operational Risks; ii) Environmental Risks; iii) Regulatory and Political Risks; and, iv) Market Risks (Figure 72).

Figure 72: Risk Heat Map



Source: Author Analysis

Operational Risks (Figure 73)

Supply Chain Disruption (OR1) | Renewable energy projects need specific raw materials that are only available in certain countries or are only produced by a small number of entities. Furthermore, transport congestion, energy and raw materials costs increase, along with rapid inflation increases in key markets, affected Vestas' ability to manage a cost-efficient supply chain.

Mitigation: With its **vertical integration and geographical diversification**, Vestas is able to reduce supply chain volatility by combining disciplined sales pricing and financial hedges, indexation of procurement and sales contracts and long-term supply agreements.

Cyber Attack (OR2) | Vestas relies on commercial, technical, and operational informational technology infrastructure. Therefore, a cyber security event could have a significant impact on Vestas' operations.

Mitigation: Cyber risk management is based on international standards. Also, with the new **Digital Solutions area**, Vestas can strengthen its efforts in addressing cyber risks, as it drives end-to-end digitalization across the Group.

People Risks (OR3) | As renewable energy gets on the top agenda worldwide, increased competition for talent among industry players increases. In fact, in certain job functions, there is a high employee attrition rate.

Mitigation: Vestas conducts **employee satisfaction measurements** bi-annually, enabling awareness and engaging employee motivation. Additionally, Vestas implements people development programs, with a focus on diverse and inclusive leadership, to support retention and employee engagement.

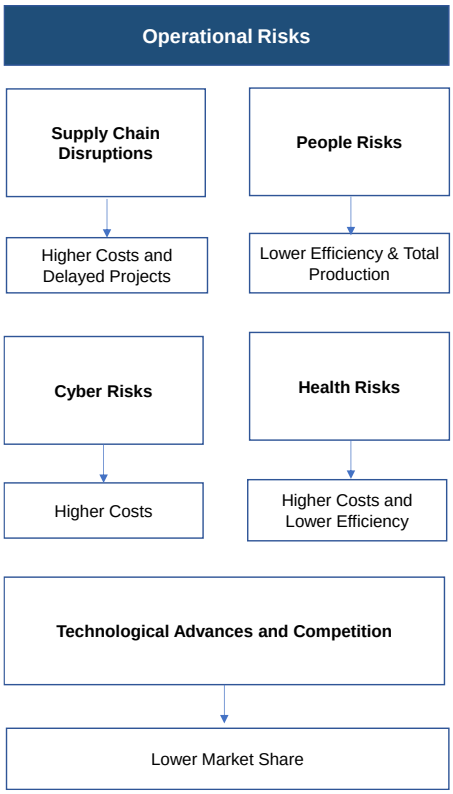
Health Risks (OR4) | Exposure to continuous low-level hum from wind turbines has been reported to produce health problems. Therefore, personal safety and security are a key priority for the company.

Mitigation: Proactive **security assessments and mitigation plans** at manufacturing, construction, and service sites are integrated into the company's operating model. Individual safety measures are tailored to local circumstances, varying across geographies and tasks. Furthermore, Vestas tracks and reports the measure **TRIR**, investigating the incidents to prevent them from re-occurring.

Technological Advances and Competition (OR5) | Innovative technology in wind turbine design, and procedures, can significantly impact Vestas' competitiveness. Major Oil & Gas companies are gradually entering the renewables industry, making it a risk for existing OEMs.

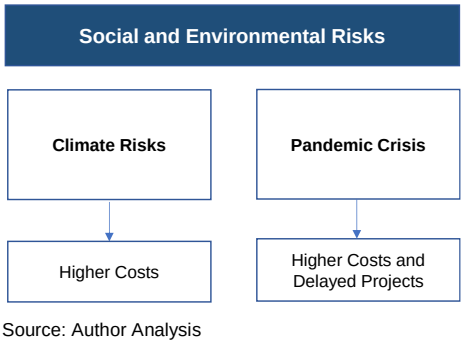
Mitigation: Vestas continuously **invests in R&D** to stay at the forefront of wind energy technology, reducing the probability of having obsolete products, and competitors ahead of them.

Figure 73: Operational Risks Impact on Vestas' Operations



Source: Author Analysis

Figure 74: Social and Environmental Risks Impact on Vestas' Operations



Source: Author Analysis

Social and Environmental Risks (Figure 74)

Climate Risks (ER1) | Through extreme weather events and temperatures, climate change has the potential to impact not only Vestas' assets (turbines), but also their operations, and supply chains. Moreover, Vestas' wind turbines are often located in remote, exposed areas, and they may be damaged by natural disasters.

Mitigation: Vestas leverages grid modernizations and weather protection systems. Also, the company **assesses and monitors the risks** and has integrated climate change scenarios into its risk management processes.

Pandemic Crisis (ER3) | A pandemic crisis could potentially impact the supply chain, either through project delays or cancellation costs.

Mitigation: The **geographical diversification of facilities** reduces the probability of shutting down production. Also, Vestas' deliveries increased, in 2020, to a record high of 17,213MW, as the company manufactures products for an essential service.

Regulatory and Political Risks (Figure 75)

Regulatory Pace Risk (RPR1) | As there is a need for more renewable solutions, ambitious political targets require fast-paced introductions of new wind turbine configurations, and a focus on reducing the LCOE. However, this makes OEM less capable of delivering sufficient quality on time.

Mitigation: Vestas' **modularization** enables a broader range of product configurations by re-using components, tools, design, and value chain concepts. It accelerates market development, cost-effectiveness, and execution at project sites. Furthermore, Vestas' quality assurance program can identify and correct potential quality issues, from design to product, construction, and service.

Geopolitical Environment (RPR2) | As Vestas is present around the globe, its operations are subject to significant risks related to geopolitical tensions, high inflation, trade wars and tariffs, which can lead to higher costs of raw materials and transportation issues, affecting Vestas' ability to make its deliveries cost-efficiently.

Mitigation: While Vestas sells its products and services to the whole world, the company also has a **global supply chain** that enables them to obtain similar turbine components from multiple suppliers. Furthermore, through global public affairs efforts, they can monitor local regulations, as well as trade tariffs.

Market Risks (Figure 76)

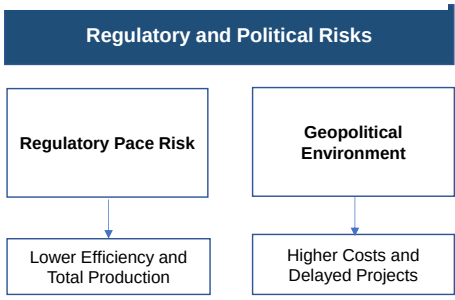
Currency Exchange Rate Fluctuations (MR1) | Payments to suppliers may be denominated in different currencies, as revenues come from different regions of the globe. The greatest exposure is to the EUR/USD exchange rate since 35% of their 2022YE revenue comes from the Americas. In addition, the United Kingdom also makes a large portion of Vestas' revenues, making it another currency exchange rate to look for.

Mitigation: Vestas uses **currency swaps and currency forward contracts** to mitigate the risk.

Commodity Prices (MR2) | As it was already able to see in 2022 (due to their negative results), Vestas was largely exposed to the prices volatility of their principal raw materials. In particular, wind turbines are made of c.80% steel, making this metal a strong risk for the company.

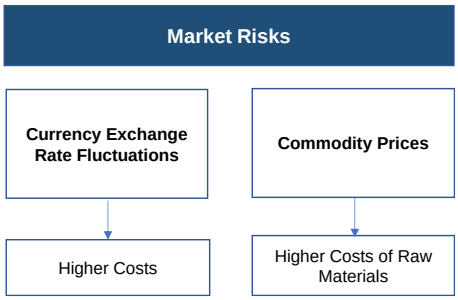
Mitigation: To lower their exposition to raw material price volatility, Vestas uses **fixed price agreements and commodity contracts**.

Figure 75: Regulatory and Political Risks Impact on Vestas' Operations



Source: Author Analysis

Figure 76: Market Risks Impact on Vestas' Operations



Source: Author Analysis

Figure 77: Offshore ASP' Sensitivity

WACC \ Offshore ASP	26.59 €	0.80	0.84	0.88	0.93	0.97
	6.56%	27.80	27.83	27.85	27.88	27.90
	6.66%	27.16	27.18	27.21	27.23	27.26
	6.76%	26.54	26.56	26.59	26.61	26.64
	6.86%	25.95	25.97	26.00	26.02	26.05
	6.96%	25.38	25.40	25.43	25.45	25.48

Source: Author Analysis

Figure 78: Onshore ASP' Sensitivity

WACC \ Onshore ASP	26.59 €	0.79	0.83	0.87	0.92	0.96
	6.56%	27.12	27.48	27.85	28.23	28.62
	6.66%	26.48	26.83	27.21	27.58	27.97
	6.76%	25.86	26.21	26.59	26.96	27.35
	6.86%	25.27	25.62	26.00	26.37	26.76
	6.96%	24.70	25.05	25.43	25.80	26.20

Source: Author Analysis

Figure 79: Offshore Deliveries' Sensitivity

WACC \ Offshore Deliveries	26.59 €	765	850	944	1,038	1,142
	6.56%	27.76	27.80	27.85	27.90	27.96
	6.66%	27.11	27.16	27.21	27.25	27.31
	6.76%	26.49	26.54	26.59	26.64	26.69
	6.86%	25.90	25.95	26.00	26.04	26.10
	6.96%	25.34	25.38	25.43	25.48	25.53

Source: Author Analysis

Sensitivity Analysis

To analyze the DCF model's robustness to changes in the key inputs, the sensitivity analysis was performed with WACC, terminal growth rate, onshore and offshore deliveries, and ASP (Appendix 32).

Ceteris paribus, the recommendation would not change for any value of **offshore ASP** (Figure 77). However, it is not possible to say the same for **onshore ASP** (Figure 78). With a price lower than €0.78m/MW, the recommendation would change to a hold one. 70% of the revenues come from the onshore segment. Therefore, it makes sense that the onshore ASP is more volatile than offshore. Likewise, **offshore deliveries** (Figure 79) follow the same trend as its ASP, whereas **onshore deliveries** (Figure 80), must be higher than 12,947MW and lower than 15,825MW, when the WACC does not change, to result in a buy recommendation. If WACC decreases by 0.1%, onshore deliveries could increase or decrease by 10% without changing the recommendation. On the other hand, if WACC increases 0.1%, onshore deliveries could see their value increase by 20%, and it would not affect the recommendation. Nevertheless, those scenarios are unlikely given the expected offshore expansion rather than onshore.

In what concerns the **terminal growth rate** (Figure 81), it seems to be the most volatile variable for the company. By decreasing either the WACC or the growth rate by c.0.2%, it would result in a different recommendation. By increasing the value of the growth rate and decreasing WACC, the recommendation would change to a strong buy, whereas by increasing the WACC, it would change to a hold recommendation.

Scenario Analysis

To better understand the probability of a price change, a scenario analysis was conducted under three different cases – The **base case, a bear case, and a bull case** (Figure 82). The bear scenario represents the lack of power storage solutions, and slow bureaucratic processes. Therefore, diminished revenues, as well as reduced company prospects, are expected. Consequently, according to DCF model, the recommendation is to sell, with a price target of **23.73€.** All other methods result in a sell recommendation and average price target of 21.63€.

In the bull scenario, renewables can reach their maximum potential, especially the offshore segment, and through hybrid solutions, renewables may become exclusively used to power multiple countries. The DCF target price results in **29.64€,** changing the recommendation to strong buy. The multiples, APV, and flow to equity methods also result in the same recommendation, with an average price target of 32.33€ (Appendix 33).

Monte Carlo Simulation

A Monte Carlo Simulation with 100k iterations (Figure 83) was performed, by varying the **terminal growth rate**, which follows a normal distribution (The mean and standard deviation are based on historical values of GDP Growth). The mean value achieved with Monte Carlo output was **27.49€/share**, which represents a difference of +0.90€ from DCF target price (Figure 84). Additionally, there is 22% probability of a hold recommendation, against 40% buy and strong buy, and 38% reduce and sell. These values represent the uncertainty and early development stage of the renewable industry. It is believed that renewables are going to expand in the following years, due to the climate urgency. However, at the same time, the world is still not prepared for full independence on fossil fuels, mainly because of lacking infrastructures and grid systems underdevelopment.

Figure 80: Onshore Deliveries' Sensitivity

WACC \ Onshore Deliveries	26.59 €	11,653	12,947	14,386	15,825	17,407
WACC	6.56%	26.43	27.10	27.85	28.60	29.42
	6.66%	25.78	26.46	27.20	27.95	28.78
	6.76%	25.17	25.84	26.59	27.33	28.16
	6.86%	24.57	25.25	26.00	26.74	27.57
	6.96%	24.01	24.68	25.43	26.18	27.00

Source: Author Analysis

Figure 81: Terminal Growth Rate' Sensitivity

WACC \ Terminal Growth Rate	26.59 €	2.03%	2.13%	2.23%	2.33%	2.43%
WACC	6.56%	26.73	27.28	27.85	28.45	29.08
	6.66%	26.14	26.66	27.21	27.78	28.38
	6.76%	25.57	26.07	26.59	27.13	27.70
	6.86%	25.02	25.50	26.00	26.52	27.06
	6.96%	24.50	24.95	25.43	25.93	26.44

Source: Author Analysis

Figure 82: Scenario Analysis Summary

	Bear Case	Base Case	Bull Case
Total Deliveries	13,797	15,330	16,863
ASP	0.83	0.88	0.92
WACC	6.26%	6.76%	7.26%
Price (€)	23.73 €	26.59 €	29.64 €
Upside/Downside	-5%	18%	43%
Recommendation	SELL	BUY	STRONG BUY

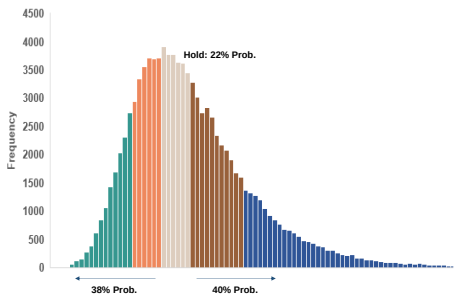
Source: Author Analysis

Figure 83: Monte Carlo' Simulation Statistics

Simulation Statistics	
Nº of Trials	100,000
Average	27.49
Median	26.56
Percentiles:	
25%	23.89
50%	26.56
75%	29.98
Standard Deviation	5.27
Skewness	1.79
Kurtosis	11.13

Source: Author Analysis

Figure 84: Monte Carlo Simulation



Source: Author Analysis

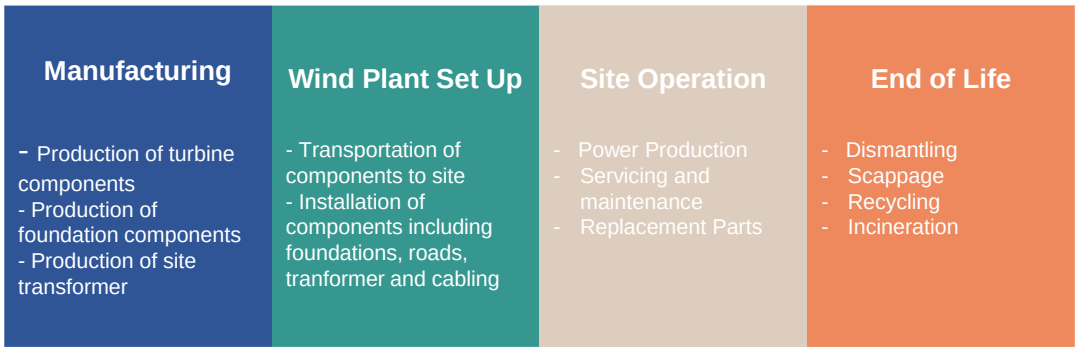
Appendices

Appendix 1: Key Concepts Definition

Concept Name	Definition
CO_2 Intensity	CO_2 Emissions divided by Total Generation
Decarbonization Technologies	Technologies that reduce human-caused carbon dioxide emissions to limit the unprecedent, life-threatening impacts of global warming
Energy Payback	Relationship between the energy requirement over the whole life cycle of the power plant vs the energy generated by the wind power plant
Levelised Cost of Energy	Average present cost of electricity generation for a generation plant over its lifetime
Order Backlog	Total capacity of turbines to be deliveres under firm and unconditional orders less deliveries made at the end of the period
Order Intake	Orders that have become firm and unconditional during the period and adjustments to existing contracts measured as either value (EUR) or capacity (MW)
Return on Energy	The amount of energy paid back to society vs the energy needed in the lifetime of that turbine
Waste Intensity	Amount of waste generated per $100m^2$

Source: Company Data

Appendix 2: Wind Plant Life-Cycle

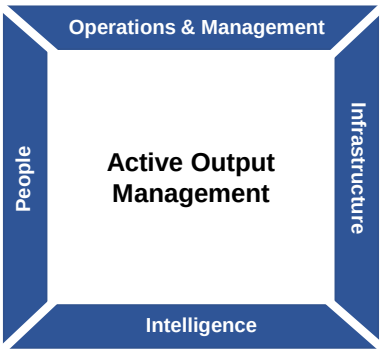


Source: Company Data

Appendix 3: Active Output Management

O&M – Precision Planning
Vestas performance monitoring systems collect data 24/7, using remote surveillance of sensor systems built into every turbine. Afterwards, highly accurate service and maintenance schedules based on site characteristics are performed.
The data collected from the field is constinuously updated and fed back into R&D, allowing to enhance diagnostic models and minimising both production loss and O&M costs.

People – In Safe Hands
Site managers and technicians understand not just the fine details of service and maintenance, but how these processes affect the long-term performance of the wind plant.



Infrastructure – Global Integration
Vestas has a supply chain with global coverage, ensuring on-time delivery in remote locations on- and offshore.
From warehouses strategically located around the world, parts can be sourced to optimise cost and delivery time.

Intelligence – Inside Knowledge
Vestas can monitor data feedback such as current wind speeds and temperatures, vibrations and air pressure. Information is transmitted to the Vestas Performance and Diagnostics Centre and processed to monitor and create predictive models – helping to eradicate the lost production and provide predictable product performance.

Name	Description
AOM 1000 Maximum Flexibility	Access to all of Vestas' capabilities, available on a time and material basis.
AOM 2000 Reduced Risk	Sustained turbine performance through regular preventative maintenance, with all componentes available on a time and material basis, and a selection of optional add-ons.
AOM 3000 Shared Risk	Complete package with a flat fee, and main componentes on a time and material basis. The risk profile is shared with Vestas.
AOM 4000 Maximized uptime	Time-based availability guarantee of up to 97% uptime. Possible to use the Vestas Performance Manager software, ensuring transparency at all times. Contract covers periods up to 10 years, with the possibility to extend for 2x5-year periods.
AOM 5000 Move wind from hour to power	All-inclusive. Guarantee based on 97% energy-based availability, moving the availability measure from hour to power. Possible to use the Vestas Performance Manager software, ensuring transparency at all times. Contract covers periods up to 10 years, with the possibility to extend for 2x5-year periods.

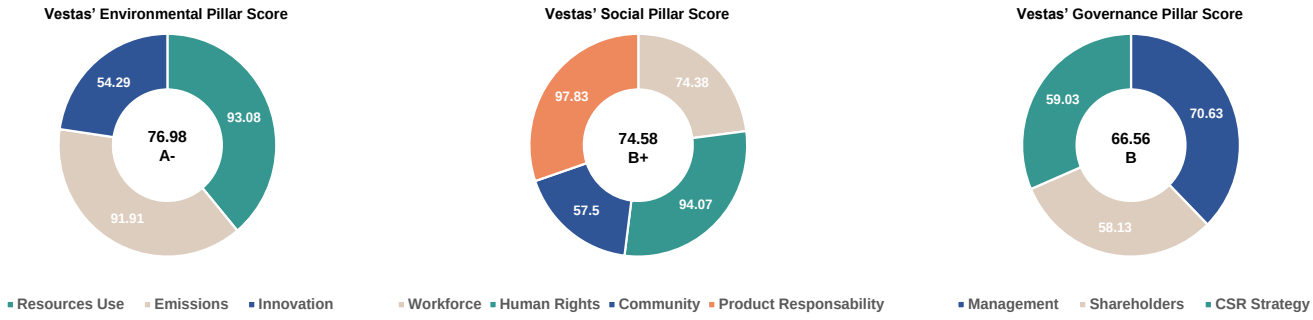
Source: Company Data

Appendix 4: Board Members

Name	Position	Independence	Member Since	Nationality	Number of Shares (value in 2022YE)	Remuneration (EUR)	Education
Anders Runevad	Chairman	No	2020	Swedish	40,480	264,499	- MBA Studies - MSc. Eletrical Engineering
Karl Henrik Sudström	Deputy Chairman	Yes	2020	Swedish	8,200	149,314	- Advanced Management Program - Business Administration
Bruce Grant	Techonology & Manufacturing Committee	Yes	2019	American	0	96,691	- Industrial Management - MSc. Business Economics
Eva Berneke	Nomination & Compensation Committee Audit Committee	Yes	2019	Danish	17,295	132,503	- MBA Studies - MSc. Mechanical Engineering - MSc. Economics
Helle Thorning-Schmidt	Nomination & Compensation Committee	Yes	2019	Danish	2,770	96,691	- MSc. Political Science - MSc European Studies
Kentaro Hosomi	Member of the Board	Yes	2021	Japanese	0	60,880	- Economics
Lena Olving	Techonology & Manufacturing Committee	Yes	2022	Swedish	350	80,147	- International Advanced Management Program - Business Economics - MSc. Science
Claus Skov Christensen	Employee Representative	No	2022	Danish	500	40,786	
Michael Lisbjerg	Employee Representative	No	2008	Danish	4,170	60,880	
Pia Jensen	Employee Representative	No	2020	Danish	790	60,880	
Sussie Dvinge	Employee Representative	No	2005	Danish	3,250	60,880	

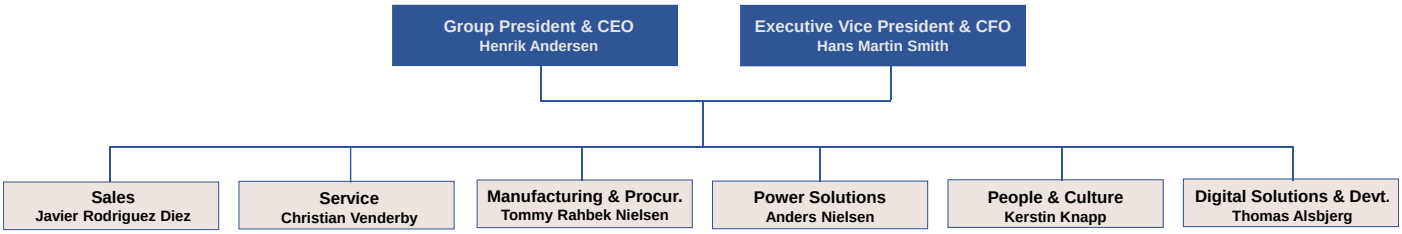
Source: Company Data

Appendix 5: ESG Scores



Source: Bloomberg

Appendix 6: Executive Management Team



Name	Appointed	Nationality	Number of shares	Education
Henrik Andersen	2019	Danish	166,772	- International Business - Master in Law
Hans Martin Smith	2022	Danish	7,438	- Science in Economics and Business Management - MSc. in Business Management
Javier Rodriguez Diez	2021	Spanish	7,438	- Executive MBA - Industrial Engineering
Christian Venderby	2019	Danish	19,379	- Business Program - Finance
Tommy Rahbek Nielsen	2020	Danish	29,953	- Finance and Business Administration
Anders Nielsen	2020	Swedish	6,000	- Industrial Engineering
Kerstin Knapp	2020	Austrian	4,918	- Business Administration and Management - Master in Psychology
Thomas Alsbjerg	2022	Danish	1,885	- Finance - MSc. In Engineering

Source: Company Data

Appendix 7: KPIs for Cash Bonus

The bonus is based on target achievement, as seen in the table below, which must be approved by the Board. Moreover, EBIT margin KPI must be met as a requirement for any bonus payout, or otherwise, Vestas will not pay out to Executive Management nor any other employee in the Group.

KPI	Weight of KPI (%)	2022 Result
EBIT Margin (%)	40	Below Target
Free Cash Flow	30	Below Target
CO2 Emissions avoided	30	Below Target
Total	100	0% of base pay

Source: Company Data

Appendix 8: KPIs for Performance Shares

KPI	Weight of KPI (%)	2022 Result
Earnings per share	50	Below Target
ROCE	30	Below Target
Market Share	20	Pending
Total	100	0% of allotted number of shares

Source: Company Data

Appendix 9: Strategic Sustainability Initiatives

Carbon Neutrality

Green Electricity: Source electricity from renewable sources

Green Service Fleet: Transition of service vehicles, benefit cars, and offshore vessels to run on renewable electricity or sustainable fuels

Industrial Heating: Transition to electricity, district heating, or biofuels

Emission-reduced steel: Focus on accelerating the decarbonisation of steel used in turbines

Suppliers: Help decarbonise the supply chain by setting targets and sharing knowledge

Zero Waste

Circular Blades: Scale up recycling solutions and design circular baldes

Internal Waste: Increase the material efficiency of the manufacturing operations and cease landfilling and incineration

Component repair and refurbishment: Expand and regionalize the repair and refurbishment infrastructure

Suppliers: Reduce supply chain waste by setting targets and sharing knowledge

Social Responsability

Safety: Decrease the Lost Time and Recordable Injury rates and avoid all fatalities

Diversity, Equity, Inclusion, and Belonging: Increase the percent of women in leadership and foster inclusion for people of all social identities

Affected communities: Increase the number of community beneficiaries reached through engagement initiatives in areas impacted by the activities

Leading the Transition

Electrification: Increase the share of global energy demand met by electricity, including the expansion of decarbonised transportation through EV's and Power-to-X technology

Sustainable Policy: Campaign for a sustainable scale-up of renewable energy by aligning climate and sustainability commitments with effective policy

Source: Company Data

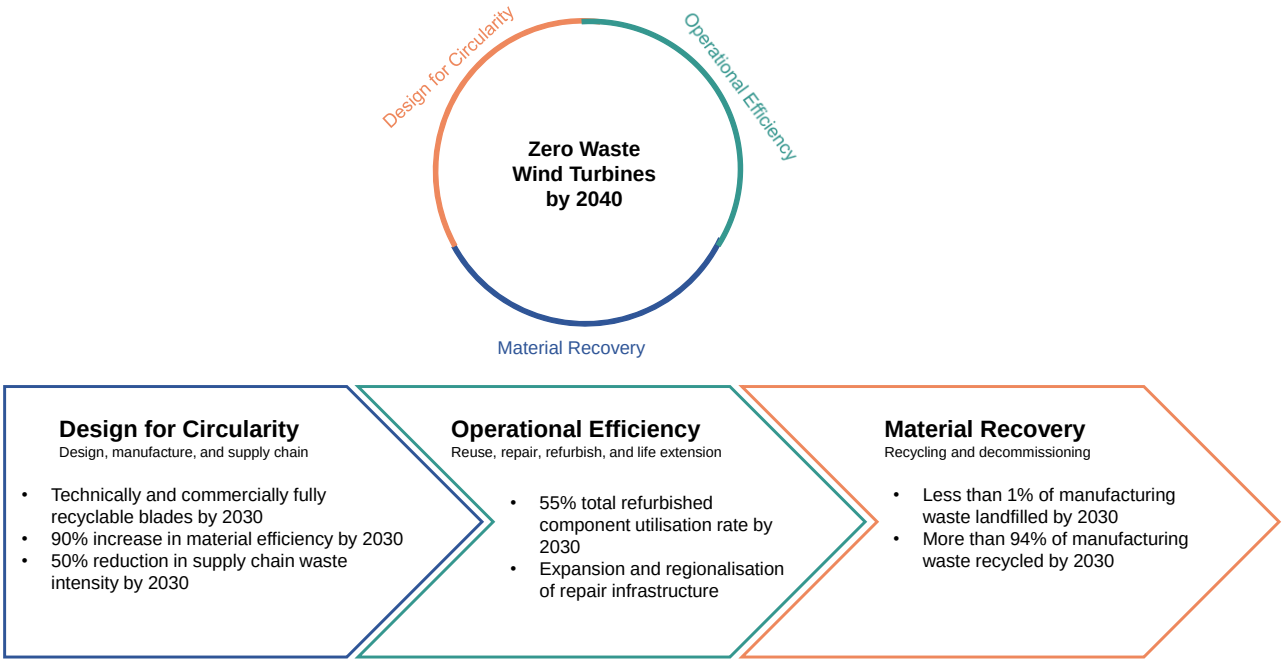
Appendix 10: ESG Historical Values and Targets

Environmental	Target	2022	2021	2020	2019	2018
Renewable Energy for own activities (%)	**100%**	100	100	100	82	68
Material Efficiency (Tons of waste excl. recycled per MW produced and shipped)	**0.2 by 2030**	1.6	2.0	2.5	3.3	3.6
Direct Emissions of CO2e (Scope 1) (1,000t)	**-100% by 2030***	98	99	83	66	69
Indirect Emissions of CO2e (scope 2) (1,000t)	**-100% by 2030***	2	3	14	48	61
Indirect Emissions of CO2 from the supply chain (Scope 3) (million t)	**-45% by 2030***	8.18	10.56	10.59	7.83	-
Expected CO2e avoided over the lifetime of the capacity produced and shipped during the period (million t)	**100% Carbon Neutrality by 2030**	408	532	493	322	275
Social	**Target**	**2022**	**2021**	**2020**	**2019**	**2018**
Total Recordable Injuries per million working hours (TRIR)	**0.6 by 2030**	3.3	3.1	3.3	3.9	4.9
Lost Time Injuries per million working hours (LTIR)		1.2	1.0	1.2	1.2	1.5
Women in leadership positions at the end of the period (%)	**30% by 2030**	23	21	19	19	19
Community beneficiaries	**35,000 in 2025**	7,572	8,236	14,770	6,093	-
Social Due Diligence on projects in scope (%)	**100% by 2025**	65	0	78	32	-
Governance		**2022**	**2021**	**2020**	**2019**	**2018**
EthicsLine cases		539	465	287	226	173

* From a 2019 baseline

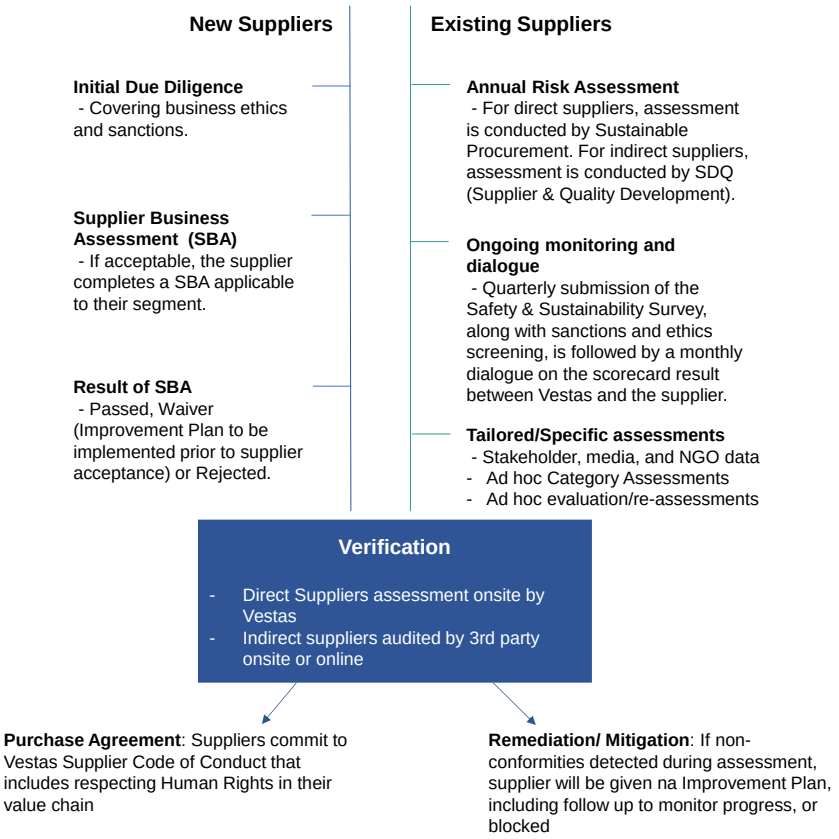
Source: Company Data

Appendix 11: Circularity Roadmap



Source: Company Data

Appendix 12: Supplier Assessment Framework



Source: Company Data

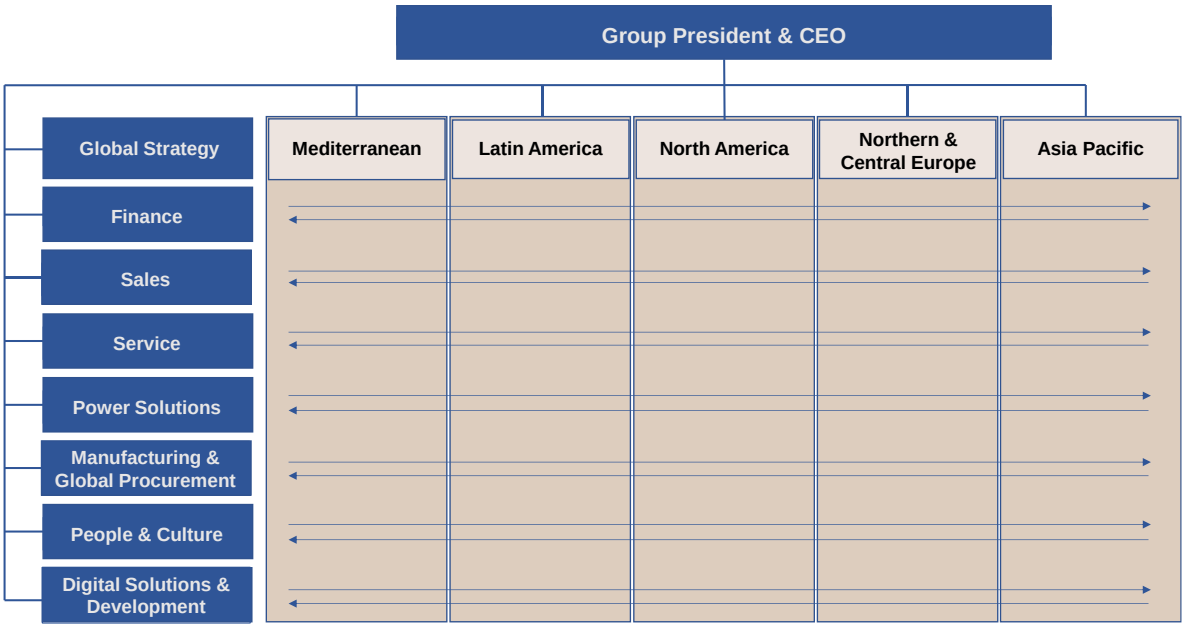
Appendix 13: Vestas' Primary Focus Sustainable Development Goals

Some of Vestas' actions took place in Africa, by supporting schools in repairing the sanitation and lavatory buildings, constructing a new classroom, and replacing windows and doors, as well as repairing the public lavatories. In the Dominican Republic, to provide energy to a rural school with constant power cuts, Vestas installed a turbine next to it. In India, over 1,400 children benefited from education kit learning materials, young women were trained in local traditional arts and crafts for individual income, and c.950 children have now access to clean drinking water.

4 QUALITY EDUCATION	Ensure inclusive and equitable quality and promote lifelong learning opportunities for all	12 RESPONSIBLE CONSUMPTION AND PRODUCTION	Ensure sustainable consumption and production patterns
7 AFFORDABLE AND CLEAN ENERGY	Ensure access to affordable, reliable, sustainable and modern energy for all	13 CLIMATE ACTION	Take urgente action to combat climate and its impacts
8 DECENT WORK AND ECONOMIC GROWTH	Promote sustained, inclusive and sustainable economic growth, full and productive employment and decente work for all	17 PARTNERSHIPS FOR THE GOALS	Strengthen the means of implementation and revitalize the global partnership for sustainable development

Source: Company Data

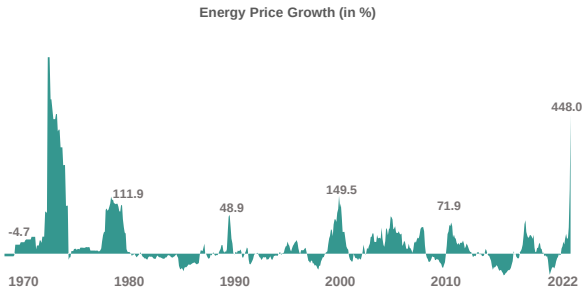
Appendix 14: Vestas' Global Operating Model



Source: Company Data

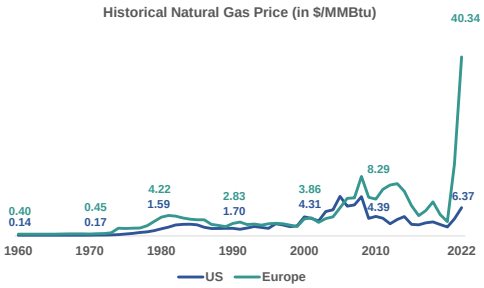
Appendix 15: Global Economic Outlook Complementary Charts

The Russian invasion of Ukraine has been a major shock to commodity markets (as both countries are key exporters of commodities), leading to significant disruptions to production and trade, and sharp price rises for all energy commodities. Between April 2020 (with the COVID-19 Pandemic beginning to spread worldwide) and March 2022 (the start of the Russian invasion of Ukraine), energy prices had the largest increase since the 1973 oil price spike.

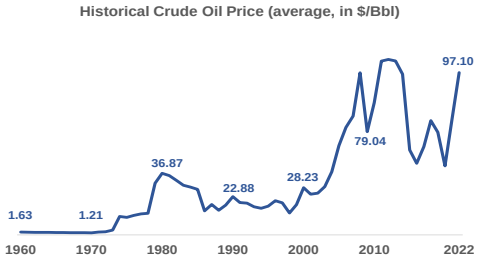


Source: World Bank

Europe imports a substantial share of its energy from Russia, including c.35% of natural gas, c.20% of crude oil, and c.40% of coal. Coal and natural gas have reached historic highs in nominal terms. However, in real terms, only the European natural gas price has reached an all-time high, and it is substantially above its previous peak in 2008.



Source: World Bank



Source: World Bank

Appendix 16: SARD Approach

To find Vestas' peers, the Sum of Absolute Rank Approaches (SARD) was followed. Within the markets of wind, solar and green technology, were chosen different companies as a starting point. Thereafter, different ratios, such as Market Capitalization, ROE, Net Debt/EBITDA, Revenue Growth, and EBIT Margin were performed for the past three years. This is because the company had negative results in 2022, which does not represent its historical values and performance. To rank the different companies, the average of those three years values was computed. Therefore, the top 5 companies that minimized the SARD Rank were:

	Variables										
Company Name	Market Cap (Billion)	Rank	ROE	Rank	Net debt/EBIT (x)	Rank	Revenue Growth	Rank	EBIT Margin	Rank	SARD
Vestas Wind Systems A/S	24,594	7	-11%	15	-2	14	7%	10	-1%	14	0
Nordex SE	2,306	13	-32%	17	1	12	21%	6	-3%	16	16
Siemens Energy AG	17,579	9	-5%	14	8	4	0%	13	-3%	15	17
First Solar	17,613	8	5%	11	-41	17	-5%	15	11%	10	17
General Electric	102,337	3	0%	13	2	9	-15%	16	3%	13	18
GoldWind	5,735	11	8%	10	3	6	10%	9	10%	11	21

Source: Author Analysis

Appendix 17: PESTEL Analysis

P	- Green energy transition is one of the most actual topics between governments and supranational organizations. - Renewable energy related investments are highly favourable, and might include government subsidies and credits. - Oil & Gas companies, although important for the world energy supply, are gradually losing their political and economic importance.
E	- Covid-19 and Russo-Ukrainian war created global economic disturbances. Also, it incentivized the transition to sustainable energy and increased EU's energy independence. - High-inflationary periods, and consequently, an imminent global recession.
S	- The worldwide population is becoming more aware of climate change and pollution. - The world population is expected to increase. Therefore, energy consumption is expected to rise accordingly.
T	- Smarter grids and storage solutions need high investments to be developed. - Innovative technology may allow improved performance, making solar and wind cost efficiency and with high capacity. - Green hydrogen development is a potential solution to long distance transportation.
E	- Renewable energy is at the center of an energy transition and climate protection, moving from fossil-fuels energy sources to more sustainable energy sources, such as wind power. - As defined in the Paris Agreement, net zero carbon emissions are now part of the agenda of every government and supranational organization. - ESG indicators are starting to have a higher impact on investors' decisions, making countries and companies consider sustainability standards.
L	- Increase of legislation and regulation towards responsible energy consumption. - Worldwide, 144 countries have set their own targets for the expansion of renewable energies, and 138 countries and regions are implementing policies to increase the share of renewables in their energy supply. - Different nations, like EU and USA, are adopting energy frameworks to reduce CO_2 emissions and reach 2050 net-zero target.

Source: Author Analysis

Appendix 18: Vestas' Financial Statements Assumptions

Income Statement	
Power Solutions Revenue	Based on industry's forecasts for both onshore and offshore.
Service Revenue	Based on Vestas' cumulative installed capacity and stable rate for competitors' turbines.
Production Costs	Based on Sales Growth.
Research and Development Costs	Based on Vestas' New Installed Capacity of the following year.
Depreciation and Amortisation	Based on previous year PP&E, and Intangibles.
Financial Income	Based on historical relationship with cash&cash and equivalents.
Financial Costs	Based on historical relationship with total debt.

Balance Sheet	
Inventories	Based on historical DIO, DSO, and DPO.
Receivables	
Trade Payables	
Contract Assets	Based on Sales Growth.
Contract Liabilities	
CAPEX	Based on Power Solutions Deliveries.
Financial Debt	Based on Capital Expenditures.

Source: Author Analysis

Appendix 19: Income Statement Forecast

Income Statement													
mEUR	Historical						Forecast					CAGR	CAGR
	2017	2018	2019	2020	2021	2022	2023F	2024F	2025F	2026F	2027F	2021-2027F	2022-2027F
Revenue	9,953	10,134	12,147	14,819	15,587	14,486	15,702	19,553	22,459	25,433	28,701	11%	15%
Production costs	-7,990	-8,503	-10,386	-13,281	-14,031	-14,368	-13,586	-17,281	-19,849	-22,478	-25,366	-10%	-12%
Gross profit	1,963	1,631	1,761	1,538	1,556	118	2,116	2,272	2,610	2,955	3,335	14%	95%
Research and development costs	-235	-229	-268	-265	-389	-457	-434	-470	-484	-502	-526	-5%	-3%
Distribution costs	-229	-189	-222	-281	-371	-462	-400	-487	-559	-633	-686	-11%	-8%
Administration costs	-269	-254	-267	-242	-368	-351	-357	-320	-346	-366	-384	-1%	-2%
Operating profit (EBIT) before special items	1,230	959	1,004	750	428	-1,152	925	995	1,221	1,455	1,739	26%	209%
Special items	0	-38	0	-52	-139	-444	26	0	0	0	0	-100%	-100%
Operating profit (EBIT)	1,230	921	1,004	698	289	-1,596	951	995	1,221	1,455	1,739	35%	202%
Income/(loss) from investments in joint ventures and associates	-40	40	3	331	36	10	30	38	37	42	47	5%	36%
Financial income	45	17	40	18	21	52	22	24	27	32	37	10%	-7%
Financial costs	-43	-68	-138	-113	-122	-162	-193	-200	-199	-199	-192	-8%	-3%
Profit before tax	1,192	910	909	934	224	-1,696	810	857	1,087	1,330	1,631	39%	199%
Income tax	-298	-227	-209	-163	-81	124	-162	-171	-217	-266	-326	-26%	-221%
Profit for the year	894	683	700	771	143	-1,572	648	685	869	1,064	1,305	45%	196%
Profit is attributable to:													
Owners of Vestas Wind Systems A/S	894	684	704	765	143	-1,572	635	671	851	1,041	1,277	44%	196%
Non-controlling interests		-1	-4	6	9	0	12	15	19	23	28		

Source: Company Data and Author Analysis

Appendix 20: Common-Size Income Statement

Common-Size Income Statement											
	Historical						Forecast				
mEUR	2017	2018	2019	2020	2021	2022	2023F	2024F	2025F	2026F	2027F
Revenue	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Production costs	-80%	-84%	-86%	-90%	-90%	-92%	-87%	-88%	-88%	-88%	-88%
Gross profit	20%	16%	14%	10%	10%	1%	13%	12%	12%	12%	12%
Research and development costs	-2%	-2%	-2%	-2%	-2%	-3%	-3%	-2%	-2%	-2%	-2%
Distribution costs	-2%	-2%	-2%	-2%	-2%	-3%	-3%	-2%	-2%	-2%	-2%
Administration costs	-3%	-3%	-2%	-2%	-2%	-2%	-2%	-2%	-2%	-1%	-1%
Operating profit (EBIT) before special items	12%	9%	8%	5%	3%	-7%	6%	5%	5%	6%	6%
Special items	0%	0%	0%	0%	-1%	-3%	0%	0%	0%	0%	0%
Operating profit (EBIT)	12%	9%	8%	5%	2%	-10%	6%	5%	5%	6%	6%
Income/(loss) from investments in joint ventures and associates	0%	0%	0%	2%	0%	0%	0%	0%	0%	0%	0%
Financial income	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Financial costs	0%	-1%	-1%	-1%	-1%	-1%	-1%	-1%	-1%	-1%	-1%
Profit before tax	12%	9%	7%	6%	1%	-11%	5%	4%	5%	5%	6%
Income tax	-3%	-2%	-2%	-1%	-1%	1%	-1%	-1%	-1%	-1%	-1%
Profit for the year	9%	7%	6%	5%	1%	-10%	4%	4%	4%	4%	5%
Profit is attributable to:											
Owners of Vestas Wind Systems A/S	9%	7%	6%	5%	1%	-10%	4%	3%	4%	4%	4%
Non-controlling interests	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Source: Company Data and Author Analysis

Appendix 21: Balance Sheet Forecast

Balance Sheet													
mEUR	Historical						Forecast					CAGR	CAGR
	2017	2018	2019	2020	2021	2022	2023F	2024F	2025F	2026F	2027F	2021-2027F	2022-2027F
Intangible assets	901	1,096	1,208	2,888	3,062	3,065	2,983	2,968	3,028	3,148	3,297	1%	1%
Property, plant and equipment	1,247	1,318	1,671	2,022	2,091	1,752	1,791	1,939	2,164	2,441	2,723	4%	9%
Investments in joint ventures and associates	150	233	169	57	609	646	458	570	655	742	837	5%	5%
Other investments	30	35	65	69	81	88	83	104	119	135	152	11%	12%
Tax receivables	51	98	156	201	229	100	135	143	182	212	273	3%	22%
Deferred tax	218	281	324	335	378	497	283	299	379	464	569	7%	3%
Other receivables	72	79	85	241	234	219	245	305	350	397	448	11%	15%
Financial investments	196	204	211	100	100	95	103	129	148	167	189	11%	15%
Total non-current assets	2,865	3,344	3,889	5,913	6,784	6,462	6,081	6,457	7,024	7,705	8,487	4%	6%
Inventories	2,696	2,987	4,098	5,289	5,673	6,373	6,104	7,338	8,157	8,930	9,730	9%	9%
Trade receivables	1,144	967	1,460	1,538	1,531	1,280	1,506	1,821	2,154	2,369	2,752	10%	17%
Contract assets	82	330	528	775	1,227	1,399	1,191	1,288	1,479	1,675	1,890	7%	6%
Contract costs	-	328	418	369	690	753	816	790	873	862	973	6%	5%
Tax receivables	53	88	125	121	102	51	100	106	135	154	202	12%	32%
Other receivables	371	515	752	981	1,105	1,221	1,157	1,440	1,654	1,874	2,114	11%	12%
Financial investments	7	422	173	111	116	0	78	97	112	127	143	4%	
Cash and cash equivalents	3,653	2,918	2,888	3,063	2,420	2,378	2,940	2,991	2,907	3,662	4,333	10%	13%
Assets held for sale						173	0	0	0	0	0	-	-100%
Total current assets	8,006	8,555	10,442	12,247	12,864	13,628	13,893	15,872	17,471	19,651	22,136	9%	10%
Total assets	**10,871**	**11,899**	**14,331**	**18,160**	**19,648**	**20,090**	**19,974**	**22,329**	**24,495**	**27,356**	**30,623**	8%	9%
Equity and Liabilities													
Share capital	29	28	27	27	27	27	27	27	27	27	27	0%	0%
Other reserves	37	22	-67	-146	22	15	15	15	15	15	15	-6%	0%
Retained earnings	3,046	3,042	3,333	4,773	4,635	3002	3,650	4,141	4,805	5,608	6,593	6%	17%
Equity attributable to Vestas	3,112	3,092	3,293	4,654	4,684	3044	3,692	4,183	4,847	5,650	6,635	6%	17%
Non-controlling interests	-	12	52	49	13	16	16	16	16	16	16	4%	0%
Total equity	**3,112**	**3,104**	**3,345**	**4,703**	**4,697**	**3060**	**3,708**	**4,199**	**4,863**	**5,665**	**6,651**	6%	17%
Provisions	483	491	459	696	686	944	817	822	832	917	949	6%	0%
Deferred tax	61	120	147	158	362	158	128	135	171	209	257	-6%	10%
Financial debts	497	498	661	867	732	2,179	1,944	1,862	1,840	1,769	1,608	14%	-6%
Tax payables	166	212	296	331	326	177	275	291	370	452	555	9%	26%
Other liabilities	19	69	76	173	145	59	131	163	188	212	240	9%	32%
Total non-current liabilities	1,226	1,390	1,639	2,225	2,251	3,517	3,295	3,273	3,401	3,560	3,608	8%	1%
Financial debts			159	487	704	248	259	291	338	384	415	-8%	11%
Contract liabilities	3,082	4,202	5,020	5,613	6,180	6,937	6,953	7,499	7,811	8,660	9,741	8%	7%
Trade payables	2,660	2,417	3,119	3,608	4,286	4089	3,902	4,964	5,702	6,457	7,286	9%	12%
Provisions	148	126	221	580	646	829	721	703	762	787	831	4%	0%
Tax payables	108	112	128	86	75	58	75	79	100	123	150	12%	21%
Other liabilities	535	548	700	858	809	1349	1,062	1,323	1,519	1,720	1,941	16%	8%
Liabilities related with assets held for sale						3							
Total current liabilities	6,533	7,405	9,347	11,232	12,700	13,513	12,972	14,857	16,232	18,131	20,365	8%	9%
Total liabilities	**7,759**	**8,795**	**10,986**	**13,457**	**14,951**	**17030**	**16,267**	**18,131**	**19,633**	**21,691**	**23,972**	8%	7%
Total equity and liabilities	**10,871**	**11,899**	**14,331**	**18,160**	**19,648**	**20,090**	**19,974**	**22,329**	**24,495**	**27,356**	**30,623**	8%	9%

Source: Company Data and Author Analysis

Appendix 22: Common-Size Balance Sheet

Common-Size Balance Sheet											
	Historical						Forecast				
	2017	2018	2019	2020	2021	2022	2023F	2024F	2025F	2026F	2027F
Intangible assets	8%	9%	8%	16%	16%	15%	15%	13%	12%	12%	11%
Property, plant and equipment	11%	11%	12%	11%	11%	9%	9%	9%	9%	9%	9%
Investments in joint ventures ar	1%	2%	1%	0%	3%	3%	2%	3%	3%	3%	3%
Other investments	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Tax receivables	0%	1%	1%	1%	1%	0%	1%	1%	1%	1%	1%
Deferred tax	2%	2%	2%	2%	2%	2%	1%	1%	2%	2%	2%
Other receivables	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Financial investments	2%	2%	1%	1%	1%	0%	1%	1%	1%	1%	1%
Total non-current assets	26%	28%	27%	33%	35%	32%	30%	29%	29%	28%	28%
Inventories	25%	25%	29%	29%	29%	32%	31%	33%	33%	33%	32%
Trade receivables	11%	8%	10%	8%	8%	6%	8%	8%	9%	9%	9%
Contract assets	1%	3%	4%	4%	6%	7%	6%	6%	6%	6%	6%
Contract costs	-	3%	3%	2%	4%	4%	4%	4%	4%	3%	3%
Tax receivables	0%	1%	1%	1%	1%	0%	1%	0%	1%	1%	1%
Other receivables	3%	4%	5%	5%	6%	6%	6%	6%	7%	7%	7%
Financial investments	0%	4%	1%	1%	1%	0%	0%	0%	0%	0%	0%
Cash and cash equivalents	34%	25%	20%	17%	12%	12%	15%	13%	12%	13%	14%
Assets held for sale											
Total current assets	74%	72%	73%	67%	65%	68%	70%	71%	71%	72%	72%
Total assets	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Equity and Liabilities											
Share capital	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Other reserves	0%	0%	0%	-1%	0%	0%	0%	0%	0%	0%	0%
Retained earnings	28%	26%	23%	26%	24%	15%	18%	19%	20%	20%	22%
Equity attributable to Vestas	29%	26%	23%	26%	24%	15%	18%	19%	20%	21%	22%
Non-controlling interests	-	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Total equity	29%	26%	23%	26%	24%	15%	19%	19%	20%	21%	22%
Provisions	4%	4%	3%	4%	3%	5%	4%	4%	3%	3%	3%
Deferred tax	1%	1%	1%	1%	2%	1%	1%	1%	1%	1%	1%
Financial debts	5%	4%	5%	5%	4%	11%	10%	8%	8%	6%	5%
Tax payables	2%	2%	2%	2%	2%	1%	1%	1%	2%	2%	2%
Other liabilities	0%	1%	1%	1%	1%	0%	1%	1%	1%	1%	1%
Total non-current liabilities	11%	12%	11%	12%	11%	18%	16%	15%	14%	13%	12%
Financial debts	0%	0%	1%	3%	4%	1%	1%	1%	1%	1%	1%
Contract liabilities	28%	35%	35%	31%	31%	35%	35%	34%	32%	32%	32%
Trade payables	24%	20%	22%	20%	22%	20%	20%	22%	23%	24%	24%
Provisions	1%	1%	2%	3%	3%	4%	4%	3%	3%	3%	3%
Tax payables	1%	1%	1%	0%	0%	0%	0%	0%	0%	0%	0%
Other liabilities	5%	5%	5%	5%	4%	7%	5%	6%	6%	6%	6%
Total current liabilities	60%	62%	65%	62%	65%	67%	65%	67%	66%	66%	67%
Total liabilities	71%	74%	77%	74%	76%	85%	81%	81%	80%	79%	78%
Total equity and liabilities	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Source: Company Data and Author Analysis

Appendix 23: Cash Flow Statement Forecast

Cash Flow Statement													
mEUR	Historical						Forecast					CAGR	CAGR
	2017	2018	2019	2020	2021	2022	2023F	2024F	2025F	2026F	2027F	2021-2027F	2022-2027F
Profit for the year	894	683	700	771	143	-1,572	648	685	869	1,064	1,305	45%	196%
Adjustments for non-cash transactions	845	716	831	803	998	1,713	902	955	1,034	1,134	1,173	3%	-7%
Interest received	17	13	27	16	19	37	98	16	78	83	102	32%	23%
Interest paid	-33	-27	-47	-40	-39	-37	-35	-8	-38	-30	-61	-8%	-11%
Income tax paid	-262	-195	-251	-219	-174	-144	0	0	0	0	0	-100%	-100%
Other Taxes							-33	-1	-7	3	-20		
Cash flow from operating activities before change in net working capital	1,461	1,190	1,260	1,331	947	-3	1,580	1,647	1,936	2,254	2,499	18%	484%
Change in net working capital	164	-169	-437	-588	9	-192	-206	-36	-394	414	382	87%	215%
Cash flow from operating activities	**1,625**	**1,021**	**823**	**743**	**956**	**-195**	**1,374**	**1,611**	**1,542**	**2,668**	**2,881**	20%	271%
				743									
Purchase of intangible assets	-223	-295	-325	-309	-360	-448	-387	-442	-514	-584	-631	-10%	-7%
Purchase of property, plant and equipment	-268	-312	-451	-379	-476	-371	-523	-669	-779	-885	-956	-12%	-21%
Disposal of property, plant and equipment	8	8	4	1	3	48	0	0	0	0	0	-100%	-100%
Dividends from investments in joint ventures and associates			52		60	13	0	0	0	0	0	-100%	-100%
Cash flow from investing activities before acquisitions of subsidiaries, joint ventures, associates and financial investments	-407	-603	-729	-687	-773	-758	-910	-1,111	-1,293	-1,469	-1,586	-13%	-16%
Free cash flow before acquisitions of subsidiaries, joint ventures, associates and financial investments	1,218	418	94	56	183	-953	465	500	250	1,199	1,295	39%	206%
Acquisition of subsidiaries		-65	-3	218			0	0	0	0	0	-	-
Purchase of shares in joint ventures and associates			-11	-3	-208	-40	0	-112	-85	-87	-95	12%	-19%
Net purchase of other financial assets	-8		2	-1	-8	3	51	-48	-36	-37	-41	-31%	-269%
Disposal of subsidiary, net of cash					99		0	0	0	0	0	-100%	-
Disposal of investment in joint ventures and associates				32			188	0	0	0	0	-	-
Net cash flow from deconsolidation of subsidiary					-4		170					-100%	-
Purchase/Disposal of financial investments		-422	241	174	-5	116	-86	-44	-34	-34	-38	-40%	-180%
Cash flow from investing activities	**-407**	**-1,090**	**-491**	**-267**	**-899**	**-679**	**-587**	**-1,316**	**-1,447**	**-1,627**	**-1,760**	-12%	-21%
Free cash flow	**1,218**	**-69**	**332**	**476**	**57**	**-874**	**787**	**295**	**95**	**1,040**	**1,121**	64%	205%
Acquisition of treasury shares	-696	-402			-12		0	0	0	0	0	-100%	-
Dividends paid	-278	-250	-201	-209	-228	-50	0	-194	-206	-261	-319	-6%	-45%
Payment of lease liabilities	0	0	-197	-82	-135	-147	-161	-157	-159	-157	-147	-1%	0%
Proceeds from borrowings			100	94	642	1,756	105	272	352	297	172	-20%	-37%
Payment of financial debt			-205	-90	-143	-155	-169	-165	-167	-165	-155	-1%	0%
Transactions with non-controlling interest		13			-22		0	0	0	0	0	100%	-
Cash flow from financing activities	**-974**	**-639**	**-367**	**-234**	**-715**	**846**	**-225**	**-244**	**-179**	**-286**	**-450**	7%	-188%
Net increase in cash and cash equivalents	244	-708	-35	242	-658	-28	562	51	-85	755	671		89%
Cash and cash equivalents as at 1 January	3,550	3,653	2,918	2,888	3,063	2,420	2,378	2,940	2,991	2,907	3,662	-3%	9%
Exchange rate adjustments on cash and cash equivalents	-141	-27	5	-67	15	-14						-100%	
Cash and cash equivalents as at 31 December	**3,653**	**2,918**	**2,888**	**3,063**	**2,420**	**2,378**	**2,940**	**2,991**	**2,907**	**3,662**	**4,333**	10%	13%

Source: Company Data and Author Analysis

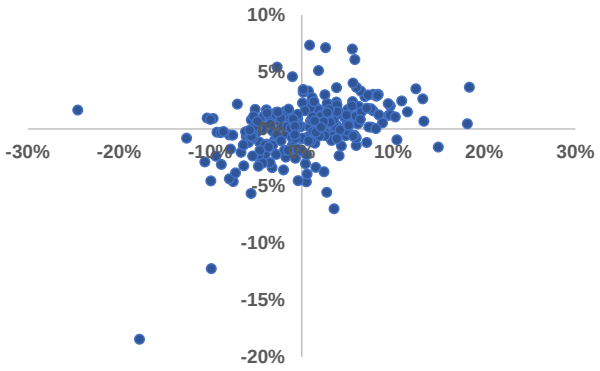
Appendix 24: Discounted Cash Flow Approach

	Forecast				
	2023F	**2024F**	**2025F**	**2026F**	**2027F**
EBIT(1-t)	761	796	977	1,164	1,391
Non-Cash Charges	953	978	1,009	1,071	1,155
Changes in NWC	206	36	394	-414	-382
CAPEX	989	1,111	1,293	1,469	1,586
Free Cash Flow to the Firm	**519**	**627**	**299**	**1,180**	**1,342**

PV (FCFF) (2023YE)	3,372 €
Terminal Value	30,311 €
PV (Terminal Value)	23,337 €
Enterprise Value	26,708,749,269 €
Total Debt	2,862,237,041 €
Minority Interests	16,000,000 €
Non-Operating Assets	3,018,599,146 €
Equity Value	26,849,111,373 €
Equity Value per Share (EUR)	26.59 €
Equity Value per Share (DKK)	198.3 DKK

Source: Author Analysis

Appendix 25: Beta - Linear Regression (Weekly, STOXX 600)



Unadjusted Beta	0.959666
Adjusted Beta	0.973111

Source: Author Analysis

Appendix 26: Beta - Pure-Play Method

Competitors	Levered Beta	Market Cap as for 23/05/2023 (million)	Total Debt	WACC Tax Rate	Beta Unlevered
Vestas	**0.76**	**26,556 €**	**2,920 €**	**22%**	**0.70**
Nordex SE	2.18	2,456 €	487 €	15%	1.87
First Solar	1.42	18,423 €	173 €	21%	1.41
InoxWind	0.53	402 €	185 €	25%	0.39
Goldwind	0.93	5,550 €	3,991 €	25%	0.60
General Electric	1.21	104,126 €	24,579 €	21%	1.02
NextEra	0.47	146,076 €	60,269 €	21%	0.35
Titan Wind Energy	0.82	3,458 €	1,013 €	15%	0.66
Ming Yang Smart energy	0.36	5,322 €	1,003 €	25%	0.32
Canadian Solar	1.46	2,412 €	3,722 €	38%	0.75
Siemens AG	1.17	125,020 €	50,636 €	15%	0.87
WEG S.A.	0.54	30,756 €	747 €	34%	0.53
Trane Technologies	1.18	39,891 €	4,486 €	13%	1.07

Mean	0.82
Median	0.70

Correction for Cash (Damodaran):

Industry Name	Number of firms	Levered Beta	D/E Ratio	Effective Tax rate	Unlevered beta	Cash/Firm Value	Unlevered beta corrected for cash
Green & Renewable Energy	20	1.6	121.12%	6.73%	0.84	4.38%	**0.88**

Vestas Levered Beta	**0.96**

Source: Author Analysis

Appendix 27: Flow to Equity Approach

	Forecast				
FCFE through FCFF	**2023F**	**2024F**	**2025F**	**2026F**	**2027F**
Free Cash Flow to the Firm	519	627	299	1,180	1,342
Interest Expenses(1-t)	-155	-160	-159	-159	-153
Net Borrowing	-64	107	185	132	17
FCFE	609	894	643	1,471	1,512

PV (FCFE) (2023YE)	4,252 €
Terminal Value	25,980 €
PV (Terminal Value)	18,969 €
Minority Interests	16,000,000 €
Non-Operating Assets	3,018,599,146 €
Equity Value	26,223,707,643 €
Equity Value per Share (EUR)	25.97 €
Equity Value per Share (DKK)	193.7 DKK

Source: Author Analysis

Appendix 28: Adjusted Present Value Approach

	Forecast				
APV	**2023F**	**2024F**	**2025F**	**2026F**	**2027F**
Free Cash Flow to the Firm	519	627	299	1,180	1,342
PV (FCFF)	519	586	261	962	1,022
PV (TV)					21,693
Present Value of Operations	**25,043**				
Interest Tax shield	39	40	40	40	38
PV (Interest Tax shield)	39	37	35	32	29
PV (TV)					619
Present Value of ITS	**792**				
Excess Cash	**3,019**				

Enterprise Value	28,853,133,446 €
Total Debt	2,862,237,041 €
Minority Interests	16,000,000 €
Equity Value	25,974,896,405 €
Price Target	25.72 €

Source: Author Analysis

Appendix 29: Multiples Approach

		Enterprise Value Multiples			Price Multiples		
	Company Name	**EV/EBITDA**	**EV/EBIT**	**EV/Sales**	**Price/Earnings**	**Price/Sales**	**Price/Book Value of Equity**
Wind	**Vestas**	14.03	28.08	1.70	**41.45**	**1.71**	**7.24**
	Nordex SE	147.57	N/A	0.39	N/A	0.38	2.32
	General Eletric	15.46	23.05	1.74	17.86	1.78	2.72
	Goldwind	11.21	18.89	1.35	13.44	0.78	0.96
	Ming Yang Smart energy	6.29	7.49	0.90	9.11	1.00	1.34
Solar	First Solar	15.61	21.97	5.03	25.12	5.59	2.93
Green Technology	Siemens Energy	7.24	N/A	0.33	N/A	0.49	1.04
	Peer Average	33.90	17.85	1.63	16.38	1.67	1.75
	Enterprise Value	64,531,706,707 €	16,975,206,218 €	25,525,889,708 €			
	Market Capitalization	64,672,068,811 €	17,115,568,323 €	25,666,251,812 €	10,610,277,041 €	26,218,787,576 €	6,490,648,998 €
	Implied Share Price	**64.04 €**	**16.95 €**	**25.42 €**	**10.51 €**	**25.96 €**	**6.43 €**

Implied Share Price	**25.69 €**

Source: Author Analysis and Companies' Data

Appendix 30: Consensus Recommendation

Institution	Analyst	Price Target (DKK)	Recommendation	Date
Jyske Bank	Janne Vincent Kjaer	210	Hold	06/15/2023
Bernstein	Deepa Venkateswaran	260	Outperform	06/15/2023
AlphaValue/ Baader Europe	Kulwinder Rajpal	205	Reduce	06/15/2023
SEB Bank	Kristian Johansen	250	Buy	06/14/2023
Citi	Martin Wilkie	340	Buy	06/07/2023
Deustche Bank	Gael De-Bray	210	Hold	06/05/2023
UBS	Supriya Subramanian	240	Buy	06/05/2023
HSBC	Sean McLoughin	165	Reduce	06/05/2023
Jefferies	Lucas Ferhani	246	Buy	06/01/2023
Deustch Bank	Gael De-Bray	210	Hold	05/26/2023
Credit Suisse	Mark A. Freshney	250	Outperform	05/12/2023
Morgan Stanley	Bem Uglow	157	Equalweight	05/12/2023
JP Morgan	Akash Gupta	156	Sell	05/11/2023
Berenberg	Henry Tarr	225	Hold	05/11/2023
Goldman Sachs	Ajay Patel	261	Buy	05/11/2023
ABG Sundal Collier	Stig Frederiksen	200	Hold	05/11/2023
Carnegie Group	Dan Togo Jensen	170	Sell	05/11/2023
Santander	Virginia Sanz de Madrid	200	Hold	05/10/2023
Danske Bank	Casper Blom	215	Hold	05/10/2023
Goldman Sachs	Ajay Patel	260	Buy	05/10/2023
Pareto Securities AS	Bard Rosef	215	Hold	05/10/2023
DNB Markets	Douglas Lindahl	242	Buy	05/10/2023
Morningstar	Matthew Donen	197	Hold	05/10/2023
DZ Bank AG Research	Werner Eisenmann	240	Buy	05/10/2023
BM Pekao	Marcin Gornik	260	Buy	04/25/2023
Fearnley Securities	Magnus Solheim	155	Sell	03/30/2023
HSBC	Sean D. Mcloughlin	165	Reduce	03/03/2023
Kepler Cheuvreux	William Mackie	250	Buy	02/23/2023
Santander	Virginia Sanz de Madrid	200	Hold	02/09/2023
Credit Suisse	Mark A. Freshney	250	Buy	02/02/2023
Societe Generale	Rajesh Singla	220	Hold	01/30/2023
Nykredit Bank	Klaus Kehl	200	Hold	01/30/2023
Jyske Bank	Janne Vincent Kjaer	200	Hold	01/20/2023
Pareto Securities AS	Bard Rosef	215	Hold	01/18/2023

Recommendation	# of Analysts	Average Price (DKK)	Average Price (EUR)
Buy	13	258 DKK	34.54 €
Hold	15	205 DKK	27.48 €
Reduce	3	178 DKK	23.91 €
Sell	3	160 DKK	21.50 €

Source: Bloomberg

Appendix 31: Financial Analysis' Ratios

PROFITABILITY RATIOS	2019	2020	2021	2022
Gross Profit Margin				
Vestas Wind Systems	14%	10%	10%	1%
Nordex SE	24%	12%	15%	9%
Siemens Energy	15%	8%	12%	12%
Goldwind	19%	18%	23%	18%
First Solar	18%	25%	25%	3%
General Electric	26%	24%	27%	24%
Peer Average	20%	17%	20%	13%
EBITDA Margin (%)				
Vestas Wind Systems	13%	9%	8%	-3%
Nordex SE	4%	-5%	1%	-5%
Siemens Energy	6%	0%	4%	4%
Goldwind	13%	12%	19%	15%
First Solar	9%	12%	15%	2%
General Electric	7%	13%	9%	8%
Peer Average	8%	6%	10%	5%
EBIT Margin (%)				
Vestas Wind Systems	8%	5%	2%	-11%
Nordex SE	0%	-1%	-2%	-7%
Siemens Energy	2%	-7%	-1%	-1%
Goldwind	10%	7%	11%	9%
First Solar	-3%	12%	20%	1%
General Electric	6%	11%	-2%	1%
Peer Average	3%	4%	5%	0%
Net Income Margin (%)				
Vestas Wind Systems	6%	5%	1%	-11%
Nordex SE	-2%	-3%	-4%	-9%
Siemens Energy	1%	-6%	-2%	-1%
Goldwind	6%	5%	7%	5%
First Solar	-4%	15%	16%	-2%
General Electric	-6%	7%	-9%	1%
Peer Average	-1%	4%	2%	-1%

LIQUIDITY RATIOS	2019	2020	2021	2022
Current Ratio (x)				
Vestas Wind Systems	1.12	1.09	1.01	1.01
Nordex SE	1.07	0.97	1.07	0.86
Siemens Energy	1.06	1.04	1.04	1.03
Goldwind	0.98	0.92	0.96	1.05
First Solar	2.73	3.56	4.40	3.65
General Electric	1.38	1.58	1.28	1.18
Peer Average	1.44	1.61	1.75	1.56
Quick Ratio (x)				
Vestas Wind Systems	0.68	0.62	0.57	0.54
Nordex SE	0.48	0.56	0.76	0.54
Siemens Energy	0.77	0.75	0.78	0.74
Goldwind	0.81	0.80	0.86	0.89
First Solar	2.35	2.89	3.48	3.05
General Electric	1.23	1.29	0.97	0.88
Peer Average	1.13	1.26	1.37	1.22
Cash Ratio (x)				
Vestas Wind Systems	0.31	0.27	0.19	0.18
Nordex SE	0.22	0.27	0.34	0.19
Siemens Energy	0.11	0.24	0.26	0.30
Goldwind	0.15	0.18	0.18	0.27
First Solar	1.64	2.06	2.52	3.65
General Electric	0.39	0.65	0.54	0.47
Peer Average	0.50	0.68	0.77	0.98

RETURN RATIOS	2019	2020	2021	2022
Return on Assets (%)				
Vestas Wind Systems		5%	1%	-8%
Nordex SE		-3%	-5%	-11%
Siemens Energy		-4%	-1%	-1%
Goldwind		3%	3%	2%
First Solar		5%	6%	-1%
General Electric		2%	-3%	0%
Peer Average		1%	0%	-2%
Return on Equity (%)				
Vestas Wind Systems		19%	3%	-41%
Nordex SE		-17%	-25%	-51%
Siemens Energy		-12%	-3%	-3%
Goldwind		9%	10%	6%
First Solar		7%	8%	-1%
General Electric		16%	-17%	1%
Peer Average		1%	-5%	-9%
ROIC (%)				
Vestas Wind Systems	19%	9%	4%	-23%
Nordex SE	-1%	-2%	-5%	-20%
Siemens Energy	4%	-8%	-1%	-1%
Goldwind	5%	5%	6%	4%
First Solar	-1%	4%	7%	0%
General Electric	3%	6%	-2%	1%
Peer Average	2%	1%	1%	-3%

ACTIVITY RATIOS	2019	2020	2021	2022
Total Assets Turnover (x)				
Vestas Wind Systems		0.91	0.82	0.73
Nordex SE		1.11	1.28	1.28
Siemens Energy		0.62	0.65	0.61
Goldwind		0.53	0.44	0.36
First Solar		0.37	0.41	0.35
General Electric		0.31	0.33	0.30
Peer Average		0.59	0.62	0.58
Fixed Asset Turnover (x)				
Vestas Wind Systems		3.02	2.46	2.19
Nordex SE		3.09	3.47	3.35
Siemens Energy		1.35	1.38	1.34
Goldwind		0.94	0.73	0.63
First Solar		0.68	0.71	0.62
General Electric		0.53	0.50	0.44
Peer Average		1.32	1.36	1.28
Days of Inventory on Hand				
Vestas Wind Systems		129	143	153
Nordex SE		116	76	64
Siemens Energy		93	86	97
Goldwind		55	50	70
First Solar		96	101	89
General Electric		91	107	127
Peer Average		90	84	89
Days of Sales Outstanding		74	72	71
Vestas Wind Systems		37	36	35
Nordex SE		10	9	11
Siemens Energy		59	57	67
Goldwind		75	178	205
First Solar		50	43	51
General Electric		76	79	106
Peer Average		54	73	88
Days of Payables				
Vestas Wind Systems		92	103	106
Nordex SE		92	84	89
Siemens Energy		68	77	90
Goldwind		113	286	342
First Solar		36	31	37
General Electric		102	111	144
Peer Average		82	118	140
Cash Conversion Cycle				
Vestas Wind Systems		73	76	82
Nordex SE		34	1	-15
Siemens Energy		84	67	75
Goldwind		16	-58	-67
First Solar		110	113	103
General Electric		65	76	88
Peer Average		62	40	37

LEVERAGE RATIOS	2019	2020	2021	2022
Net Debt to EBITDA (x)				
Vestas Wind Systems	-1.21	-0.91	-0.50	N/A
Nordex SE	1.31	N/A	-3.87	N/A
Siemens Energy	-0.93	-27.66	-2.83	-4.20
Goldwind	2.78	2.55	2.29	3.04
First Solar	-6.34	-4.48	-3.57	-68.06
General Electric	8.79	3.77	1.02	0.57
Peer Average	1.12	-6.45	-1.39	-17.16
Total debt/EBITDA (x)				
Vestas Wind Systems	0.66	1.30	1.40	-5.66
Nordex SE	4.95	N/A	6.17	N/A
Siemens Energy	0.50	23.62	2.42	2.55
Goldwind	4.28	3.89	3.24	5.35
First Solar	1.76	0.85	0.54	3.47
General Electric	14.01	7.37	5.03	5.49
Peer Average	5.10	8.93	3.48	4.22
Debt to Equity Ratio (x)				
Vestas Wind Systems	31%	39%	38%	81%
Nordex SE	94%	119%	46%	66%
Siemens Energy	8%	16%	18%	19%
Goldwind	71%	75%	86%	98%
First Solar	9%	5%	4%	3%
General Electric	339%	211%	87%	72%
Peer Average	104%	85%	48%	52%
Debt to Total Assets Ratio (x)				
Vestas Wind Systems	7%	10%	9%	12%
Nordex SE	18%	21%	12%	12%
Siemens Energy	2%	6%	6%	6%
Goldwind	21%	23%	26%	27%
First Solar	6%	4%	3%	2%
General Electric	36%	30%	18%	14%
Peer Average	17%	17%	13%	12%
EBIT Interest Coverage Ratio (x)				
Vestas Wind Systems	7.28	6.18	2.37	-9.85
Nordex SE	-0.16	-0.52	-0.83	-4.16
Siemens Energy	1.89	-11.13	-2.69	-2.52
Goldwind	3.31	4.72	4.78	3.08
First Solar	-3.44	13.21	45.00	1.67
General Electric	1.27	2.59	-0.96	0.46
Peer Average	0.57	1.77	9.06	-0.30

DIVIDENDS	2019	2020	2021	2022
Vestas Wind Systems	-201	-209	-228	-50
Nordex SE	0	0	0	0
Siemens Energy	0	0	0	-72
Goldwind		-89	-139	-139
First Solar	0	0	0	0
General Electric	-602	-601	-533	-593
Peer Average		-138	-134	-161
Dividend per Share				
Vestas Wind Systems	1.06	0.23	0.05	0.00
Nordex SE	-	-	-	-
Siemens Energy	3.90	-	0.10	0.10
Goldwind	0.34	0.21	0.36	0.35
First Solar	-	-	-	-
General Electric	0.04	0.30	0.30	0.30
Peer Average	1.42	0.25	0.25	0.25

Source: Author Analysis

Appendix 32: Sensitivity Analysis

The sensitivity analysis was performed to evaluate the significance of changes in key inputs in the target price. Therefore, it is relevant to look for deliveries, the ASP, and the terminal growth rate.

Deliveries were changed by about 10% of the original value, while ASP was 5%. For the terminal growth rate and WACC, it was 0.1%.

Onshore Deliveries

WACC	26.59 €	8,495	9,439	10,487	11,653	12,947	14,386	15,825	17,407	19,148	21,063	23,169
	6.26%	26.92	27.41	27.96	28.57	29.24	29.99	30.73	31.56	32.46	33.46	34.55
	6.36%	26.18	26.67	27.21	27.82	28.49	29.24	29.99	30.81	31.72	32.71	33.81
	6.46%	25.47	25.96	26.50	27.11	27.78	28.53	29.28	30.10	31.01	32.00	33.10
	6.56%	24.79	25.28	25.83	26.43	27.10	27.85	28.60	29.42	30.33	31.32	32.42
	6.66%	24.14	24.63	25.18	25.78	26.46	27.20	27.95	28.78	29.68	30.68	31.77
	6.76%	23.52	24.01	24.56	25.17	25.84	26.59	27.33	28.16	29.06	30.06	31.15
	6.86%	22.93	23.42	23.97	24.57	25.25	26.00	26.74	27.57	28.47	29.47	30.56
	6.96%	22.37	22.86	23.40	24.01	24.68	25.43	26.18	27.00	27.90	28.90	29.99
	7.06%	21.82	22.31	22.86	23.46	24.14	24.89	25.63	26.46	27.36	28.36	29.45
	7.16%	21.30	21.79	22.34	22.94	23.62	24.37	25.11	25.94	26.84	27.84	28.93
	7.26%	20.80	21.29	21.84	22.44	23.12	23.87	24.61	25.44	26.34	27.34	28.43

Offshore Deliveries

WACC	26.59 €	557	619	688	765	850	944	1,038	1,142	1,256	1,382	1,520
	6.26%	29.78	29.82	29.85	29.89	29.94	29.99	30.04	30.09	30.15	30.22	30.29
	6.36%	29.04	29.07	29.11	29.15	29.19	29.24	29.29	29.34	29.40	29.47	29.54
	6.46%	28.33	28.36	28.40	28.44	28.48	28.53	28.58	28.63	28.69	28.76	28.83
	6.56%	27.65	27.68	27.72	27.76	27.80	27.85	27.90	27.96	28.02	28.08	28.15
	6.66%	27.00	27.04	27.07	27.11	27.16	27.21	27.25	27.31	27.37	27.43	27.51
	6.76%	26.38	26.42	26.45	26.49	26.54	26.59	26.64	26.69	26.75	26.82	26.89
	6.86%	25.79	25.83	25.86	25.90	25.95	26.00	26.04	26.10	26.16	26.22	26.30
	6.96%	25.23	25.26	25.30	25.34	25.38	25.43	25.48	25.53	25.59	25.66	25.73
	7.06%	24.68	24.72	24.75	24.79	24.84	24.89	24.94	24.99	25.05	25.12	25.19
	7.16%	24.16	24.20	24.23	24.27	24.32	24.37	24.41	24.47	24.53	24.59	24.67
	7.26%	23.66	23.70	23.73	23.77	23.82	23.87	23.91	23.97	24.03	24.09	24.17

Offshore ASP

WACC	26.59 €	0.68	0.72	0.76	0.80	0.84	0.88	0.93	0.97	1.02	1.07	1.12
	6.26%	29.88	29.90	29.92	29.94	29.96	29.99	30.01	30.04	30.06	30.09	30.12
	6.36%	29.13	29.15	29.17	29.19	29.22	29.24	29.27	29.29	29.32	29.35	29.38
	6.46%	28.42	28.44	28.46	28.48	28.51	28.53	28.55	28.58	28.61	28.64	28.67
	6.56%	27.74	27.76	27.78	27.80	27.83	27.85	27.88	27.90	27.93	27.96	27.99
	6.66%	27.09	27.11	27.13	27.16	27.18	27.21	27.23	27.26	27.28	27.31	27.34
	6.76%	26.48	26.50	26.52	26.54	26.56	26.59	26.61	26.64	26.66	26.69	26.72
	6.86%	25.88	25.90	25.92	25.95	25.97	26.00	26.02	26.05	26.07	26.10	26.13
	6.96%	25.32	25.34	25.36	25.38	25.40	25.43	25.45	25.48	25.51	25.54	25.57
	7.06%	24.77	24.79	24.82	24.84	24.86	24.89	24.91	24.94	24.96	24.99	25.02
	7.16%	24.25	24.27	24.29	24.32	24.34	24.37	24.39	24.42	24.44	24.47	24.50
	7.26%	23.75	23.77	23.79	23.82	23.84	23.87	23.89	23.92	23.94	23.97	24.00

Onshore ASP

WACC	26.59 €	0.68	0.71	0.75	0.79	0.83	0.87	0.92	0.96	1.01	1.06	1.12
	6.26%	28.30	28.60	28.92	29.26	29.61	29.99	30.36	30.75	31.17	31.60	32.05
	6.36%	27.55	27.85	28.17	28.51	28.87	29.24	29.61	30.01	30.42	30.85	31.31
	6.46%	26.84	27.14	27.46	27.80	28.16	28.53	28.90	29.30	29.71	30.14	30.60
	6.56%	26.16	26.46	26.79	27.12	27.48	27.85	28.23	28.62	29.03	29.46	29.92
	6.66%	25.51	25.82	26.14	26.48	26.83	27.21	27.58	27.97	28.38	28.82	29.27
	6.76%	24.89	25.20	25.52	25.86	26.21	26.59	26.96	27.35	27.77	28.20	28.65
	6.86%	24.30	24.61	24.93	25.27	25.62	26.00	26.37	26.76	27.17	27.61	28.06
	6.96%	23.74	24.04	24.36	24.70	25.05	25.43	25.80	26.20	26.61	27.04	27.50
	7.06%	23.19	23.50	23.82	24.16	24.51	24.89	25.26	25.65	26.06	26.50	26.95
	7.16%	22.67	22.98	23.30	23.64	23.99	24.37	24.74	25.13	25.54	25.98	26.43
	7.26%	22.17	22.48	22.80	23.14	23.49	23.87	24.24	24.63	25.04	25.48	25.93

		Terminal Growth Rate										
	26.59 €	**1.73%**	**1.83%**	**1.93%**	**2.03%**	**2.13%**	**2.23%**	**2.33%**	**2.43%**	**2.53%**	**2.63%**	**2.73%**
	6.26%	26.95	27.50	28.08	28.69	29.32	29.99	30.69	31.43	32.20	33.02	33.89
	6.36%	26.35	26.88	27.43	28.00	28.61	29.24	29.91	30.60	31.34	32.11	32.93
	6.46%	25.77	26.28	26.80	27.35	27.93	28.53	29.16	29.82	30.52	31.25	32.03
	6.56%	25.22	25.70	26.21	26.73	27.28	27.85	28.45	29.08	29.74	30.44	31.17
	6.66%	24.69	25.15	25.63	26.14	26.66	27.21	27.78	28.38	29.00	29.66	30.36
WACC	**6.76%**	24.19	24.63	25.09	25.57	26.07	26.59	27.13	27.70	28.30	28.93	29.58
	6.86%	23.70	24.12	24.56	25.02	25.50	26.00	26.52	27.06	27.63	28.22	28.85
	6.96%	23.23	23.64	24.06	24.50	24.95	25.43	25.93	26.44	26.99	27.55	28.15
	7.06%	22.78	23.17	23.57	23.99	24.43	24.89	25.36	25.86	26.37	26.91	27.48
	7.16%	22.35	22.72	23.11	23.51	23.93	24.37	24.82	25.29	25.79	26.30	26.84
	7.26%	21.93	22.29	22.66	23.05	23.45	23.87	24.30	24.75	25.23	25.72	26.23

Source: Author Analysis

Appendix 33: Scenario Analysis

For the scenario analysis, it was performed the same changes for deliveries and ASP as in sensitivity analysis. However, for WACC, it was changed c.0.5% either for bull, and bear case.

Base Case	Price	Upside/Downside	Recommendation
Discounted Cash Flow	26.59 €	18.2%	BUY
Multiples	25.69 €	10.9%	HOLD/NEUTRAL
Adjusted Present Value	25.72 €	11.1%	HOLD/NEUTRAL
Flow to Equity	25.97 €	13.2%	HOLD/NEUTRAL

Bull Case	Price	Upside/Downside	Recommendation
Discounted Cash Flow	29.64 €	43.3%	STRONG BUY
Multiples	28.54 €	34.3%	STRONG BUY
Adjusted Present Value	31.72 €	60.4%	STRONG BUY
Flow to Equity	30.97 €	54.3%	STRONG BUY

Bear Case	Price	Upside/Downside	Recommendation
Discounted Cash Flow	23.73 €	-5.2%	SELL
Multiples	23.04 €	-10.9%	SELL
Adjusted Present Value	20.37 €	-32.8%	SELL
Flow to Equity	21.49 €	-23.6%	SELL

Source: Author Analysis

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Recommendation System	Investment Recommendation				
Level of Risk	**SELL**	**REDUCE**	**HOLD/NEUTRAL**	**BUY**	**STRONG BUY**
High Risk	≤0%	>0% & ≤10%	>10% & ≤20%	>20% & ≤45%	>45%
Medium Risk	≤-5%	>-5% & ≤5%	>5% & ≤15%	>15% & ≤30%	>30%
Low Risk	-≤10%	>-10% & ≤0%	>0% & ≤10%	>10% & ≤20%	>20%

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