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Abstract:

This report looks deeper into how the last five years have had external factors that dramatically changed the world, along with the wind turbine industry, with a focus on the Danish company Vestas, as well as how it should react to these factors.
These recent seems to have been more unstable than the period before it, namely the calmer period between the financial crisis and 2019, and recent times are therefore the base of interest of this report.
This started with issues around creating enough supply of different materials and chips, which started to create supply chain issues for many companies, which also impacted Vestas.
Afterwards the Corona virus meant shutdowns almost everywhere, forcing Vestas to seize production in plants temporarily, and required layoffs as well. Raw material, distribution and energy costs also sore upwards. However, governments were quick to react with stimulus and new incentives to help throughout society, but especially also in renewable energies. The political help only grew after Ukraine was invaded by Russia, incentivizing especially European countries to accelerate the path of independence of Russian energy.
Both supply chain issues and rising demand have already started showing in Vestas' financials, where backlog is now bigger than ever, while margins are negative for the first time in a long while.
Looking forward Vestas can expect to be impacted even more by the competitiveness in the market, as big competitors will be even more eager than ever to get a bigger slice of the growing industry, also shifting the bargaining power to customers, while some suppliers are also currently on top due to scarcity.
Even with this, expectations are that wind industry will grow to be the biggest source of renewable energy in the future, and with Vestas currently being the biggest in this segment, expectations have only grown exponentially in the last 5 years, as their stock price has also soared upwards compared to both the international and national market, as well as the industry. This reflects Vestas current market position as market leaders, and with several strong sides and opportunities.
Despite huge expectations, Vestas suffer different weaknesses and external threats, which must be mitigated in order to maximize growth. This can both include diversification, in terms of both revenue streams, geographics and suppliers, as well as preparing for different future scenarios, as the last five years have clearly shown that the future can be very difficult to foresee. Doing so will require the company to remain agile, a difficult task for a company of Vestas size, but inevitably a task that can help them better react to potential changes in demand and material supply, as well as changes in regulations and policies worldwide.

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Subject of Choice:

The main topic of this report will be looking at how recent years in history have globally been heavily influenced by several unforeseen happenings, many with drastic consequences, and their impact on the Danish company Vestas.

Since the end of the financial crisis in the late 00's, many developed countries have had a stable GDP-growth for quite a while. Furthermore, inflation rates have also remained within where most economies aim to have it[1] [2], without it being too high nor too low, aiming at only a few percentages per year.

In the same period, there have also been only few significant political conflicts, with Brexit perhaps being one of the more significant ones.

This calm period seen both politically and economically would in around 2019 then be impacted firstly by a shortage of chips, which were used in products with electronic elements required to work. Big industries such as for example the computer and car industry were largely impacted, and are still to this day, by heavy delays in new products, long waiting time on current products, and higher prices on the parts.

Shortly after, the Coronavirus was found in China and quickly spread to the rest of the world, resulting in many countries going into lockdown with varying restrictions. As this would slow down economies dramatically, most countries decided to help stimulate the economy. To pump money back to the economy is a common way to help keep demand up, although it does not come without consequences. The consequence would show up quickly, and inflation was now a beginning problem growing month to month. Inflation itself is not an issue when kept around a few percentages a year, but high inflation will become a problem.

To make matters a lot worse, the European continent saw war break out in February of 2022, when Russia made the decision to invade the eastern and northern part of Ukraine.

As of writing this paper, the war is still raging, more than a year after its beginning, and fears of more violence are ever growing.

The response from many parts of the world was to enforce different sanctions against Russia, which Russia has afterwards responded to by making sanctions of their own.

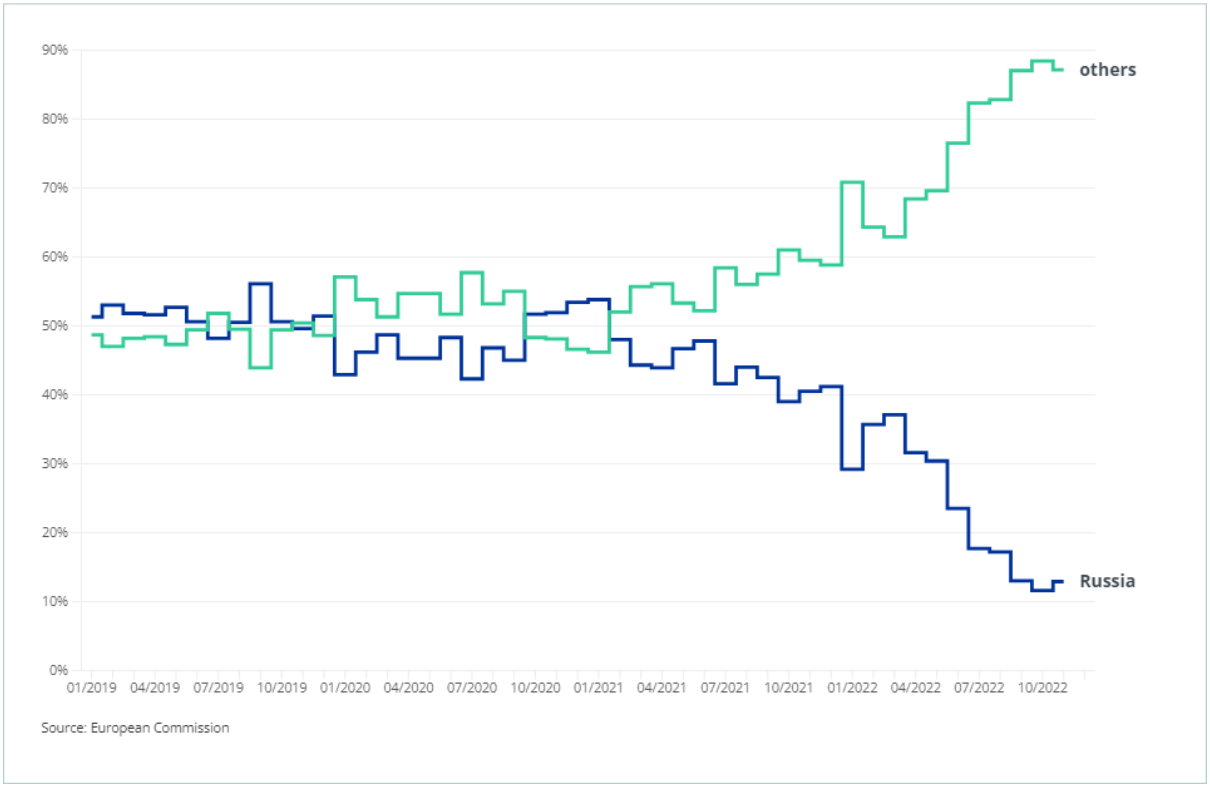
A big part of the sanctions in relation to Russia has been revolving around gas, as many countries, especially in Europe, are depending on Russian gas [3]. Below chart shows the gas supply to

[1] https://www.ecb.europa.eu/mopo/strategy/pricestab/html/index.en.html

[2] https://www.federalreserve.gov/faqs/economy_14400.htm

[3] https://www.consilium.europa.eu/en/infographics/eu-gas-supply/

Europe divided between Russia and all other sources.



With many countries being dependent on this gas, which is now either not being used or being heavily taxed, the price of energy has risen immensely since war broke out. To counter this, some countries have offered more stimulus into the economy.

This has created even more inflation, both due to the energy prices, and to the increase in printed currency.

As the inflation rates have become a serious issue, interest rates all over the world have now for the first time in a long while started to rise again.

But as the debt levels of many countries are also high, an increase in interest rates will hit these already struggling economies even harder. Thus, the interest rates for example between USD and EUR, from the FED and ECB, have not followed each other exactly, with the interest rates in Europe usually lacking a bit behind. The difference in interest rates and inflation rates have therefore also created big volatility in the exchange rates between USD and EUR.

With the current pressure on the world, both politically and economically, it can be easy for many to deprioritize focus on sustainability and climate change. However, this subject has far from been forgotten. As many countries seek an alternative to Russian gas, the focus on sustainable energy and the companies within this sector has perhaps never been bigger.

There are multiple big companies within this sector, and one of them, within the wind energy section, is the Danish company Vestas. A company represented in the C20-index, Vestas is a

global partner when it comes to the energy industry, focusing on sustainable solutions within the sector.

The company focuses on both designing, manufacturing as well as the installation of wind turbines, which are both for offshore and onshore, with service of the turbines as well. It is one of the top competitors on the market, with wind turbines producing more than 145 GW wind power, when looking globally, while having 40+ years' experience.

Having almost 30.000 employees employed across the globe, they sell their solutions to many different countries.

The latest years of ever-increasing focus on climate changes has also shown up as revenue for the company, as it has risen for around 10 billion euros in 2017, to more than 15 billion euros in 2021. Despite this, the company seems to not have been able to drive this increase in revenue into profits, as the profit in 2017 of 894 million euro, was higher than the profit in 2021 of only 176 million euro. When comparing the 176-million-euro profits to a revenue of over 15 billion euro, this cannot be all too satisfying for investors. Problems with profits is indeed something the company has struggled with before, having been on the brink of bankruptcy on several occasions, most recently only 11 years ago.

It would be expected that a company such as Vestas, who operates within the turbine industry from end to end, that the events mentioned previously are likely to become big impacts when it comes to future growth. On one hand there is a possibility of recession from the inflation and interest rates, but on the other hand there might lie opportunities as political agendas favor future green energy over Russian gas. However, these future growth opportunities may be hindered by issues in sourcing as also mentioned, when perhaps both encountering delays and increase in cost prices.

Thus, it seems the recent times and future have placed Vestas in quite a storm, which will be the focus of this report.

Problem Identification

The developed markets are currently under immense pressure from different aspects, all affecting them to some extent. Issues in supply chain, the coronavirus, big nations in war, and with inflation and interest rates soaring upwards, many countries and companies will have seen recent results likely being very different from previous expectations, and will also have adjusted future expectations, based on the aforementioned events.
While these expectations for most companies have been adjusted down, some specific sectors may see something to gain.
For Vestas, a very large company but with very thin margins, any bigger adjustments to operations could have critical impacts. Already low profitability could easily be seen being even more challenged with perhaps higher costs from sourcing issues, lead times, or perhaps high interest rates leading to customers being less likely to spend large sums.
These different elements mentioned previously will already have impacted Vestas, and will also continue to do so, meaning an understanding of how exactly Vestas has been impacted, could lay the foundation to understand how the company will also be impacted going forwards.
Understanding what has impacted the company, and what will continue to do so, will also be the base of how the company should act in the future.

Problem Formulation and Research Questions

With the above introduction and problem identification briefly explained, a problem formulation can be formed as such:

How has the recent global destabilization impacted Vestas so far, and what is the outlook of the company going forward?

To help answer this, the following research questions will be answered individually:

1: How have external factors impacted Vestas in the last 5 years?

2: Which factors will continue to influence Vestas going forward?

3: What should Vestas do, following the recent global events?

The goal with these questions, is to initially get a better understanding of how reality has changed recently for the company compared to expectations, but also to the industry. Another point to this is also the importance of knowing the past better, in order to better act in the future, as a better understanding of where the company stands and where it comes from is acquired. By looking at the recent 5 years, and the effects of the factors, a good base foundation will be attempted to be laid as a start.
After a good understanding of the previous and current situation has been established, looking into the near future is a logical next step. The first step would be to look at what has impacted the company recently and try to identify if these are factors that are going to continue to be an obstacle or opportunity for the company, or if perhaps instead it is something that is going to go down in relevance. Apart from that new threats and opportunities may be present and will pose a challenge for the company in the near future.
With both a good understanding of what has impacted the company recently, as well as what will continue to do so, together with a deepened understanding of the company, it is thereafter relevant to look at what the company and its resources have done, can do, or should do to attempt to mitigate potential risks the best way, scale down already occurring risks and threats, while simultaneously making the most of old or new opportunities.
As the questions above are answered after being analyzed, the company would likely be able to put together a strategy and initiatives, setting themselves up the best way for the future.
In the end it should be fairly simple to string the conclusions from the analysis of the research questions above, to put together an answer that can explain the problem formulation stated initially.

Theory Choice and Delimitation

When it comes to theory choice, there will be different ways to view and different paths to take in order to answer all of the individual research questions. While there might not be any objectively correct or incorrect ways to answer them, some theories, models and analysis can help to better

answer the questions at hand. Some of these questions may be more relevant now given the recent events, while other models would perhaps have been better at explaining the same questions, if we were in calmer markets.
Given Vestas' size, the focus will be on going in depth with the theories and models used, rather than using more theories and models but with less information in each. The reason for this is that given the size of the company and industry, as well as the amount of available data, it allows for a more in-depth analysis, instead of simply brushing the surface with a lot of smaller ones.
3 research questions were chosen, as with these 3 it should be possible to both paint a picture of recent times, of what is to come, and how the company should approach these in conjunction. Therefore, with good conclusions from all 3 research questions combined, and with the conclusions drawn in respect to each other, it should be possible to answer the problem formulation satisfactorily.

1:

Answering the number one question, the focus undeniably is on external factors that have impacted Vestas, and their industry as a whole.
For this there are multiple different models which could see use, but before doing so, a better understanding of the company Vestas and the markets in which they operate. While it is a Danish company at first, it is also a company being very much impacted by what is happening in other countries and parts of the world. The initial focus should therefore be to get an understanding of which exactly these are, and to which of these have the biggest impact. While it may not be possible to include and analyze all the factors in all the markets they operate in, getting a good understanding of the biggest will likely be sufficient to go forward with getting an idea of what impacts the company. When this is done, and the analysis of the markets is done, it can be summed up using a model.
One model that could be used, could be the PIE-model, focusing on politics, institutions and economy. These are three of the absolute main factors that have likely impacted Vestas recently, and gives a good depth, as both formal as well as informal institutions are taken into account.
However, for this report, another good model for summing up similar information is the PESTEL. While also focusing on politics and economy, this furthermore looks at social, legal, technological and environmental factors. It is presumed that including these areas with each of their own dedicated focus will provide value, as all these areas may indeed be very important to Vestas, and especially in recent history.
While some of these factors may be somewhat correlated with each other, for example the political

decision about lockdown would have had a negative impact on the economy, it will be beneficial to see how these intertwine.
The PESTEL should also show somewhat clearly which of these areas are affected in ways which may perhaps not only explain some of the development previously but will also be having effect in the future. As mentioned previously, the next research question(s) will also benefit from being able to tell which of the external factors that have affected the company will continue to do so in the future.
Another way of going about this could have been to create both a PESTEL-model which was focused on factors that have had an impact up until now, and then a second PESTEL-model looking only at what is impacting the company in the future, but as many of these will be repeated, one single PESTEL will make more sense in this case.
While the PESTEL is good for explaining the external factors that have influence on the company, it gets criticized for not necessarily providing an answer to how the company should and does deal with the factors mentioned. This is attempted to be addressed in the last research question instead.
The first research question focuses on what ways the factors have impacted the company, and another way to view the impacts, is to look directly at the company finances. There are several reasons for this; it firstly hopefully ties together the expected impact from the PESTEL, to the actual impact on the finances. As the world moves fast, and since Vestas is a publicly traded company, the effects should already be quite visible in their books, and should be published quarterly, making the information readily available.
There are again also benefits to looking into the finances when looking at the research questions ahead, as an understanding of their finances will also help tell the story of how much potential headwind the company is financially able to stand and reveals other strengths and weaknesses about the company.
One of the weaknesses of a financial analysis is that it only shows the true facts of the pasts, while offering very limited information on the future. This therefore only provides a “here and now”-picture and is therefore already dated the day after it is released.
The time period has been limited to the last 5 years, as anything happening prior to that has likely already been dealt with, and because it is within this time frame that several external events have taken place, that could impact the company.

2:

Going from looking at the recent past in research question number one, to looking at current and future in research question number two, several of the findings in the first are very likely to still be relevant. Therefore, the initial part will look at what factors are still important for this question. Although some of these will probably require further research as well, for example the inflation up until now has been mostly relevant in the first question, while expected future inflation was not, but will be for this question.
For other theories that can help explain what to expect from the future, the different parities will be looked at. Combining the information from the PESTEL with parities gives a good understanding of current and future expected inflation and exchange rates, and what effects they will have.
Another important point to how Vestas is expected to perform, is how the overall market that they are operating within is looking. The new scenario that they are finding themself in may well have changed in the last few years. Because of that, it makes sense to research their current position on the market, as well as the other actors on the market.
As the supply chain issues could also have impacted the bargaining power of their suppliers, and financial pressure could have had an impact on the customers, a full Porter's Five Forces analysis will also be relevant.
Some critics that the model usually gets is that is does not take future demand enough into account, but this is attempted to be addressed in the last research question, which combines current market situation with how the company should act going forward.
The supply chain issues could also be the basis of a whole supply chain analysis, but this has been left out of the report. The reason for this is that while pressure on the supply chain has likely increased, the procedure may not have changed dramatically. Also, getting a full understanding of their supply chain might be difficult to keep relatively short, and as the other models seem more relevant for their future, a full supply chain analysis has been left out.

3:

To analyze how the company should act in the current market, first the notable conclusions from the first two research questions should be restated. How the company should operate going forward will be heavily dependent on what has happened to the market and themselves recently, as well as what the outlook for the market and themselves looks like in the future.
To summarize this, a SWOT analysis can be used to sum up both the internal strengths and weaknesses identified in prior analysis, and external opportunities and threats can also be

highlighted.
Looking at these four areas will ensure the company exploits their strengths and opportunities, while limiting and/or improves their weaknesses and mitigates their threats.
While the SWOT is a good too, it should not be seen as a direct analysis, but rather be seen as a way to sum up the previous analysis made.
After having summed these up, the next stage of answering the research question will be to look into risks and risk mitigation mainly, but also looking at possible growth-opportunities.
The IB course have a big focus on global risks and risks mitigations, which this report will attempt to draw into action, and should be a way for the company to help avoid difficult times.
After this, the last point will be somewhat related, which is looking into how scenario-analysis can help the company better prepare for a number of potential future outcomes, all gated behind a lot of uncertainty.
Regarding delimitation, Ansoff's matrix will not be taken into use. The reason for not using Ansoff's Matrix is that this model focuses on alternative growth strategies for a company, for which there are two concerns. The first is that in difficult times, additional funding for new growth is less likely to be allocated, as the finances will likely be required somewhere else in the company.
The other reason is a lack of obvious opportunities. While Vestas will likely always seek new markets if a market should start allocating money for renewable growth, this is not necessarily an entirely new strategy. Neither would it be suitable for a company like Vestas to also attempt to build other green energy solutions. While they do not discourage the use of for example solar energy, their own competences lie within wind energy.
Instead of looking mainly at growth strategies, some theories from risk management will likely prove more useful and will together with the general understanding of the company’s current risk mitigation, be able to show where focus should be placed.
Another model that could have seen use is the TOWS, which looks at the SWOT and turns them into actionable points to deal with the items in the SWOT. While this is also a good opportunity, the main focus from this report is on the difficult recent times and the external factors they have brought with them, and how to mitigate them, rather than how to amplify the strengths of the company.

Methodology and Data

The choice of methodology can be to focus on a research approach that is either inductive, aiming at developing a theory as a first point, or deductive, which seeks to test an already existing theory. While these are the standpoints used theoretically, reality does not always reflect this very black and white picture the same. Apart from not always being crystal clear, reality can also change over the course of time. Keeping an openness in terms of methodology is therefore important and is also the aim for this report.

The start of this report will have some assumptions regarding the external events mentioned, and their effects on the company. A rather large effect is assumed and can therefore be viewed as an existing theory which is to be researched and tested. The initial methodology will therefore be leaning more towards a deductive approach. However, a mix can then be more suitably applied for the second research question, where both an expected continuation of the existing theories will be tested, but looking forward, new theories could also be developed.

Lastly, in the third and final research question, the focus is mainly on how the company should respond to what is happening currently around them, and their current state as well. With this, new theories will be developed, and a more inductive approach is therefore more suited, in broader terms at least.

The conclusion is therefore that both deductive and inductive approaches are to be used for the method of this paper.

In regard to the collection of information, this paper will be using qualitative combined with quantitative data. Simply using one would not be able to thoroughly explain and answer all research questions. However, a combination of both should be able to best provide different insights, which combined will paint the full picture the best.

To put this into a clearer perspective, looking at the first research question, quantitative data can be used in highlighting external effects in recent times, such as interest rates, inflation, covid effects, quantitative easing etc. In these cases, actual numbers will be a good indication of the development that is to be researched.

On the other hand, the data that is more qualitative can give different views which the qualitative data cannot. To again put this into clear perspective, this can for example be done with the other research questions. If the recent war in Ukraine has shifted what most of the people value or view as their main global concerns, the focus on environmental issues may have started to be prioritized less.

Another example could be analyzing the relationship between the company and either their customers or suppliers. Only measuring these in numbers would be close to impossible and

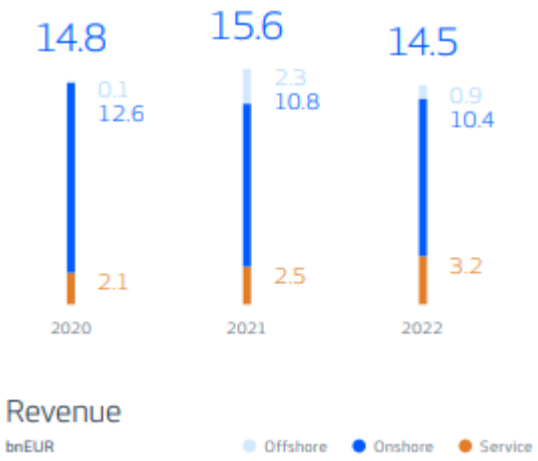
insufficient.
Being able to draw conclusions from both quantitative data, qualitative data, as well as a combination from both will likely lead to the most covering answers to the research questions, and in the end, the problem formulation.
Given the difference in qualitative and quantitative data, the literature used for this report will therefore also be from a variety of different sources. Vestas is a large company with many articles being written about the firm, and therefore having extra focus on the sources becomes even more crucial.
Most sources will come from websites with access granted through CBS, combined with some websites used for trustworthy economic data. These could be the World Economic Forum, OECD, World bank etc. These websites provide mostly quantitative data, but also with some qualitative data and outlooks for the future as well.
There are also different sources directly related to the industry which will be used, for example IEA (International Energy Agency) and WindEurope.
Another source used will be Vestas directly. With the company listed on the stock exchange, they are likely to want to push information to stakeholders and shareholders, in the form of for example detailed annual and quarterly financial reports, with commentary.
However, the focus will mainly be quantitative, as their financial numbers should be the best indications of how the company is doing, they may try to make reality sound better and more optimistic than it is, to keep up investor hopes, and company share prices.
With the company being listed publicly, many analysts will likely also do much research about both the company, but also the industry. This report will therefore also take analysts' reports into consideration, but these should be viewed compared to each other, as some may be more positive than order, a better full picture is achieved by looking not only at a few of them.
Another way of gaining the required information could be to contact Vestas themselves. More often than not, publicly traded firms such as them will have investors relation who can provide even more information directly. However, as there is so much data already available, this has not been deemed necessary.
As they are publicly traded, another form of data is also available, and will be used also to assess the changes in the perceived value of the company, and this is done by their stock price.
Evaluating the stocks movement in the given period, both isolated, compared to others in the industry, and compared to the market as a whole, should also give a good indication of how the company is doing and expected to do in the future in comparison.
Given the company size and available data, the main data sources will therefore be secondary data rather than primary data.

Even with all these sources of information, it is likely that something will be missed along the way, as not all articles can be read, which of course leaves some uncertainty.
There is also a chance that after this paper is finished, reality can quickly change for the company, meaning this should be viewed mostly as a static perception.
Due to the amount of available information, having a high sense of source criticism is also important. While financial data such as their own finances, their competitors' finances, and stock prices may reveal the “truth”, softer values and opinions will not be as clear to evaluate if completely true.
A way to mitigate incorrect data and untrustworthy information will therefore be to attempt to find multiple sources confirming the same stories or sharing the same views on the company.
Another thing to remember is that the communication from the company itself might also be attempting to make the upsides sound even better than they might be, and to underplay the potential risks in the company, to maintain a higher stock price and less perceived uncertainty.
Some analysts may also have a skewed view or have certain interests. Again, multiple sources will be taken into consideration to mitigate these risks.
Choosing trustworthy sources and getting them confirmed by multiple sources will therefore be the main way to deal with overall source criticism issues.

An introduction to Vestas

Before beginning the analysis of the initial research question, a baseline understanding of the company follows first.
The company Vestas was founded back in 1945 by Peder Hansen but has roots that go back even further than that. The company was founded in the western part of Jutland Denmark as a blacksmith and started out by creating different kinds of appliances and kitchen tools, as well as agricultural equipment.
From then, the company went on to produce parts such as milk coolers, cooler for turbo chargers, and hydraulic cranes for light trucks, before starting to explore alternative energy production in the 70’s. While the first prototypes and even mass-produced wind turbines did suffer from various issues and low power output, as technology evolved and more parts of the supply chain and this quality control was taken in house, the performance of the turbines improved.
Despite being on the brink of bankruptcy in 1986, the company and their orders grew through the 90’s and early 00’s, as offshore also became a possibility, and as the company went public.

Even though the company has been in financial issues from time to time, the company today has now grown to a very large size, by both organic growth from technological advances and a competitive edge, as well as through various acquisitions over the last decades.
The company advertises its values as simplicity, collaboration, accountability and passion. Most noteworthy are their focus on being agile, as well as a remained customer focus.
This has led to the company today being a global leader in both onshore wind turbines and service of them, as well as being a leading player on the offshore market. It has over 29.000 employees who help design, manufacture, install and service wind turbines and hybrid projects in over 88 countries worldwide. While the company openly supports all sorts of sustainable energy solutions, the company focuses on wind energy, with their installed base of +164 GW wind turbines.



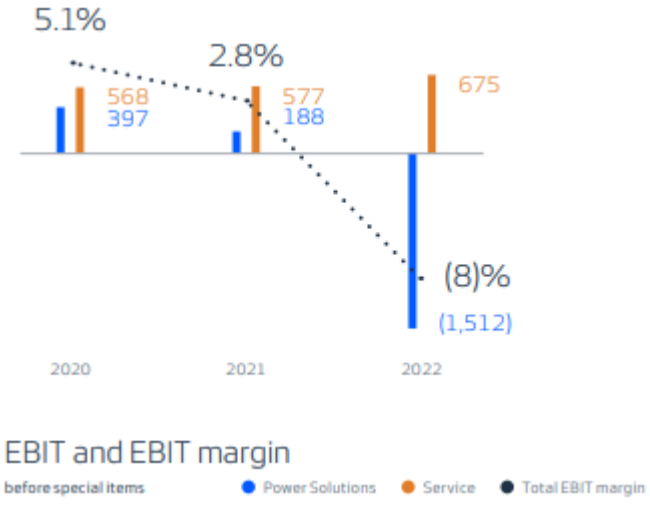
While offshore is indeed a focus for the company, in 2022 the onshore turbines accounted for over 10bnEUR in revenue, while offshore was less than 1bnEUR, and service being at 3.2bnEUR[4].

Geographically, EMEA is taking up more than 50% of the revenue generated in both 2022 and 2021, with the Americas being around 30-35%, and Asia Pacific being the remaining 15-20%.

Geographical distribution of revenue

mEUR	2022	2021
EMEA	7,826	8,818
Americas	5,111	4,807
Asia Pacific	1,549	1,962
Total	**14,486**	**15,587**

Though the revenue has not gone up recently, the EBIT and EBIT margin has unfortunately for the company also been challenged, where especially power solutions is struggling to break profits.



[4] Vestas 2022 Annual Report

Recent times for Vestas

As mentioned previously, with the first research question focusing on recent events impacting the company, the first part of getting this understanding will be with the PESTEL. As Vestas is a global company, no single market will be focused, however North America and Europe will be amongst the most important areas for the company.
As a reminder, the focus of this research question is limited to the latest 5 years as of today.

PESTEL

(P)olitical

The first and arguably one of the most important points in the PESTEL will be the political factor. While this factor will for all companies always be of big importance, the recent events globally will have made political factors even more determining.
With the pandemic came for nearly all countries, varying levels of lockdowns, both in terms of length and strictness. For a company with most of the revenue coming from building new wind turbines, shutdown of both own and supplier factories resulted in big consequences. Already in April of 2020, the company suspended guidance for the year[5], after delivering close to Q1 targets. Not long after, the company decided to start cutting jobs[6] as R&D projects were slowed.
However, the production halts due to the pandemic were not severe enough to drastically impact the company in terms of slow production falling through to the revenue. The company achieved an increase in revenue of 22 percent in 2020, and even increased their order backlog from 16bnEUR to 19bnEUR as well[7]. Thus, the political impact regarding restrictions during COVID may have slowed potential growth, but not to a concerning level, as the company was indeed able to still grow during the peak year of the virus.
This may on its own be somewhat surprising, as the energy sector would be very closely linked to the productivity of the different economies. With a slowdown in the economy, there would likely also be a decrease in demand for more energy production, also meaning lower energy prices, lowering demand even further.

[5] https://www.vestas.com/en/media/company-news/2020/vestas-suspends-guidance-for-2020-c3082966
[6] https://www.greentechmedia.com/articles/read/vestas-makes-400-job-cuts-as-coronavirus-impact-bites
[7] Vestas 2022 Annual Report

However, what materialized was not a long U-shaped recovery pattern in the economy, once again mainly due to political factors.

According to GWEC (Global Wind Energy Council) already back in April 2020[8], "Estimates of stimulus packages that have already been launched or announced are in excess of $10 trillion globally".

In other words, to avoid a long U-shaped recovery from the lockdowns, sickness, and deaths, large stimulus packages were quickly announced and rolled up, meaning a quicker V-shaped recovery.

According to DNV, there would also be quite a significant impact on electricity prices between a V-shaped recovery, which was expected to fall between 3-4% in 2020-2021, and a U-shaped recovery, which would instead have meant a decrease around 6%[9].

While higher electricity prices due to stimulus makes the business case for wind turbines better on its own, another positive of the stimulus is of course the stimulus itself. According to IEA (International Energy Agency), with data from IMF (International Monetary Fund), $480 billion globally has been dedicated to clean energy from stimulus packages, with around $17 billion of these being directed at onshore and offshore markets, in which Vestas operates. Geographically, the majority of this comes from Europe.

A part of this comes from The Recovery and Resilience Facility (RRF) from the European Union, a part of the EU stimulus program announced in 2020, with a budget of EUR 724 billion, with at least 37% of the budget being required to be spent on climate-related issues[10].

But the path back to more normal lives in Europe was then in 2022 disrupted again.

Because as if a global pandemic with following politically decided lockdowns and stimulus packages was not enough, tensions between Russia and Ukraine meant that on the 24th of February 2022, Russia invaded Ukraine, once again meaning war on the European continent, disrupting the world. Many of Vestas biggest markets were quick to side their sympathy with Ukraine and condemned the aggressions from Russia. Denmark did the same. As a result of this, Vestas announced on their 2022 annual general meeting that the company planned to withdraw all its activities in Russia[11].

The loss of the Russian market, which in 2021 ranked the 11th biggest economy in the world according to Statista[12], was not a small loss for Vestas either. However, CEO Henrik Andersen informed at the same meeting that Russia was not amongst the ten largest markets for the

[8] https://gwec.net/wind-industry-statement-on-economic-recovery-from-covid-19/
[9] https://www.dnv.com/article/will-the-coronavirus-pandemic-impact-the-global-wind-industry--179046
[10] https://www.iea.org/articles/how-much-will-renewable-energy-benefit-from-global-stimulus-packages
[11] https://www.vestas.com/content/dam/vestas-com/global/en/investor/corporate-governance/general-meetings/2022/2022_agm_mom_uk.pdf.coredownload.inline.pdf
[12] https://www.statista.com/topics/7835/economy-of-russia/

company. Although therefore not a major market, an also one which with their gas-supplies were not likely to become a top 3 market anytime soon, Vestas did suffer financially from this withdrawal from the Russian market, as already back in 27th of September 2021, the company received four separate projects for an order of 253 MW totally[13].

Calculating the exact negative impact of the withdrawal from the market may be difficult, Vestas themselves noted a EUR 269m cost recognized in their 2022 following Russia's invasion, with most of this (EUR 159m) being write-downs of inventories located in the two countries. Vestas ended 2022 with a negative profit before tax of EUR 1.572m, so this is quite a significant part of it. While these are the direct costs of the withdrawal, there will also be additional revenue and margin that is missed going forward due to the stopped activities in the country. What exactly the lost revenue and margin going forward will be, is unknown.

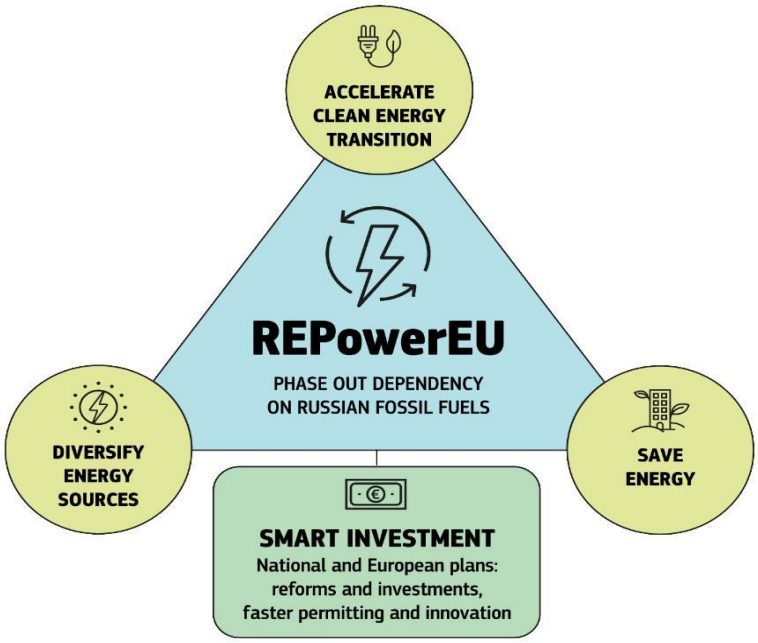
The other part of the withdrawal from Russia, comes in the form of the boycott of Russian gas. As displayed earlier, before the conflict Europe received around half of their gas from Russia, thus being heavily reliant on the resources. With the conflict and sanctions, many countries, especially in Europe, immediately started seeking other alternatives. While the world was by no means ready for a complete stop of inflow of Russian resources, many were quick to react. The European Union were already by 18th of May ready with a specific plan to rapidly reduce its dependency on Russian fossil fuels and accelerate the movement to greener solutions[14]. This was dubbed the REPowerEU Plan.

While the plan is quite detailed, the main points were summarized with this illustration [15]:

[13] https://www.vestas.com/en/media/company-news/2021/vestas-adds-to-russian-order-book-with-253-mw-across-fo-c3422029

[14] https://ec.europa.eu/commission/presscorner/detail/en/IP_22_3131

[15] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2022%3A230%3AFIN&qid=1653033742483



While the “Save Energy”-initiative will not directly help the case for Vestas or its competitors, the other points should be seen as opportunities.

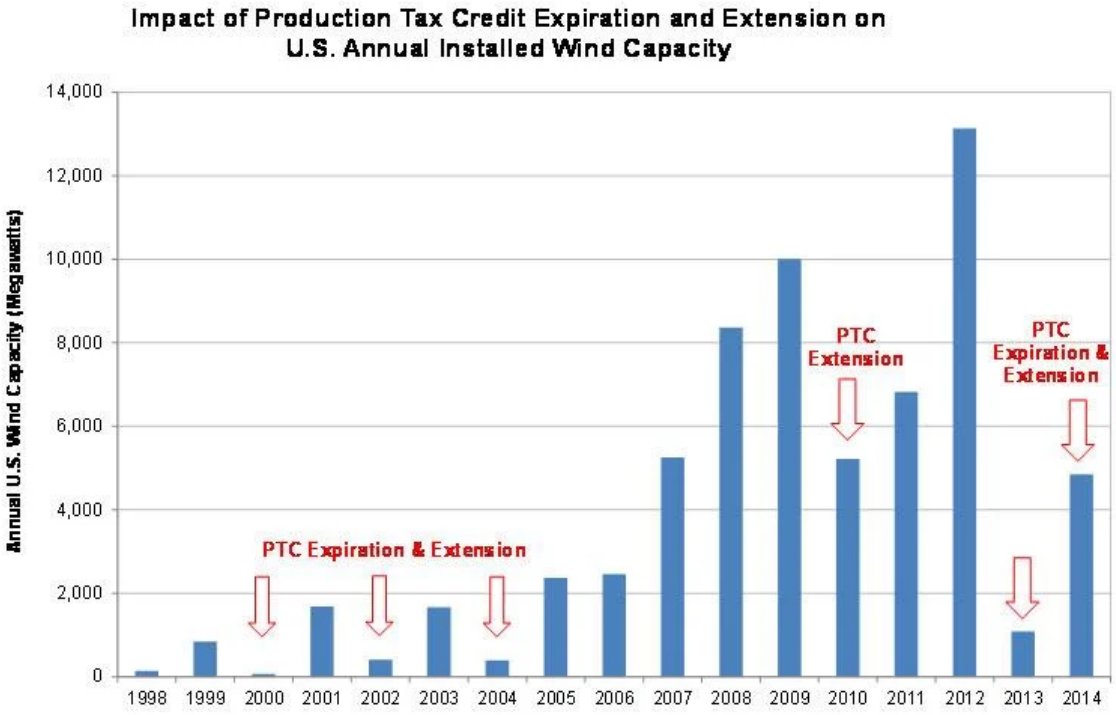
With “Diversify Energy Solutions”, the EU seeks to put even more focus on wind energy, especially offshore. While doing so, there is also a focus on several points regarding helping the troubled supply chain in the business.

This in combination with the “Accelerate Clean Energy Transition” means that EU has communicated a plan for an investment need in Solar and Wind power of an additional 86 bn EUR, as the goal is to increase the target from the Renewable Energy Directive to 45% in 2030, compared to the current 40% goal.

Since the conflict, the dependence on Russian gas has fallen from 50% to around 20% today, with the aim of being completely independent as of year 2027.

In the United States, there are also big incentives relative to cleaner energy, most noteworthy the production tax credit (PTC). The PTC is a credit given to help support the production of renewable energy, which was first introduced in 1992, and has since then had several expirations and expansions. It simply works by offering a tax credit based on the kWh of green electricity generated. While the credit is very impactful, it also poses a somewhat of a risk to the industry, as the below chart clearly shows just how dependent the industry is of this scheme, with installations

in 2013 coming almost to a complete stop, as congress was taking a long time to extend the PTC.



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While the industry in the US is very dependent on this, the current agreement runs until 2025[17], which should help keep a relatively steady flow of projects running through this scheme. Furthermore, new incentives to take over from 2025 are also in the works, with the new lean Energy Production Tax Credit and Clean Energy Investment Tax Credit incentive from the US state, although it being a little different from the current PTC. The incentives do because of their significance also get a lot of attention from the companies in the industry, with Vestas being of the companies speaking out publicly of the importance of the tax credits for the industry. [18]

While the current biggest countries for Vestas are as mentioned previously mainly in EMEA and Americas, other markets such as the Chinese are rapidly growing, and is also expected to keep doing so, with further government-funded investment in this part of the world as well.

[16] https://www.ucsusa.org/sites/default/files/styles/original/public/images/energy-graphic-production-tax-credit-wind-capacity-bar-graph.jpg?itok=-7VBaH7M
[17] https://www.epa.gov/green-power-markets/inflation-reduction-act
[18] https://www.vestas.com/en/media/blog/Markets/60-ptc-extension-forging-solutions-faster

Table 11. Expected wind power investment costs (in 2010 constant prices)

		2010	2020	2030	2050
Projected average tariff (CNY/kWh) without taking into account of transmission and storage cost.	Land-based	0.57	0.51	0.48	0.45
	Near offshore	0.77-0.98	0.77	0.60	0.54
	Far offshore	-	>2	2	1
Total investment in the year (CNY billion)		**123.4**	**136.2**	**298.2**	**427.6**
Total accumulated investment (CNY billion)		**313.1**	**1 777.3**	**3 833.8**	**12 096.2**

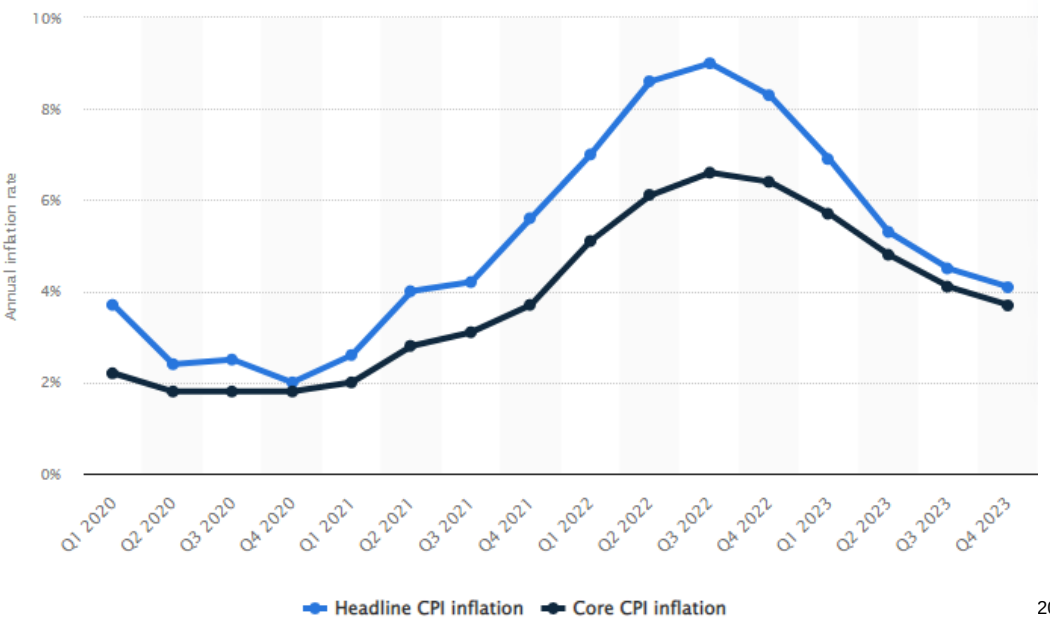
[19]

(E)conomical

Just like the majority of companies worldwide, Vestas are directly affected by the economic development in the world, even outside their specific market.

One of these is inflation. As mentioned previously, the larger financial institutions in the world aim at an inflation rate around 2%, with a few percentages of acceptable deviation. This has also been what we have seen mostly up until corona.

With all the stimulus packages mentioned previously, and a general wish to keep the economy going in many places of the world during lockdown, a lot of money has been created and sent out into the system. With money going into the economy, and low interest rates, came an increasing inflation rate, starting in 2020.



[20]

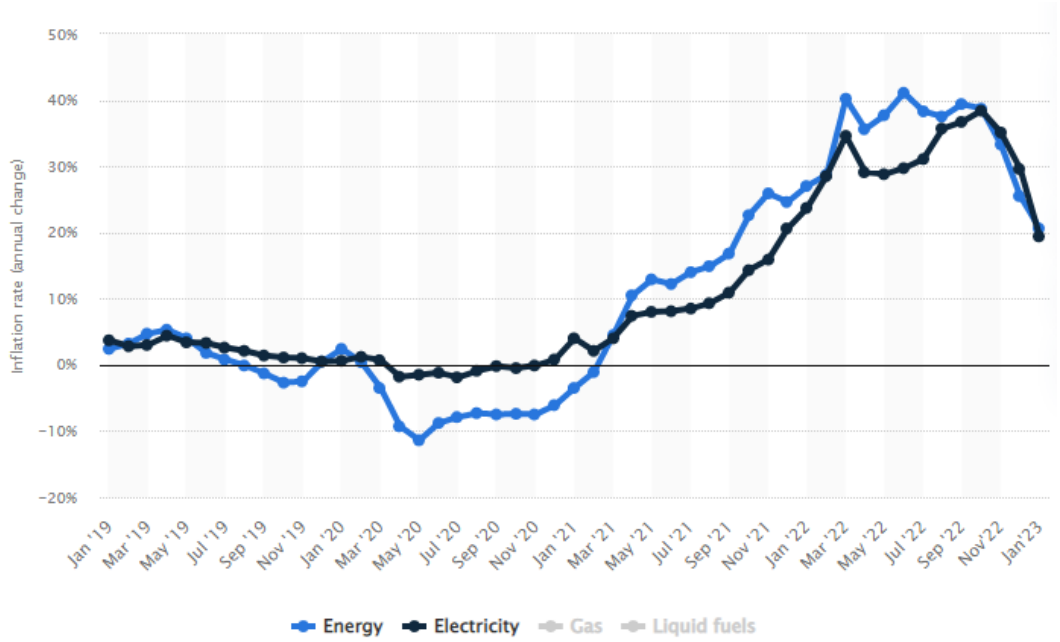
[19] https://iea.blob.core.windows.net/assets/8c00f1d3-8054-4e4f-b81f-2b7a23619167/TechnologyRoadmap-ChinaWindEnergyDevelopmentRoadmap2050.pdf

[20] https://www.statista.com/statistics/1330092/global-inflation-rate-forecast/

As the conflict in Ukraine escalated and sanctions hit, a lot of countries were now also limited in terms of how to supply energy and consumer goods, inflation globally rose even further, peaking in summer of 2022, at a global level of over 8%, and a core inflation rate over 6%. With the core inflation rate being 2% lower, it tells the story that energy was a big contributing factor to the overall inflation increase.

While an increase in overall inflation will be a challenge for both world economies and the private companies to handle, it for some comes with opportunities that may outweigh the negatives.

An increasing inflation might for Vestas mean overall increased costs, but the relatively higher increase in energy prices will drastically improve the business model of wind turbines, as the energy they produce now may seem even more valuable than ever. However, these effects are already starting to slow down, yet still at a very high level.



21

Looking a bit deeper at the inflation of some of the key raw materials that is relevant for Vestas business, such as iron and copper, the first saw, according to Worldbank[22], an increase of 48%, while copper had an increase of around 51% from 2020 to 2021. To put the iron price increase into context, Vestas wind turbines are made from 80-90% steel and iron materials [23].

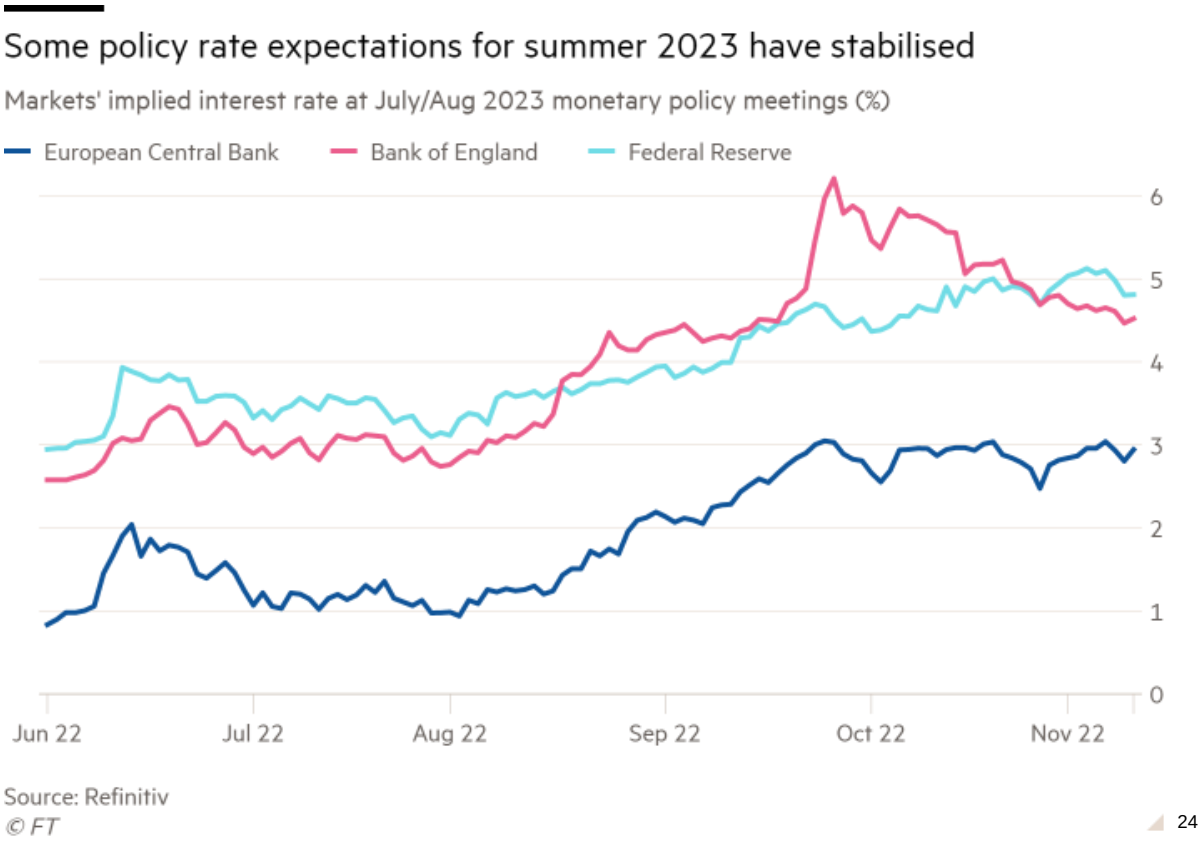
It should therefore be expected that these costs will have hit Vestas profitability hard.

[21] https://www.statista.com/statistics/1328128/eu-energy-inflation-rate-by-commodity/

[22] https://openknowledge.worldbank.org/server/api/core/bitstreams/813e7ba3-332f-55f0-a857-85c2cc773d7a/content

[23] https://www.vestas.com/content/dam/vestas-com/global/en/sustainability/environment/2023_03_Material-Use-Brochure_Vestas.pdf.coredownload.inline.pdf

As a result of the high inflation, financial institutions have lately started increasing the interest rates, in hopes to quickly slow down the unwanted high price increases.
While it has been in the interest of all the markets that Vestas operates in, the interest hikes started quicker, and at higher frequency, as well as with bigger percentages in the US than with the ECB.
Common is though that interest rates are now at a level not seen before in many years and are expected to stay high until inflation has been combated.



[24]

Higher rates will make all investments, including ones directed at wind turbines, require higher expected returns in order to be carried out as profitable, as now money can sit in risk-free assets and generate higher income than in the last many years. Thus, making the business case for Vestas even more difficult.
Another part of this is of course also the already built-up depth that many countries around the whole have, especially those who went harder on the easy monetary policy, will now be even more costly to bear.
The different interest rates in each country have also had an impact on the exchange rates

24
https://www.ft.com/__origami/service/image/v2/images/raw/https%3A%2F%2Fd6c748xw2pzm8.cloudfront.net%2Fprod%2F13b133d0-6551-11ed-a4c8-edb038257669-standard.png?dpr=1&fit=scale-down&quality=highest&source=next&width=700

between currencies, where USD to EUR has been very volatile. According to the interest rate parity, we can expect that the exchange rates will keep drifting apart, as different interest rates levels are kept, all else equal.
But interest rates are expected to keep up until inflation cools off. IMF expects inflation to fall from 8,8% in 2022, to 6,6% in 2023, and 4,3% in 2024[25], so a somewhat quick reduction in rates should also be expected. For energy prices however, a lot will depend on the situation between Ukraine and Russia, and any other potential issues, but will be even more uncertain than the overall inflation levels.
While inflation in the energy sector and in general has been high on its own, the industry has been fighting supply chain issues for a few years at this point. Back in January 2022, the company communicated that "we expect the near future and at least 2022 to be heavily impacted by cost inflation"[26]. There were furthermore expectations of supply chain instability due to the pandemic, with increasing transportation and logistics costs, as well as increased costs regarding raw materials and components for the actual wind turbines, with competitor Siemens Gamesa Renewable Energy experiencing the same troubles [27].

(S)ocial

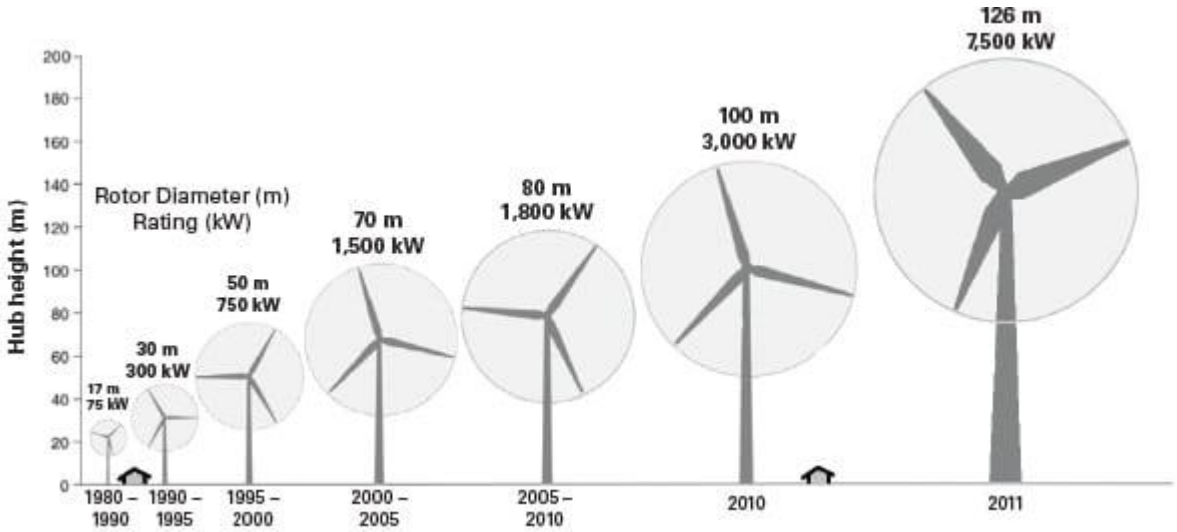
When discussing social factors for the windmill industry, one of the topics will be the resistance from people who do not like the idea of parks being raised near their home. People are usually not a fan of the noise, the view it may block, or the distraction from the rotating blades. Despite this, several research shows that there are no negative health impacts related to living close to these [28] [29]. Instead, studies have actually shown that people prefer to live near a wind farm rather than other energy plants, such as for example solar energy [30]. Some articles even show that after the Russia invasion, especially citizens in European countries have become more accepting of onshore wind farms, after the invasion in Ukraine, as people are now more aware that the alternative would be to import gas from Russia [31].

[25] https://www.imf.org/en/Publications/WEO/Issues/2023/01/31/world-economic-outlook-update-january-2023
[26] https://www.vestas.com/en/media/company-news/2022/vestas-announces-preliminary-2021-figures-and-financial-c3493707
[27] https://www.siemensgamesa.com/newsroom/2022/02/220203-siemens-gamesa-press-release-results-q1-2022
[28] https://www.sciencedaily.com/releases/2018/06/180605112138.htm
[29] https://www.sciencedirect.com/science/article/pii/S0973082622000898
[30] https://www.nature.com/articles/s41560-019-0347-9
[31] https://windeurope.org/newsroom/news/how-do-communities-all-over-europe-benefit-from-having-a-wind-farm-nearby/

Even before this, environmental awareness is an ever growing point of interest, getting increased media attention, and a point which most people are valuing higher and higher, making Vestas gain even more attention as time goes on.
While people are getting more and more conscious of where they get their energy, another important measure is also the number of people. The world population is expected to keep growing, mostly caused by an increasing in forecasted life expectancy [32].
With an increase in world population also comes an expected positive real GDP growth, and a higher percentage of people worldwide with access to electricity. With higher production and more people, naturally also comes an expectation for increased worldwide energy consumption. While future predictions on energy consumptions vary, IEA projects an increased demand in energy from 2021 to 2040 of 21% [33], with an ever-increasing percentage coming from renewable sources.

(T)echnological

Continued technological advance will always happen in a capitalistic market, and the wind energy industry's largest technological advance since the actual wind turbine, has perhaps been to start being able to build turbines offshore. Since then, the main advances made have been towards the actual energy production of the wind turbines. Both the sizes of the turbines, and the effectiveness has improved upon since the first prototypes.



(picture from IEA)
Vestas themselves have also ramped up their development part of their revenue-generating

[32] https://data.worldbank.org/indicator/SP.DYN.LE00.IN
[33] https://www.iea.org/reports/world-energy-outlook-2021

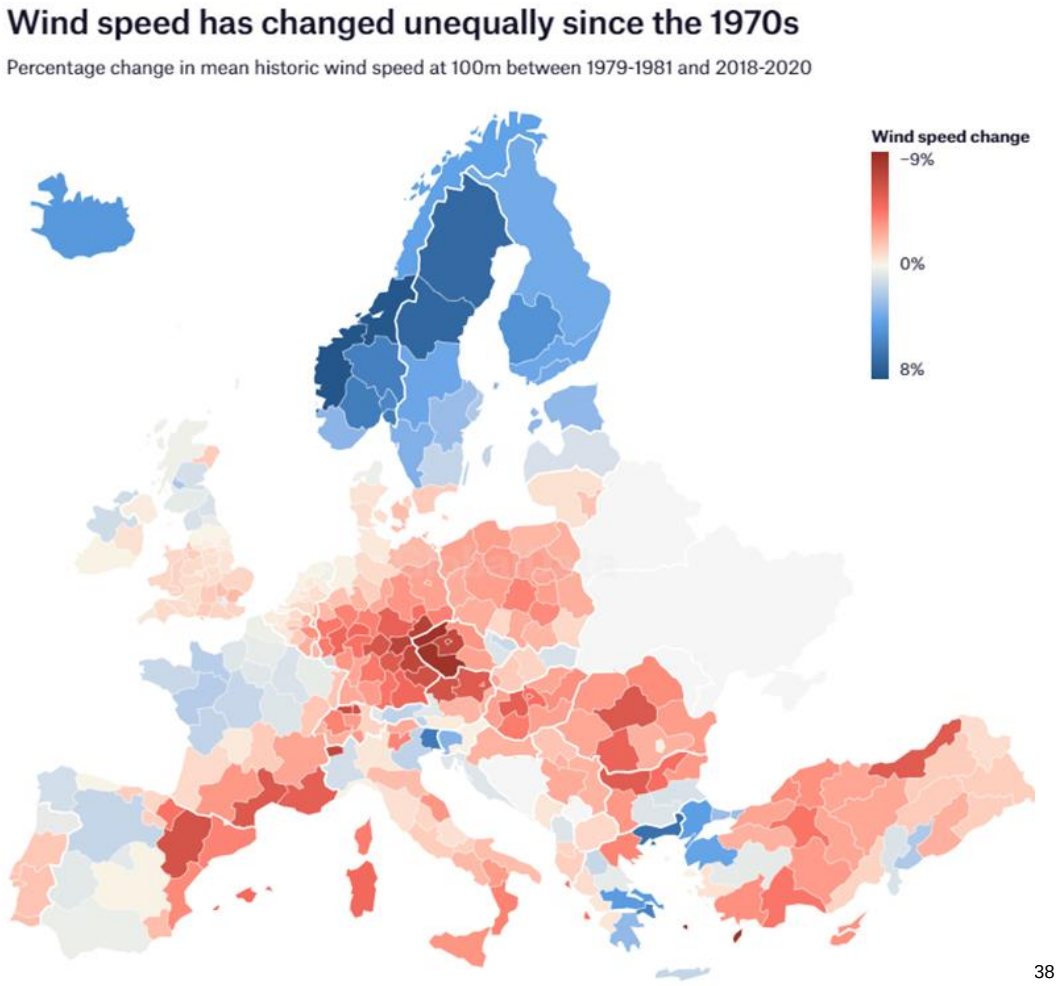
business, engaging in project development to help customers grow their business, as they cover the end to end phases of initial planning of a power plant, to final installations, helping in areas such as designing sites, permits, financing etc.
Even with the desire to advance through technology, Vestas have been hit by the recent uncertain times, as they fired 400 R&D workers back during the beginning of COVID, as mentioned previously.
While Vestas have acquired several companies through time, the focus is still on wind in terms of green energy, rather than anything else. As for example the EU seeks to diversify their energy sources, this is both a good and a bad scenario, as wind will seek to be a stronger resource on their own, but other sources of energy will likewise also grow, challenging the wind industry.
With the market defined and a clear and logical development path regarding technological advancements on the wind turbines themselves, the competitors on the market instead seek inwards to optimize the relatively low margins on actual production of the turbines.
As mentioned previously, both material and distribution costs have increased both for Vestas as a company, but also for the wind turbine industry altogether. As a result of this, Vestas has engaged in different ways to lower their costs, for example the Danish company has entered a strategic partnership with the Danish transport company Maersk[34], as well as invest in Copenhagen Infrastructure Partners[35].
Other similar investments could be in South Korea to mature offshore wind supply chain[36].

(E)nvironmental

As a producer of an environmentally friendly way of getting energy, it is no secret that this area is what Vestas attempts to create awareness of. The company was even in this regard named as the most sustainable company in the world[37].
While the advantages of using renewable energy are obvious, there are also forming new types of awareness on this. For Europe specific as an example, more requirements are made in terms of

[34] https://www.vestas.com/en/media/company-news/2021/vestas-enters-strategic-partnership-with-maersk-on-all--c3450391
[35] https://www.vestas.com/en/media/company-news/2020/vestas-invests-in-copenhagen-infrastructure-partners-to-c3257805
[36] https://en.prnasia.com/releases/apac/vestas-declares-intention-to-invest-in-maturing-wind-supply-chain-in-south-korea-390963.shtml
[37] https://www.vestas.com/en/media/company-news/2022/vestas-named-most-sustainable-company-in-the-world-c3488428

companies reporting on their ESG. With the new ESRS (European Sustainability Reporting Standards), companies will be forced to report even more on their sustainability. Being able to source clean energy will therefore prove to be a good way to achieve this.
Another important thing for the industry regarding environmental factors, will be the actual wind in the future. With climate changes affecting almost all environmental aspects as we know it today, wind is also one of them. However, the development in wind is not as straightforward. Some reports are showing an increase in wind, while others show a decrease, it seems the reality will be that wind changes will depend on the geographical location. As an example, below is a map that shows this exact development in Europe.



[38]

With this in mind, Vestas and competitors should be able to get even more energy from their turbines, if possible, to place wind farms in the areas with increased wind speed. However, areas

[38] https://www.energymonitor.ai/finance/risk-management/weekly-data-changes-in-wind-speed-caused-by-climate-change-may-affect-future-wind-power-output/

with storms and alike would mean increased operational risks and may make it more tricky to set up the farms in the first place.

(L)egal

Legally, the industry is affected by several different challenges. By far the biggest issue for the industry, is permitting.
The issue is not necessarily whether or not it is possible to get the required permits, instead, the main issue revolves around the time it takes the whole permitting process from end to end, which is causing big issues and delays in the industry.
To put into perspective how big of an issue the permitting issue is, Vestas have addressed this publicly numerous times, and even have made videos to create awareness of the issues, together with articles [39]. The issue is especially critical in Europe. Where the US has been quick to extend the previously mentioned PTC, the speed in Europe is not the same. The new EU goals to hit their renewable energy targets in the future is also not believed to be hurdled the most by finance, cost or technology, but simply by the slow permitting process.
Actually, obtaining permits for wind projects can take up to 9 years, critically slowing the process [40].
Because of this, the REPowerEU-program set up to help Europe become independent of Russia's gas does not have their main wind power related topics in extra financial resources (even though it is a part of it), but rather helping to accelerate the permitting process [41].
Apart from delaying many projects, there are however also further issues with the slow permitting process. Some projects may never even take place due to the expectation of the lengthy process. Furthermore, the ones that do, will see their investments not provide value until a much later date. The lengthy process also means that there are high costs with dealing with the permitting process itself.
Vestas even themselves estimates that the EU has 80 GW of approximated wind capacity currently stuck in delays regarding permitting.
How effective the incentives in the REPowerEU-program will be is yet to be seen but is seen to be a positive acknowledgement of the issue.

To conclude on the PESTEL, there have been a large amount of highly impactful factors within the wind industry sector within the last 5 years.

[39] https://www.vestas.com/en/about/Our-policy-recommendations/permitting
[40] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2022%3A230%3AFIN&qid=1653033742483
[41] https://ec.europa.eu/commission/presscorner/detail/en/IP_22_3131

The pandemic and with it the subsequent stimulus from countries all over the world and shortages of some components and materials, inflation has played a huge part. With inflation also came higher interest rates, making debt more expensive, and requiring new investments to be even more profitable to be executed. But large stimulus was made to help the economy, and especially to also help boost sustainable energy sources, done by both the EU and the US to name the biggest.
As the war in Ukraine erupted, many of the big customer countries for the wind industry set extra focus on becoming independent of Russian gas, and on accelerating renewable energy, with new ambitious targets. With a growing world population, with increased access to electricity, longer life expectancy, and expected growing GDP, the energy needs are also only going upwards. While technology in the sector also keeps growing, actually executing on projects is taking a long time with very long permitting time, especially in Europe, which is slow to react, causing major issues for the industry. However, as the environment gets ever increasing focus, and ESG reporting gets even more demanded, clean energy is still, and has recently especially been in major focus, with big financial help from the world.

Financial analysis

Given that the main focus of the research above has been on factors affecting the company and industry within the last 5 years, it should be expected to see the effects follow through to the company finances, in both its P&L as well as their balance sheet. This should also help translate some of the softer values and political changes into actual realized financial impact, which should therefore also help get a better understanding of which impacts have been most effectful.
The time period therefore will be the same, the last 5 years, but will be taking a closer look at the most recent years, as this is the time when most of the above-mentioned effects will have had most of their impact.
The data will be taken directly from Vestas own financial reports, published on the company's own website. The focus will be on revenue, profits, and unusual and noteworthy movements in both P&L and the balance sheet.
It should be noted that Vestas in late 2020 acquired 50% of the shares from MHI in the offshore part of the business, hence the change in how offshore revenue is accounted for in their financials.

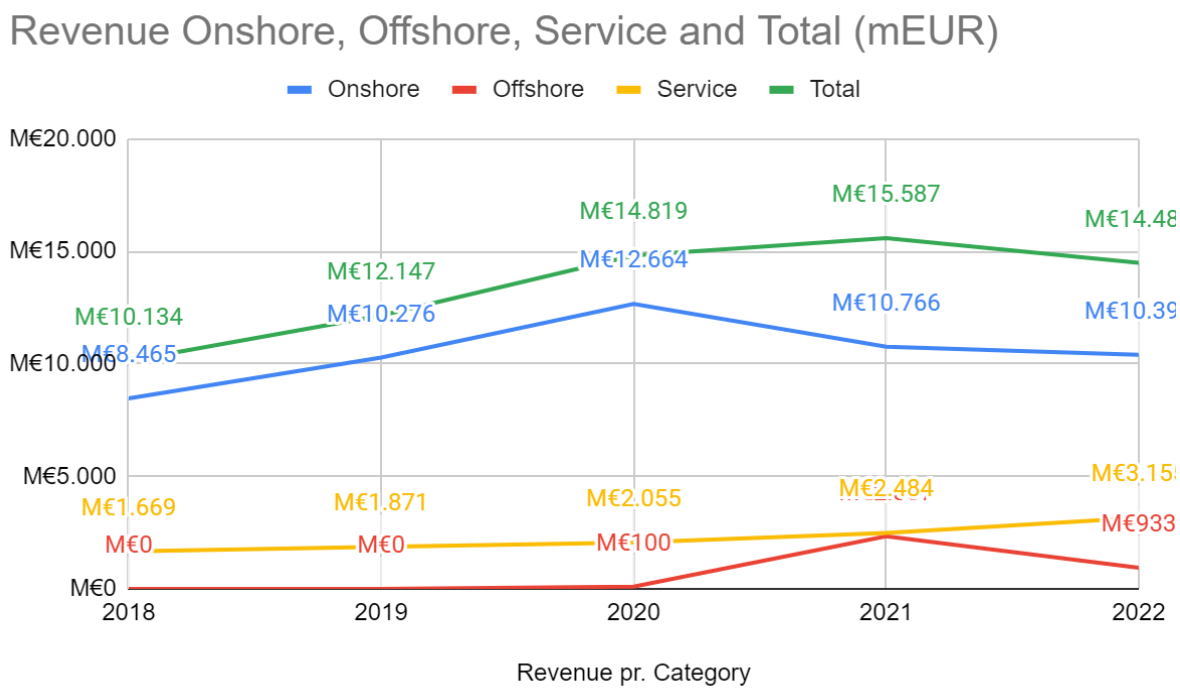
Revenue:
Looking first at the development of revenue for the company within the last 5 years, the company has seen increased revenues compared to the first year in 2018, with all 4 other years being

above. However, the last 3 years sees a quite horizontal development in revenue, between 14.486 mEUR and 15.587 mEUR being the highest in 2021. Noteworthy is the relatively big climb in 2020, where revenue increased from 12.147 mEUR in 2019 to 14.819mEUR in 2020, in a year where lockdown and production stops had its biggest effect. Despite this, the company was able to grow their revenue.

When looking at the revenue split between the three main revenue channels, being onshore, offshore and service, it is noticeable that their main business, being onshore, is the category seeing the least growth when looking in a percentage-comparison to the first year. Further noticeable is that the last two years are at a significantly lower level than back in 2020.

On a more positive note, offshore has grown since being introduced as a separate revenue-channel, since the takeover. However, as the period is shorter, it is difficult to judge the real development using these numbers.

On an even more positive note, the service segment has seen solid and steady growth every year, ending with an 89% increase in revenue in 2022 compared to the first observation year in 2018. The most significant increase came in 2022, where revenue increased around 27% compared to the year before.

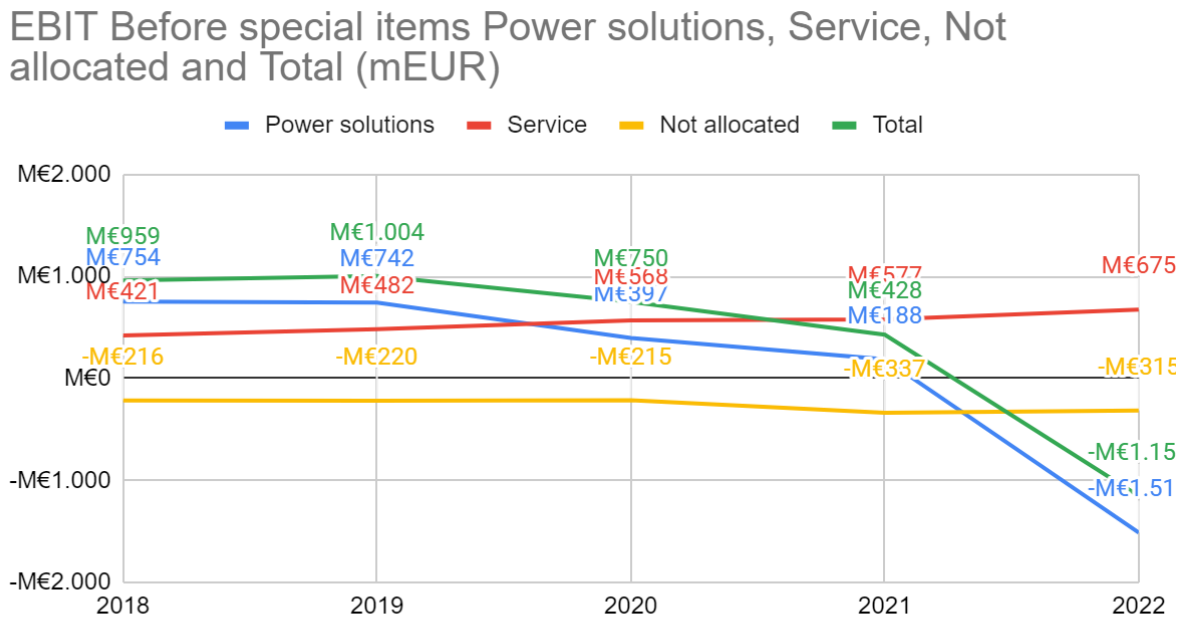


Revenue pr. Category

Profitability:

Looking next at the EBIT before special items, categorized by power solutions (onshore and offshore), there clearly seems to be a trend as well. While revenue increased from 2018 to 2019, and then remained somewhat flat, it is a different story for profitability. Here instead, the profitability

remains somewhat flat in the first two years, but afterwards goes down year after year, with 2022 showing an overall negative EBIT for the first time in the observations period. The main reason for the drop is directly related to production costs, where in 2022 the production costs were more than 99% of the revenue, leaving behind basically no margin for all non-production related costs.
In terms of category, it is especially the power solutions that pull the overall EBIT down, going from by far the most profitable, to by far the least profitable market segment. Meanwhile an increasing revenue in the service segment has not been compromised by slowing profitability but has instead grown together with the revenue.

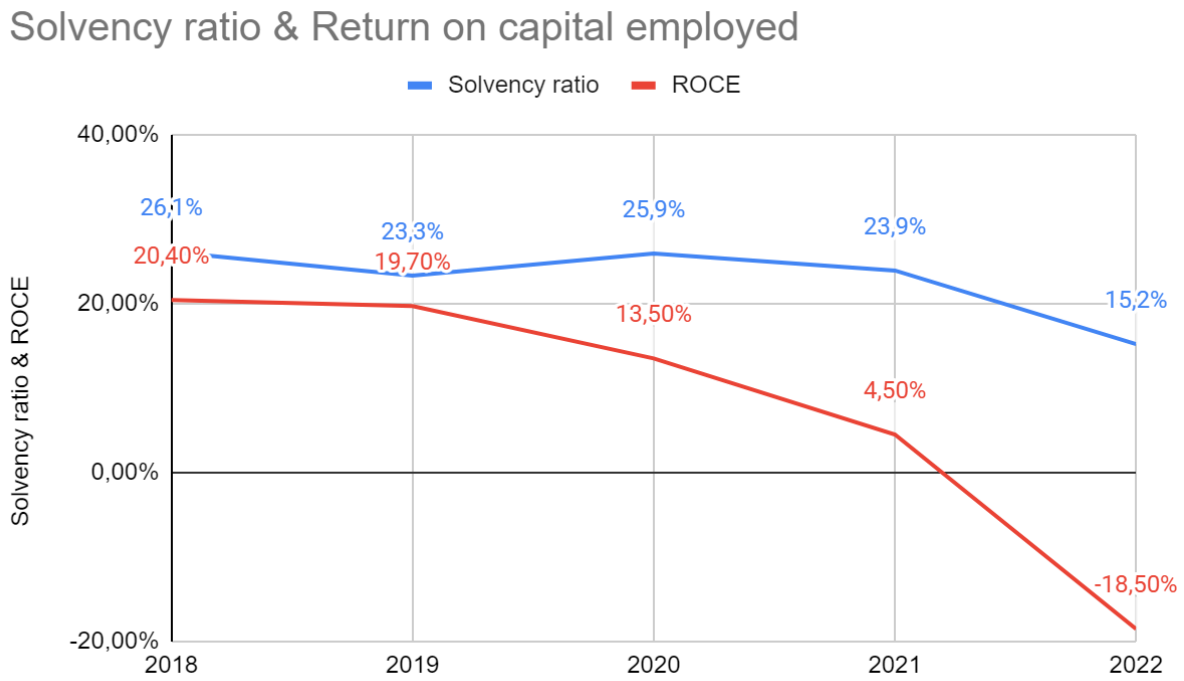


EBIT Before Special Items pr. Category

Based on the above, it can be concluded that the last five years has not hindered top line growth for the company, and even in a year where lockdowns were at their highest, the company was able to produce their highest revenues. But since then, growth has not continued for the power solutions, and especially the onshore part of the business. Instead, while revenue has remained constant, profitability has been taking a huge hit.
According to the company themselves, the most recent difficulties in maintaining profitability on their power solution segment mainly comes from continued external cost inflation, as well as supply chain disruptions. Looking back to previous years financial reports, there are also other factors mentioned, with the struggle to achieve higher margins simply being an increasing competitiveness in the market.

Another reason for the weak performance in the last observation year of 2022, is increased warranty provision. In 2021 the company had a net warranty ratio of 4,4 percent of the revenue, but this increased all the way up to 6,4 percent in 2022, mainly due to increased repair and upgrade cost, rooted in cost inflation and supply chain disruptions.
Other factors were an increased research and development costs from 389mEUR in 2021 to 457mEUR in 2022, mainly related to impairment losses on offshore technology. Distribution costs also rose from 371mEUR in 2021 to 462mEUR in 2022, relating to increasing depreciation on equipment for transportation.
In addition to this, the company lost 269mEUR related to the withdrawal from Russia after the breakout of the war.

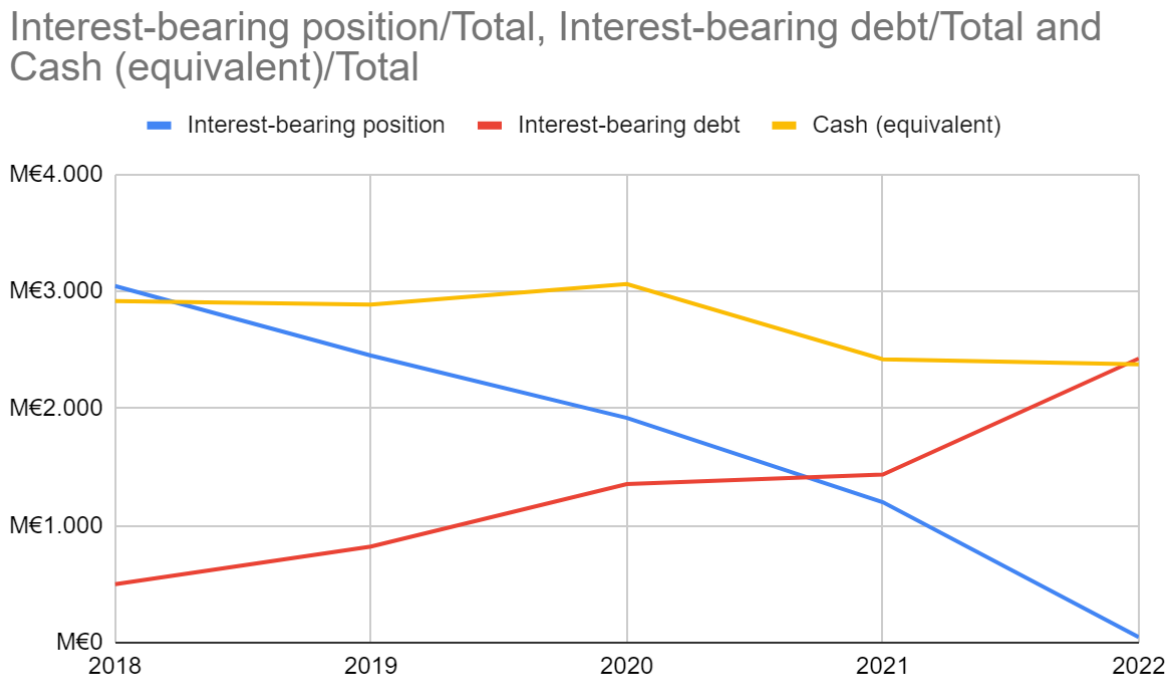
With a non-growing revenue and profits that turns negative, another interesting part to look at would be the company's capital position. With the figures available in the financial report, one measure could be looking at solvency ratio, calculated as equity at the end of the year, divided by the total assets. While the solvency ratio already at the beginning in 2018 is not too impressive at 26,1%, it has since then only decreased down to 15,2% in 2022. The drop in 2022 naturally comes from the loss of equity due to the company being unprofitable in the year, while still paying out dividends, although be it a quite small one compared to previous years. While the total balance sheet has almost doubled since 2018, the equity has actually decreased, though it is by a very low amount.
Looking at the capital employed, it is also clear to see that the company in the beginning was able to return very impressive numbers, with the two first years being around 20%. However, since then, the company has struggled to put the capital into profitable business.



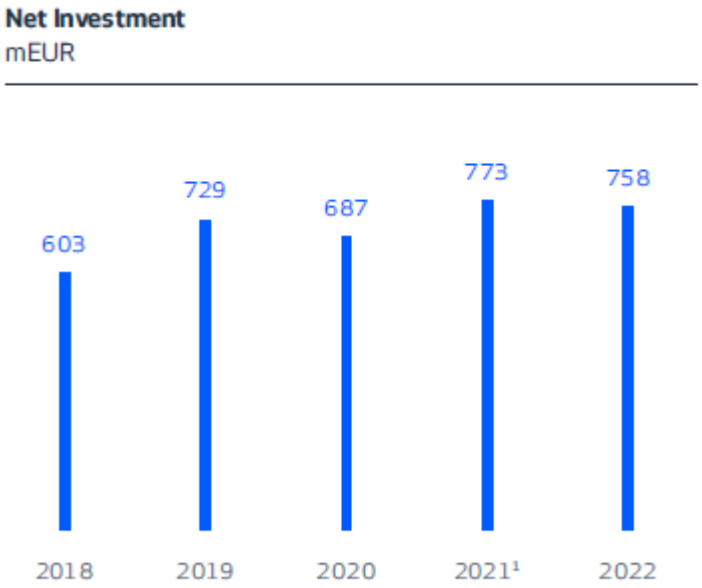
Looking deeper at their cash and debt positions, a clear and similar picture is painted. While the company's interesting-bearing position started off at a strong point, it has ever since the first year in observation simply fallen steadily every year, ending very close to 0 at 2022. Meanwhile the interest-bearing debt has done the opposite, starting off quite low but ever since 2018 has increased. While some of this debt is also related to bonds, and covering for older bonds, seeing the trends of these will see worse and worse P&L results will not be satisfactory to the company or its stake- and shareholders.

With increasing debt and increasing interest rates, a logical thought would be to look at the potential risks associated for the company, and potential increased losses related to these. When looking at interest income and interest costs however, the difference in 2022 was only a loss of 14mEUR, which is not too critical for the company.

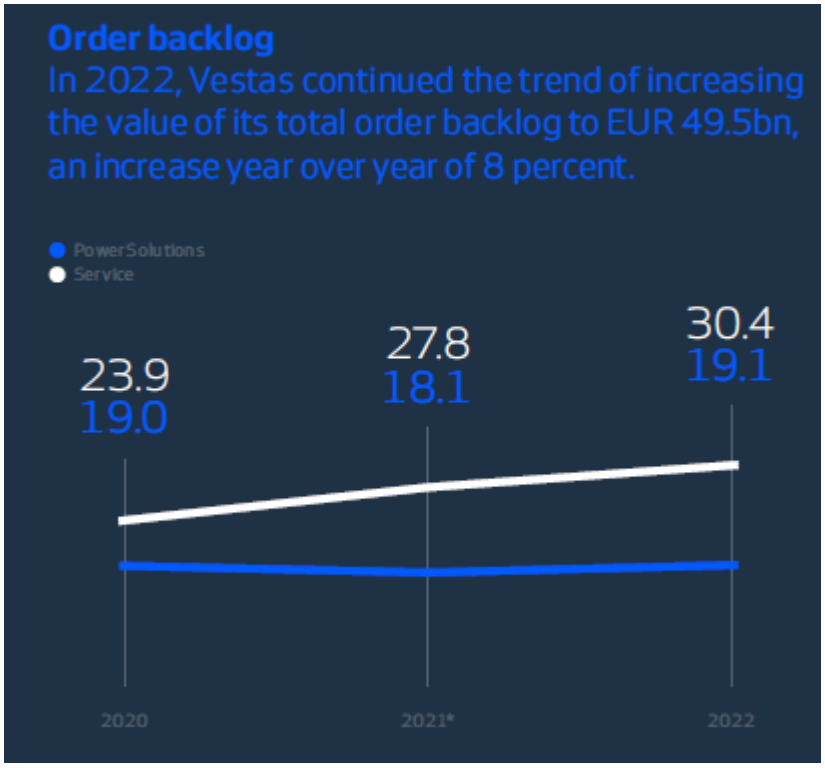
On a positive note, the company has not seen a material decline in their cash and cash equivalent position, which could perhaps have been expected, following the trend of the two other mentioned metrics.



Some of the decline in the interest-bearing part and increase in debt have likely been spent on investments. According to Vestas, a fairly high amount has continuously been posted into what they themselves label as “value-adding investments”, which are mainly targeted at a new platform for the offshore business. Looking at the trend, it is clear that despite poor results and reduced funds, the company is willing to keep spending in this area.



To conclude, in the beginning of the observation period, in the last years of the 10's, the company saw an increased revenue, which has not tempered off. However, while profitable at first, the company has struggled with increased production costs and has had special items cost related to the withdrawal from Russia, ending in negative profitability in 2022. On the balance sheet, the company has seen increased debt in times of increasing interest rates, but without the rates hugely impacting the company yet. While some of the debt is related to the negative operational results, much of it is also related to a continued investment into an offshore platform, which has not slowed despite worsening results.
The company is looking into a tough situation if the current trends continue, however if one is to believe that most of the bigger issues are to be solved, there are also positives, as the company still holds a decent cash equivalent position, has not seen significantly declining revenue in tough times, and is currently seeing a backlog bigger than ever before.



To sum up the first research question, the last 5 years have been a rollercoaster ride for Vestas. The company saw decent margins, low debt and increasing revenue, while being able to keep post decent amounts into continued development. Unfortunately for the company, external factors have since burdened the industry, as components and raw materials have increased massively in cost, and supply chains in general being highly challenged. Meanwhile energy prices have also made the production of the turbines even more expensive. While COVID brought with it stimulus

packages benefitting the industry, it also forced temporary closures of factories. The company was able to sail through this period with still decent profitability in 2020, however as 2021 hit, things got worse. The supply chain issues got worse, inflation did the same, and even though revenue hit a new high for the company, EBIT fell to less than half of what it was the year before. Vestas did however expect to keep earning money in 2022 and keep a positive cash flow. Optimism was short lived though, as war in Ukraine broke out, which meant the company had to write off assets, saw even more issues with supply chain and cost increases. This led to both negative EBIT, negative cash flow, and increase in debt. As if that was not enough, the company had to write off an investment into the offshore platform, had a big increase in warranty provision, and are facing issues in project execution and long permitting processes, limiting the company's potential. It is therefore safe to say that the company is in a much more challenging position now than it was 5 years ago.

The Scene ahead

Having now gotten a better understanding of what has happened to the company leading up till now, the focus will now shift from looking backwards to forwards. Although the section above was focused on prior times, some of these elements will continue to be important for the future.
One of the important factors, will be the development in the war in Ukraine. There are a lot of different possible scenarios, some more than likely, and all with different outcomes for Vestas. A peaceful outcome may lead to some countries at some point going back to wanting to use more Russian gas for power, which would to some degree affect electricity prices, and therefore pressure the business case for wind turbines, at least for the short term. However, this is likely not something to be expected. A more likely scenario is that no matter the outcome in the war, at least the European Union will continue to seek diversification in how energy is supplied to the continent. On the other hand, an escalation of the war might mean even more sanctions by both sides of the conflict. While further sanctions on energy provided by Russia may help the business case for Vestas, it is not a guarantee that Vestas will be able to profit on it, and there might also be sanctions that could further challenge their supply chain.
Additionally, the company should be helped by the many recent initiatives to help accelerate green energy, all over the globe. By just how much is of course still unknown, as it will depend on different things, such as how effective the initiatives from for example the EU is of helping supply chain and quickening the permitting process. Furthermore, the PTC in the US seems to be in place

for a good period of time still, which should further help stability in the market.
Other positive notes are that the high current inflation and interest rates are by many expected to go down in a relatively short timeline, as also mentioned previously. As Vestas has been highly challenged on price increases in costs, lower inflation will hopefully help their margins, but perhaps even more importantly than overall inflation, is expected commodity inflation.
Worldbank expects iron ore prices to drop 17% alone in 2023, despite the Ukraine-Russia conflict, while also expecting longer term downwards pressure on prices [42]. But as iron is expected to decrease significantly, the same is not to be said about copper however, where the price is expected to remain high.

							Percent change from previous year		Differences in levels from April 2022 projections	
Commodity	Unit	2020	2021	2022f	2023f	2024f	2022f	2023f	2022f	2023f
Metals and Minerals										
Aluminum	$/mt	1,704	2,473	2,700	2,400	2,434	9.2	-11.1	-700	-700
Copper	$/mt	6,174	9,317	8,700	7,300	7,361	-6.6	-16.1	-1,400	-2,400
Iron ore	$/dmt	108.9	161.7	120.0	100.0	98.0	-25.8	-16.7	-20	-5
Lead	$/mt	1,825	2,200	2,100	1,900	1,917	-4.6	-9.5	-200	-200
Nickel	$/mt	13,787	18,465	25,000	21,000	20,708	35.4	-16.0	-3,000	-1,000
Tin	$/mt	17,125	32,384	31,000	22,000	22,257	-4.3	-29.0	-10,000	-13,000
Zinc	$/mt	2,266	3,003	3,500	2,800	2,771	16.6	-20.0	-200	-400

[43]

While the financial situation of the company is not as good as it has been, it is not close to a crisis either, and with continued investing during this period, the company should be set up somewhat nicely for the upcoming period.
The increasing inflation and increased electricity prices have also meant that Vestas has been able to continuously increase their sales prices, shown in this graph.

[42] https://openknowledge.worldbank.org/server/api/core/bitstreams/813e7ba3-332f-55f0-a857-85c2cc773d7a/content
[43] https://openknowledge.worldbank.org/server/api/core/bitstreams/813e7ba3-332f-55f0-a857-85c2cc773d7a/content page 6

[44]

To be able to raise prices to such high relative levels in such a short amount of time, both tells the story of the pressure of the global energy supply and inflation, but at the same time also tells a story of how necessarily this has been, as the company has even started to have negative profitability, which would have been a lot worse without these price increases.
Further to price increases, the company ended 2022 with their biggest order backlog in terms of revenue-value so far, a record that has been broken several times within the last few years. Though it should be mentioned that the wind turbine backorder in terms of MW has decreased in the last two years. But the fact that the company has increased their backlog, despite keeping a high level of revenue, in such difficult times, clearly shows how big of an impact the political incentives actually have had.
With this in mind, a closer look at the current market and its actors will also help determine the outlook for Vestas going forward.

Porter's Five Forces

The scene is somewhat set, as more and more focus, political incentives and improved technology now means that renewables are ready to switch into next gear. The way in which Vestas is able to do so, will depend very much on the market they operate in. To analyze this further, a Porter's Five Forces approach is used.
The market in focus here is the wind turbine market.

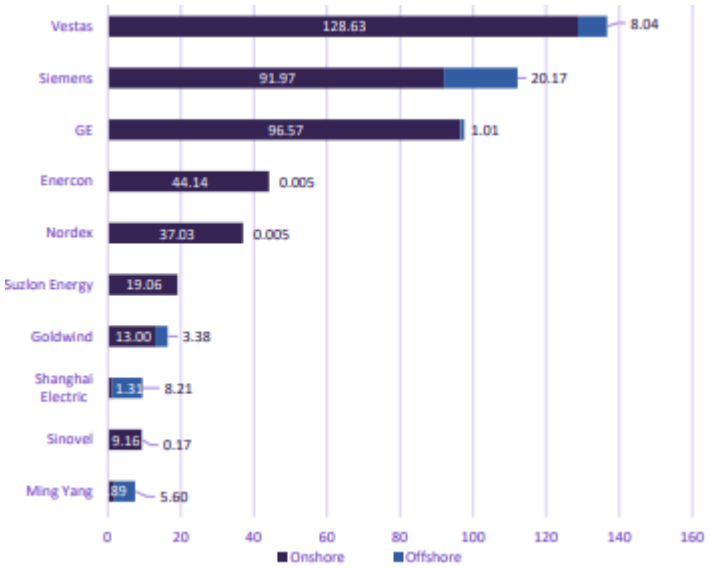
Competitive Rivalry

The wind industry can be described as a differentiated oligopoly, in the sense that it is a market mainly dominated by few but large companies. To put this into perspective, the number 1

[44] 2022 Annual Report page 6

manufacturer (Vestas) measured on GW Capacity, is 100 times bigger than number 20 in the market (Sany Group Co Ltd)[45].

Further according to Globaldata, the top 5 biggest wind turbine manufacturers accounted for 65% of the total installed capacity in 2021 [46].



(Top-10 Wind Turbine Manufacturers, Split by Wind Farm Type[47])

Vestas is the biggest in the industry, with a market share ranging from 15-20% depending on the source and the year, with Globaldata claiming 19% in 2022 [48].

Number two and three on the market Siemens GA and GE Renewable Energy. While these are the big players in the Western market, China has a number of smaller but still quite big companies. With market shares varying across years, it is clear that the market is highly competitive.

The main factors when it comes to gaining market share, are mainly the lowest price that the companies are able to offer their wind turbines, as many of the orders come directly from auctions. Another important determining factor is the quality and technology of the turbines, as cost of energy is important, together with expected service costs.

While Vestas is the largest in the industry, it does not dominate in both on- and offshore farms. Vestas has their main installed base onshore, where they are market leaders by fair, but Siemens are far ahead of Vestas in terms of offshore.

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[45] Top Equipment Manufacturers, January 2023 - GlobalData Intelligence Center - Explorer (cbs.dk)

[46] https://www.globaldata.com/media/power/vestas-establishes-leading-global-wind-turbine-manufacturer-2021-says-globaldata/

[47] https://explorer-globaldata-com.esc-web.lib.cbs.dk/Analysis/details/top-equipment-manufacturers-january-2023-170680?cntr=lRSR0DXVMKYZ1LBuVj-mDsh4l0BeyG9GaEfiu1FcBbYe8yBOJYuy4jbq0CCtVZk3mjBX8HhiPQYm43PbvfMaPA== slide page 8

[48] https://www.globaldata.com/media/power/vestas-establishes-leading-global-wind-turbine-manufacturer-2021-says-globaldata/

As mentioned previously, offshore is something that Vestas recently has invested more money into and expect a higher percentage growth in this market compared to onshore [49].
As per Globaldata, another noteworthy point is that while Vestas are currently the biggest, it also seems they are likely to keep that position for a while, showing the biggest pipeline as of January 2023 of all companies.
Another interesting point in the market is the company structure of the companies. While Vestas is dedicated to wind turbines, Siemens is a company with a much larger overall portfolio, having their wind turbines only be a part of it. The same can also be said for example GE. The increased capital of the other competitors will likely be a very big threat to Vestas in the future.
There is therefore an increased competitiveness in the market, and there are both players in the market with bigger capital than Vestas, and Chinese competitors which beat them on price, making for a difficult time for the company.

Overall, the market sees highly competitive rivalry, which is only expected to grow as the industry as a whole is expected to grow. However, Vestas has the current best position as the biggest company in the market.

Threat of New Entry

As mentioned previously, the wind turbine market can be viewed as a differentiated oligopoly, with few very big companies in the industry, dominating most of the market share. This is usually a tell of high entry barriers, which it also is in this case.
There are a few causes for these high entry barriers. First off is the high capital required to actually manufacture a single windmill, let alone a whole possible wind farm. Unlike many other industries, a single produced unit has a very high start cost.
Next is the technology currently required to start competing with the rest of the industry, requiring large investments into R&D.
It is also an industry highly affected by heavy processes requiring knowledge as well, as for example with the long permitting process in Europe. There are also other specific law requirements making it more difficult to start up.
Some countries may also be starting to be more interested in having local companies manufacture the turbines, rather than foreign companies, making it less profitable for new entries, as globalization gets limited. China is an example, where the market is being more and more

[49] Vestas 2022 annual report, page 16

dominated by domestic companies.
Next but similar to the technology required, is the supply chain overall. As explained earlier, even Vestas have been dealing quite a lot with supply chain issues, where their economies of scale might even have helped them in getting better deals, which would not have been as likely to be possible for newer entries.
With this in mind, it is not likely that new entries to the market will be able to provide products at an attractive price. This will always be a big issue for any company, but as auctions are common in this marketplace, price is a big factor in this industry.
On the other hand, there are arguments to be made as to why the threat of new entries is rising. As technology advances, it might become easier and easier for new entries to gain access to the same technology, and compete on the market.
As more and more money in general is being pushed into renewable energy, more companies should automatically be attracted to the industry.
At the current time though, the overall threat of new entries is low, but rising.

Threat of Substitution

The wind industry is but one of the many different sources of renewable energy, that has emerged in the last decades. While coal and fossil fuels are also alternatives when it comes to energy sources, the threat of non-environmentally friendly sources should slowly decline, with countries all over the world seeking cleaner solutions.

Table 3: Global renewable energy market category segmentation: % share, by volume, 2017–2022

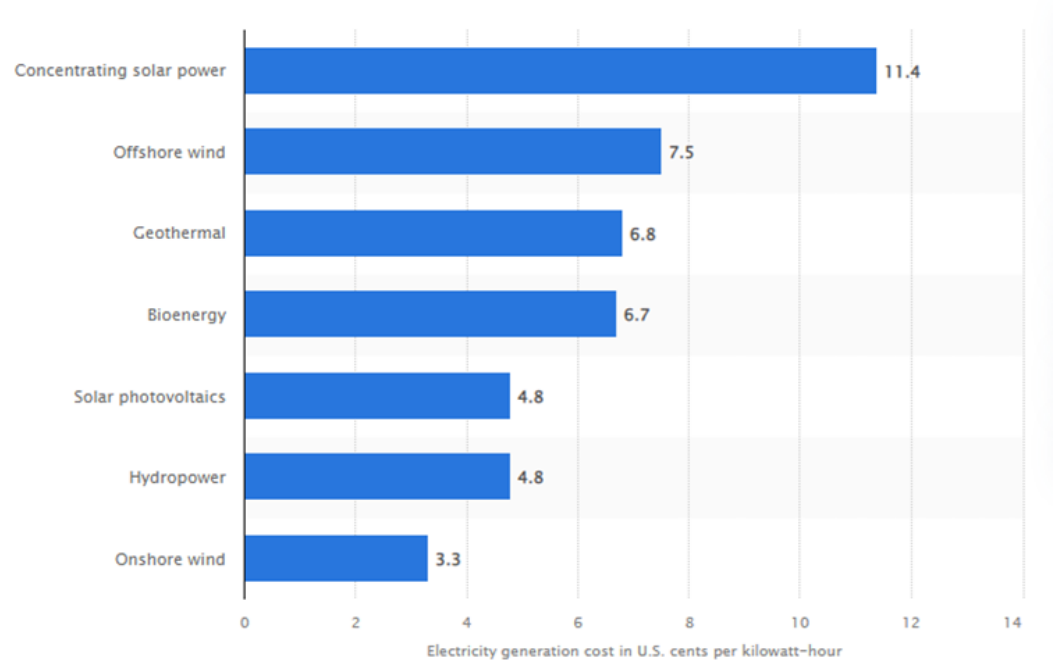
Category	2017	2018	2019	2020	2021	2022
Hydroelectricity	61.9%	59.6%	57.1%	54.8%	50.8%	48.7%
Wind	19.7%	20.6%	21.8%	23.0%	25.0%	25.5%
Solar Pv	7.8%	9.5%	11.1%	12.6%	14.3%	16.2%
Biopower	9.4%	9.1%	8.9%	8.6%	8.8%	8.7%
Geothermal	1.2%	1.1%	1.1%	1.1%	1.0%	0.9%
Total	100%	99.9%	100%	100.1%	99.9%	100%

SOURCE: GLOBALDATA © GlobalData [50]

There are as shown above a variety of different renewable energy sources that deliver the same green energy as wind is capable of. The biggest of which has in recent history been hydro and

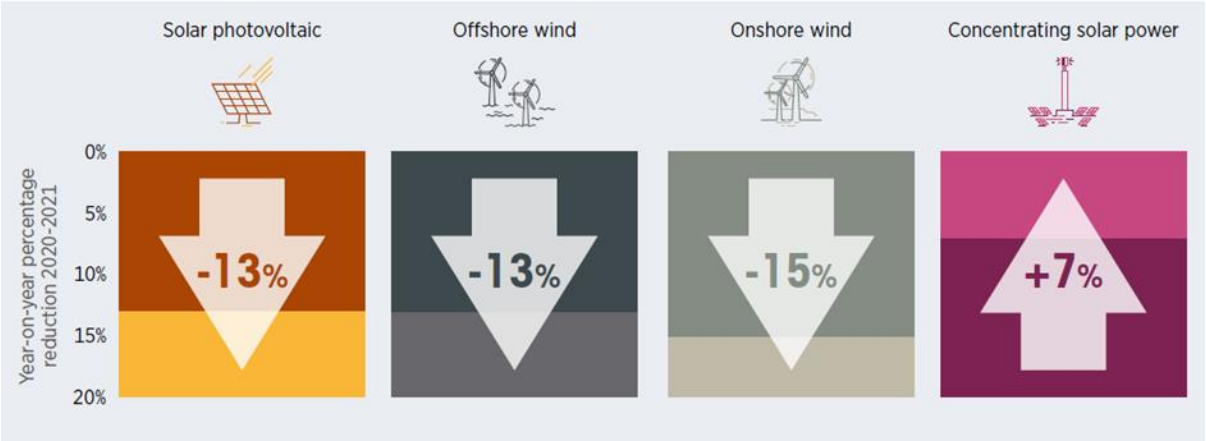
[50] GlobalData Industry Profile – Global Renewable Energy January 2023 report

solar. There is a trend towards wind and solar, moving away from hydroelectricity, which is a source of energy also affected by potential droughts.
Other reasons according to Globaldata is quite simply that investments into hydropower have been slowing recently, while it has increased for both solar and wind segments instead.
Another obvious crucial factor to the threat of substitution from the other sources are the price per kilowatt from each source. According to Statista, the cheapest source of renewable energy in 2021 was onshore wind, followed by hydro, with offshore and solar being some of the most expensive [51].



Looking forward, the trends shown previously are expected to continue. The International Energy Agency forecasts in their Net Zero Scenario that wind and solar will be the two biggest sources of energy, with 7933 and 7414 TWh respectively, and hydro being 5704[52].
One of the biggest drivers to the expectation of wind and solar being the biggest sources, also comes from the fact that these are some of the sources where the cost of energy has gone down the most in recent years, as demonstrated below.

[51] https://www.statista.com/statistics/478049/global-utility-scale-electricity-generation-cost-by-resource/
[52] https://iea.blob.core.windows.net/assets/deebef5d-0c34-4539-9d0c-10b13d840027/NetZeroby2050-ARoadmapfortheGlobalEnergySector_CORR.pdf



The wind industry should not be expected to be able to “fight off” the other renewable energies and be the only source of clean energy. As mentioned previously, the EU for example aims to diversify their energy sources, thereby not being reliant on a windy day or a sunny day to provide their energy.

But continued technological advances towards lowering costs and increasing effectiveness will help the wind industry move into the position of the biggest renewable source.

Compared to today, the threat of substitution is a big point of debate, as the wind industry takes over a bigger part of the overall renewable energy provided, but as technology advances, new green energy sources may be found, or current ones made more efficient.

Supplier Power

Not many years ago, the bargaining power of suppliers could mainly be split into two categories, with suppliers of basic materials and metals and those more focused on technology. As there would be many suppliers in the first category, their bargaining power would be considerably lower than those providing technological input to the company.

But in recent years, this picture has changed dramatically.

While inflation is likely something most of their suppliers have faced, it seems clear that even though Vestas has a large number of suppliers, the suppliers have been able to shift their increasing costs onto Vestas instead, meaning lower or negative margins for the company. These issues have also caused Vestas to be forced to have delays in some of their projects. As this has very big consequences for the company, they are likely willing to go to great lengths to avoid delays, meaning an even higher bargaining power for the suppliers, both in terms of components

and in terms of raw materials, but freight as well, following the issues from back during the Coronavirus.
This has meant that Vestas in 2022 have screened more than 3200 suppliers, to help battle these issues [53].
As a result of the big issues on the supply-side of Vestas' business, major investments have also been made into this area, through acquisitions, partnerships, and increased supplier diversification. As it stands currently, it is therefore clear that the bargaining power of suppliers is currently on their side indeed and has recently developed heavily into their favor. If the power is going to shift looking forward is unclear as there are many uncertainties in the steel and iron markets, but looking at forecasted iron ore prices from earlier, the market should calm, and prices are expected to drop. Combined with the big efforts from the industry and political interest in helping supply chains, it should get better.

Customer Power

Vestas in 2021 had 952 customers according to themselves [54]. While almost a may seem like a lot, for a company of Vestas' size, it is in fact quite few, which also means that the company has less customers to rely on.
Because of the relatively few numbers of potential customers, Vestas and the industry in general puts a big effort into measuring customer loyalty and improving on the points of issues coming from these measurements. While Vestas net promoter score has gone down in recent years, it is still above average, and something the company at least communicates is a high priority. Better customer relations might mean customers are less likely to leave them for another company, if Vestas were to for example increase their prices.
And just exactly that, is what Vestas has done recently, and at a quite fast pace, compared to usual inflation rates, as shown below.

[53] https://www.vestas.com/en/sustainability/supplier-sustainability#:~:text=In%202022%2C%20we%20screened%20more,into%20the%20Vestas%20supply%20chain.
[54] https://www.vestas.com/en/about/our-partners/Customers

[55]

Being able to both increase prices and maintain a big backlog, must mean Vestas at least have some form of bargaining power, although the price increases are likely a general theme in the entire industry.

These price increases even come after several projects for the company have been delayed.

Another relevant element to consider regarding buying power, is potential switching costs. On one hand, wind turbines have gotten cheaper and cheaper in terms of maintenance costs [56], they are also becoming more and more technologically advanced. This means there are arguments to be made for both sides in terms of switching costs.

However, as the industry is growing, new competitors are entering, and alternative sources of clean energy are also increasing, the buyers gain more and more options, meaning their bargaining power is ever increasing.

To wrap up the Porter's Five Forces analysis, one of the important things is the overall expected growth in the renewable energy sector, including wind. This has meant that the threat of substitute products and new competitors in the field is rising, as more companies want a slice of the ever-growing cake. As competition grows, buyers will have more possibilities to choose from, increasing their bargaining power. Apart from that, recently sourcing raw materials and components to make these turbines have been increasingly difficult.

Even though there are a lot of reasons for Vestas to be pessimistic, there are still positives. The reason the competition is growing is as mentioned because of the expected growth of the renewable energy sector. Within this sector, Vestas is the biggest, at least regarding onshore. Further to this, the wind industry has been trending upwards in terms of total share of the

[55] Vestas 2022 Annual Report

[56] http://www.windmeasurementinternational.com/wind-turbines/om-turbines.php

renewable energy market and is expected to become the largest in the future. Thus, if Vestas can keep their lead, they are likely still on a significant growth path.

Stock Development

Being a publicly traded stock also means, that additional data is available compared to non-public companies, in the sense that the company's stock price should always reflect investors' expectations of the future. This helps get a good understanding of exactly what kind of market value the overall market prices the company at, on a daily basis, and helps understand how the market prices change to the company and its surroundings.
While tracking the development of Vestas value in itself is relevant, comparing to the Danish and overall market will also tell if the increases could be partially driven by an overall upswing in expected value in the market, or if it is specific to either the company or the industry.
To give a comparable view, the development of the Vestas stock has the dividend-payouts added to the value. The Danish stock market development is measured by the OMXC25 index, and the world market development is measured by the fund "iShares MSCI World EUR Hedged UCITS ETF". This fund is chosen, as it captures the vast majority of the free float-adjusted market capitalization in developed countries, while also being hedged to the Euro, so that the return cannot be explained by currency developments. Due to costs and the fund only focusing on developed markets, it does have its limitations, but should give a good indication of the development of the overall global stock market.
Unfortunately, there is no good index to compare Vestas to their direct competitors in the market, as their competitors are either not only a wind turbine company, or are not listed on the public stock market. A potential candidate to compare it to the industry, could be "ISE Clean Edge Global Wind Energy Index". There are other relevant indexes, but these do not have a 5-year history to compare to unfortunately.
To set expectations firstly, the historic annual return on stocks have varied greatly from year to year, but has on average grown around 10 percent per year [57] before inflation.
It should be mentioned though, that annual return has been very volatile.
The time period which will be looked at, is the 5 years between 09-02-2018 and 09-02-2023. 5 years is chosen to have a long enough time period to judge the development, and the specific dates are chosen, as Vestas released their 2022 annual report on the 08-02-2018, meaning the

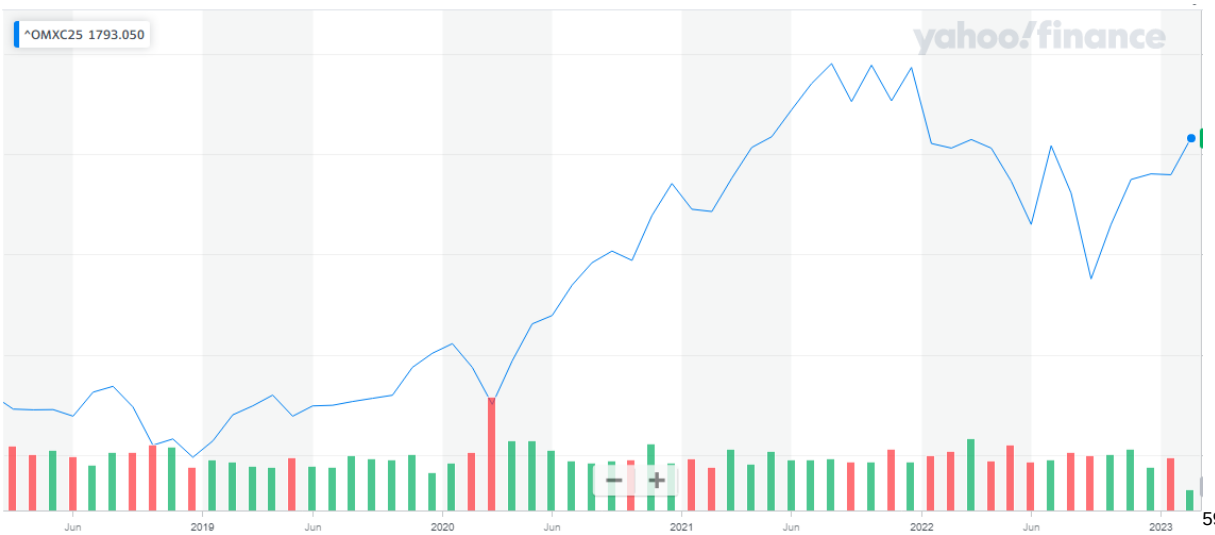
[57] https://advisors.vanguard.com/VGApp/iip/advisor/csa/analysisTools/portfolioAnalytics/historicalRiskReturn

market will have had time to correct following the information in the report.
Over this period, the **world market** delivered a total return of **41,92%,** despite all the overall global challenges mentioned previously. Even with a worldwide pandemic and war including one of the world's biggest countries, the overall stock market has delivered quite decent returns. One thing to note is that these returns are before inflation, which in this period has been higher than in the period leading up to it, meaning a lower real return. The decent returns likely tell the story that while inflation and interest rates have a big return, they are not expected to last for a long time. Similarly, it seems that the war has not impacted the world market greatly, perhaps suggesting that the market does not expect the conflict to get a lot worse.

[58]

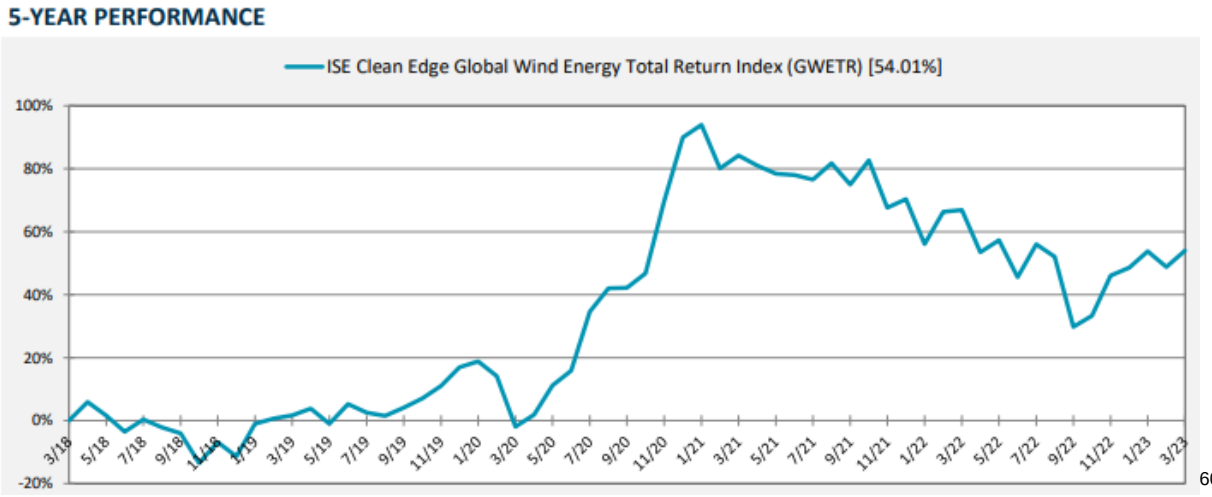
Looking instead at the **Danish market**, it delivered an even more impressive return of **64,34%**. While the pandemic also caused lockdowns in Denmark, the better return of the Danish market compared to the global market is likely to be explained by a few different reasons. The biggest reason might be that the Danish market has quite a few big pharmaceutical companies, which are companies not as affected by lockdowns as other companies.
But it may also be partially attributed to the Danish government's response to the corona crisis. What it shows at least, is that the expected future profits for Danish companies was not heavily compromised. It should though be noted that the sizes of the companies in this index are of such scale that the local politics alone is likely not enough to be a material difference maker, though it will matter to some degree.

[58] https://www.justetf.com/en/etf-profile.html?isin=IE00B441G979#chart



[59]

Compared to the **Global Wind Energy Index**, this “only” rose **43,26%** in the same period. It should be noted that this index is in USD, which does introduce currency changes as well. Overall, it does follow the overall stock market quite closely, and does not perform significantly higher or lower in comparison.



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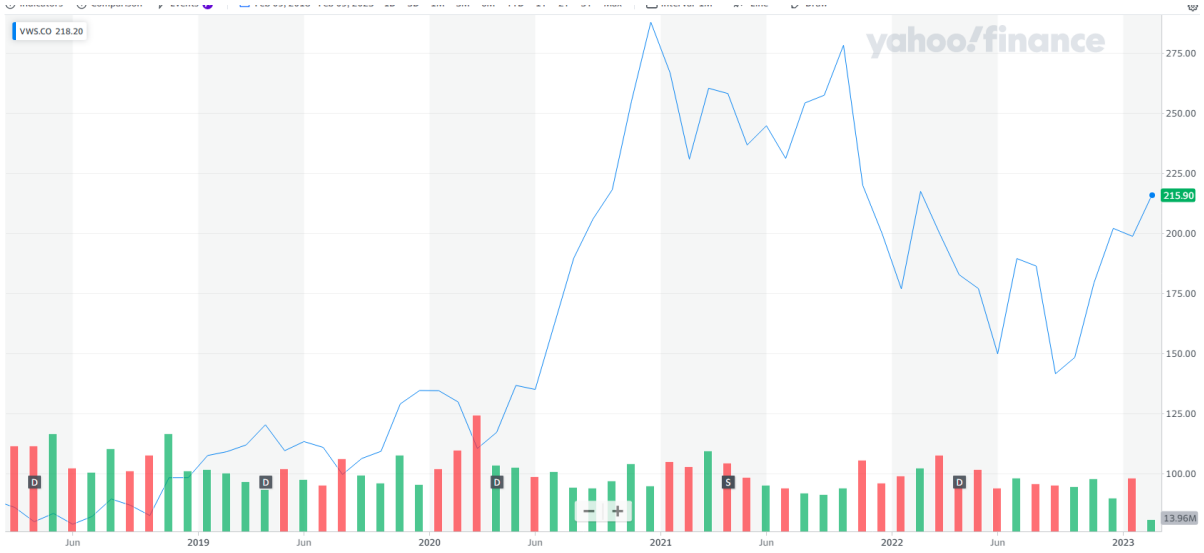
Looking lastly at **Vestas** themselves, the company has seen their stock rise by an impressive **190,22%** when including dividends, for the same period. The company paid out dividends 4 times over the course of the 5 years, in April of 2018-2021.

With the company only seeing their profitability go down quickly during the last 5 years, the exact opposite happening to their stock tells the story of an expectation that the company is more than able to capitalize on the opportunities that lie ahead in the near term, and that these opportunities have grown more than the market previously expected.

[59] https://finance.yahoo.com/quote/%5EOMXC25/history/
[60] https://indexes.nasdaqomx.com/docs/FS_GWETR.pdf

Looking closer at the actual development in the stock, it is clear that most of the stock increase came in the second half of 2020, where the stock was sitting at a quite higher price than it did at the beginning of February 2023.
This tells that expectations of future profit grew significantly in this period but has so far not been able to keep momentum.
It should be noted that the stock prices in the chart decrease at the time of dividend payment, whereas it has been included in the total return for the period.
Also, the company did issue a 1:5 stock split, but in the chart the stock split has been accounted for.



[61]

To sum up, based on market expectations, Vestas are apparently set up to do well. The analyzed factors previously mentioned are estimated to have such a big positive impact for the company, that the company expected future profits to have risen significantly. Even when comparing to both the world market, the industry and the Danish market, Vestas' market value has grown more in the last 5 years respectively. Lastly, while new competitors may appear, it is still a capital heavy industry with high entry barriers.

To conclude on the second research question, there are a lot of different important elements which will affect Vestas in the period to come.
The big political move to quicken up on their renewable energy targets is set to help the sector as a whole to grow quite significantly, with many different regions setting ambitious targets. This has created an even bigger motive for competitors to sharpen up, and for new competitors to start

[61] https://finance.yahoo.com/quote/VWS.CO/

entering the market, however these are still met by high entry barriers. But as for example the EU seeks to diversify their sources of energy, Vestas can expect even more threats of substitution. Increased competition and different sources of energy will also increase buyers purchasing power, weakening Vestas position. But as the wind industry is the source of renewable energy expected to grow the most, and with Vestas being the biggest current manufacturer of wind turbines, they are in a dominant and promising position.
While current supply chain issues have given an edge to the company's current suppliers, forecasts are expecting both interest rates, overall inflation, and raw material prices to fall within the next few years, drastically helping Vestas to be able to achieve positive margins again.
To put Vestas' favorable position into perspective, one can compare the development in their stock price and therefore market value and expected future profit, with either the overall global stock market, the Danish stock market, or with the industry. When compared to either of these benchmarks, Vestas stock returns have in the last 5 years dominated all of them, returning over 190% in the time period. This is despite the last 5 years seeing stagnating revenue, and loss in margins, which goes to show how big the future expectations really are for the company.

Preparing for the Future

To prepare for the future, the first step will be to summarize the relevant conclusions from the previous analysis. Those have highlighted external factors, but have also shown how and what have had an impact on Vestas specifically, and how it has influenced them. This has given some points which can highlight Vestas' current position, which will be done with a SWOT-analysis. This can help highlight areas, both good and bad, where the company needs to redirect its focus.

SWOT-Analysis

(S) Despite the recent global challenges, Vestas have several strong sides currently. One of the biggest is their current **market position**, being the current overall market leader in the wind turbine industry, especially on the **onshore** part of the market. This position is likely to be kept, as the company also has a large **backlog,** meaning the company has revenue into the foreseeable future. Not only are they the largest on the market, but they also have a **strong brand**, being named the most sustainable company in the world. While the turbine-part of their revenue has not seen a

dramatic increase in recent times, their **services** have, and are also having great margins on this part. The last company strength mentioned is their strong development in their **stock price**.

(W) Despite the positives, the company is also struggling in other places. Recent times have meant that in 2022, the company saw **negative margins** in their annual results, which has also led to a weakened **cash position** compared to earlier. While the majority of the negative margins come from external factors, it has exposed a struggling **supply chain** in recent years.
While the backlog mentioned before means secured revenue, due to the high inflation it has also meant that they have some **delayed projects with lower expected margins.** Their market-position, while overall good, is weaker both in both the **offshore**-segment and in **China**. Lastly the company has seen **quality issues** leading to an increased warranty provision.

(O) On the opportunity side, one of the biggest carrying a large part of the industry, is the heavy **political support** for renewable energy, which has accelerated rapidly in the last few years. While the market is already big, expectations are that the market is going to grow a lot more, especially the wind-focused parts of renewable energies, and especially **offshore**, in all parts of the world. Expected economic future growth also means more **new developed markets** will start shifting focus to cleaner energies, expanding the market. The same growth also means an overall **increase in energy demand**. Being a very capital heavy and technologically advanced market also means that despite increasing demand, the **entry barrier** to the market is still relatively high, helping Vestas to keep their strong market position.

(T) As renewable energies are growing, it is not just the wind industry. While wind is expected to be a major player in the field, many countries seek to diversify their power sources, meaning that there will always be a large **threat of substitution** from for example solar and hydro. Even though Vestas believes they should live together in collaboration, it is indeed also a threat. Another threat which has already materialized, but will continue to play a crucial role for the margins of the company, is the current **high inflation**, both overall, and especially on the raw materials for the turbines. Furthermore, high **interest rates** will also continue to pressure the business cases of wind turbines, until they are once again down to lower levels. With the big attraction to the market currently, even though Vestas is currently the biggest, there are some **big competitors** coming from huge organizations, who will do everything they can to threaten the market position of Vestas The current conflict in Ukraine can also have a negative impact going forward.

Internal Situation	
Strengths	**Weaknesses**
* Market Position * Onshore Market * Big Backlog * Strong Brand * Increasing Service-segment * Stock Development	* Challenged Profitability * Worsened cash position * Supply chain issues * Delayed projects with low margins * Offshore market * Position in China * Quality issues
External Situation	
Opportunities	**Threats**
* Political support * Offshore market * New developing market * Increasing demand in energy * High entry barriers	* Threat of substitution * Inflation * Interest rates * Tough competition

Risks, Risk Mitigation and Growth.

The above-mentioned points lead to the next segment, looking at potential risks for the company, how to mitigate them, and how to also keep growth.
The company's weaknesses and threats are an obvious way to start, but also the opportunities, if not realized, can materialize into company risk.
Before painting a horrible potential of the future, it should be repeated that the current expectations for Vestas, according to stock prices, is that the future is brighter than it was previously.

One initiative that can help slightly mitigate three major points, relates to the company's production sites. Vestas has both struggled with increasing logistics costs, as well as several delays in projects. The company further has the biggest backlog in company history measured in expected revenue, and also have clear commitments from various states as to future expected investments. These three factors could all be better addressed, if Vestas was able to move production closer to the actual sites where the products will be sold. Producing closer to the end geographical location of the wind farms will mean fewer kilometers in terms of transportation, lowering costs, and to a low degree also speeding up projects. Lastly, with the backlog and promised political initiatives of

investments in clean energy and quicker permitting, it should be easier than ever to forecast where revenue would likely come from.

Another important risk mitigation can come from increased focus on product diversification. Vestas is by far the leader on the market in terms of onshore wind turbines but is behind on offshore, to especially the competitor Siemens. In absolute terms, the onshore market is also bigger, being in Vestas favor, but future expectations are that offshore is expected to grow at a larger percentage-rate than onshore. Shifting a bigger portion of company focus onto offshore can therefore mean a more diversified product portfolio, better suited for the future, opening up more possibilities.
Further to this is the service-segment. While still a relatively small portion of the overall revenue again compared to onshore, it again serves as a separate revenue-stream and an added diversification benefit. It has also seen to be the most profitable of the current revenue-streams, meaning that if the goal is increased revenue, the company can compromise some margin on this if it means more business can be won in the segment.
Lastly is the development segment which once again can help diversify revenue, making the company overall less volatile to issues in one particular revenue-stream.

In a similar fashion, diversification can also be an asset in terms of graphical diversification. In 2021, China was by far the country with the biggest installed capacity of wind power, but Asia Pacific only accounted for around 11% of the revenue for Vestas in 2022, with EMEA and Americas being Vestas main markets.
While both EMEA and Americas have promised dedication to further their position in renewable energy, this still leaves a huge market on the table for Vestas. Further, Asia Pacific is seeing more emerging markets transitioning to developed markets, increasing both energy demand but also demand for cleaner energy as countries progress. A similar case can be made for Africa, where the expectation is that the industry already by 2030 is expected to grow significantly.
This again mitigates the risks of a single country or region being slow or no longer aiming to hit their future clean energy targets, and thus lowers those specific risks. It was also showed earlier how a slow approval from governments in the US lead to an abrupt halt in projects, further showing the need for diversification.

Another future risk mitigation could be to reevaluate their contract terms. During high inflationary periods such as the current one, combined with long project times mainly due to permitting and supply chain, Vestas now has a backlog including some projects that are selling at a lower price than newer projects, even to a degree where they are no longer profitable, but still legally binding. While both the inflation and permitting time is expected to decrease, no one rarely predicts high inflation in the long term, yet it is something we see from time to time, and this is very likely not the

last.
Being able to adapt the contract in a way that better can follow changes in either lead time on the total project, or adapt to changes in sourcing prices, will make sure that the company is less likely to agree to projects which can turn out with a negative margin in the end.

The last risk mitigation is quite as simple as it is obvious. The industry as a whole has suffered greatly from supply chain issues. Foreseeing the issues that have hit the sector within the last couple of years has been near impossible, but on the other hand has been a wakeup call. Because of this, most companies in the industry are now putting a lot more focus into the supply chain, both internally and in terms of suppliers, where more suppliers might be beneficial to de-risk. Continuing to focus on this should be obviously beneficial.
The supply chain issues, and fluctuating FX rates also makes hedging even more meaning- and impactful than ever. With increased global operations also come higher currency risks, which in a world where interest rates and inflation rates can be very different in each country, makes it even more important to consider, due to parities.
Similar previously agreed future contracts on raw materials will have likely paid off, and can depending on price be a security for the future to mitigate further risks.

Net working capital could from another perspective also be interesting to look at. The liability has increased in the last few years but could be a subject for discussion in the future. The current model sees prepayments paid to Vestas as the customer projects progresses, but should capital become an issue, it may be worth looking into the amount of the prepayments.
On the other hand, if Vestas is able to improve their cash flows as forecasted, interest rates drop, permitting is drastically improved, and demand is high, using some of the capital may be considered putting into pre-producing parts or fully built wind turbines may be an opportunity, given the customer a shorter time between order and actual energy production. This would though be a few years out in the horizon, but may be another way of tempting customers.

Scenarios

So far most of the conclusions have some base in future expectations, made by credible sources. However, the future will always remain somewhat unknown.
As also seen in both of the previous research questions, recent times and future times are subject to massive uncertainty. Most of the effects in the first research questions were triggered by unforeseen events, and as such only planning for one future scenario expectation may be a very risky strategy.

There are a number of different items which can play out very differently from initial expectations mentioned in the second research question.
Preparing the company for several different possible outcomes of the future, and thus scenarios, should therefore be considered to not be surprised when reality hits.
Making several scenario-analyses from Vestas would also mean a high dependency on agility. Having several possible scenarios to which the company needs to be able to adapt requires a certain set of planned actions, according to what scenario ends up being the most correct one, and being able to act accordingly will sound easier than it is. Being agile is also something that would have been able to help the company in these recent unstable times and will likely be something the company has also improved upon lately.
One example of scenarios could be the interaction and development between current inflation and current interest rates. Both are expected to go down to more regular levels within a relatively short time frame, but depending on the big banks of the world, the time until both are back to more normal levels can be different. Further shortages of specific materials and goods could also keep up inflation, and simply basing all current actions on one specific path back to regular levels may be very flawed, and could cost the company. Instead, hedging for worse times than currently expected could be a more effective way of mitigating risk, while also remaining agile enough to react if reality ends up being more positive than the worst scenarios.
Another example of scenario analysis being relevant could be in terms of development of the current conflict in Ukraine and Europe. This is yet again another case where there are expectations of how the situation will pan out, but reality might both be better or worse than the single most likely scenario. A worsening of the situation could mean parts of the world having to reallocate funds heavier towards the military, rather than focusing on cleaner energy. It could also have a worse effect on the current supply of raw materials if these are being cut short or need to be prioritized to something else. Though the absolute worst scenario here will be difficult to prepare for.
On the other hand, if the situation gets better, it might mean that raw materials from both countries allow for better sourcing prices. Further it could mean two new large markets open up sooner than expected and could thus have positive effects as well that may be worth somewhat preparing for.

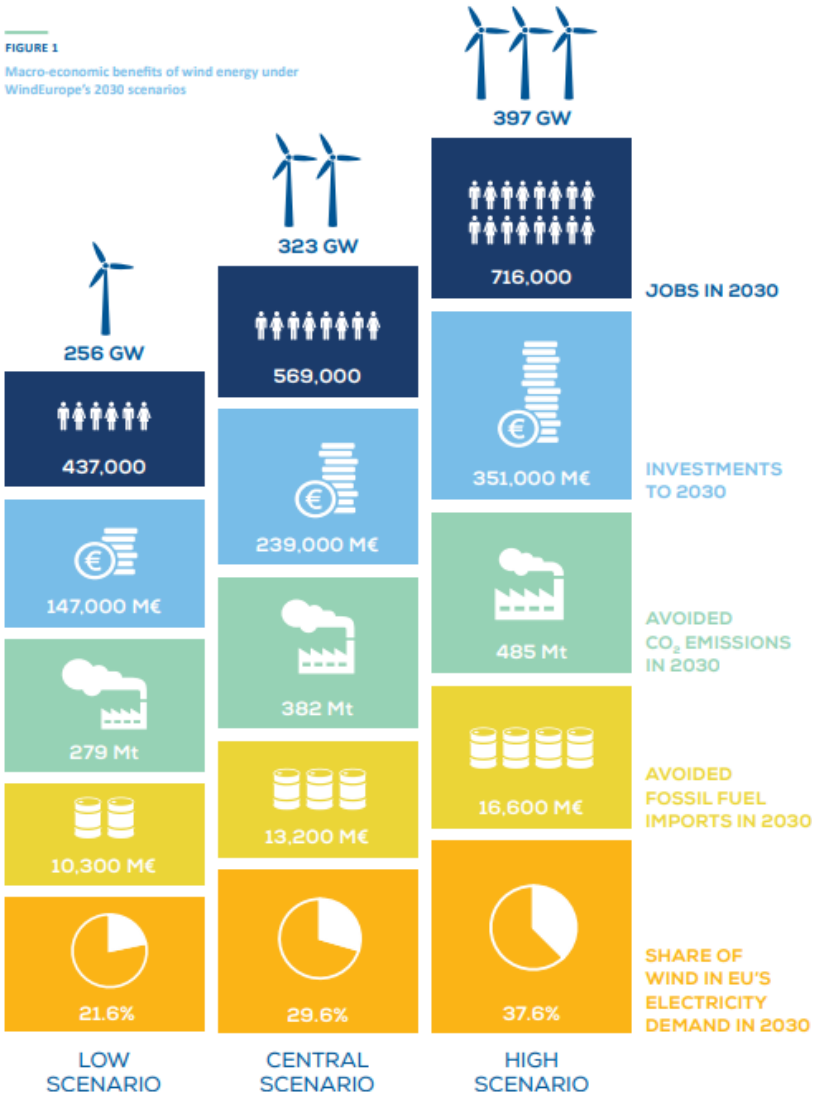
A last example could be overall demand, which will depend on a large number of factors, including both previous scenario-examples.
Having one set of expectations only to future demand could challenge the company dramatically if the future does not pan out as expected. Having instead some ranges where demand may fall within can help the company stay agile and better react to swings in expected demand. Setting up a large amount of production sites because the company expects the best scenario, only to see

some other risks materialize may be detrimental to capital and future gains.

There are countless examples of political targets not being met, or even more realistic, being changed several times over the course of time, as governments change following elections or other crises requiring more capital.

Being aware of this and setting up several scenarios, with some distribution of likelihood, and according to such will be important, and especially coming off these very unforeseen shaky times, might both make it more difficult than ever, but at the same time more important than ever as well.

To set these scenarios into perspective, below is a figure from WindEurope having 3 different scenarios for expected growth in the wind energy sector till 2030 [62].



These scenarios were made in 2017 and are meant for Europe, and since then the expectations have drastically changed, with the new RePowerEU plan aiming for 510 GW, only for EU-countries

[62] https://windeurope.org/wp-content/uploads/files/about-wind/reports/Wind-energy-in-Europe-Scenarios-for-2030.pdf

[63]. This just goes to show how expectations can change dramatically in a short amount of time, and how the most agile company is likely to bear fruit.

To conclude, there are several points to consider for Vestas in regard to the future, based on what has been discussed in the previous two research questions.
It has been possible to identify both strengths, weaknesses, opportunities and threats for Vestas, which is a good foundation to find areas to focus on. In these uncertain times, with new weaknesses emerging and several threats lurking, risk mitigation is crucial to either eliminate or reduce negative impacts of these elements, both in terms of diversification and supply chain.
In these uncertain times, it is also important to remember that reality may turn out drastically different from what current forecasts are showing, both due to unforeseen events as seen recently, or simply due to changes in priority for firms and governments. To be able to deal with uncertainty, preparing for different scenarios in regard to for example interest rates, inflation, war, demand etc., and remaining agile, might be the key to better successfully navigating through these uncertain times, while optimizing as best as possible.

[63] https://www.iea.org/reports/is-the-european-union-on-track-to-meet-its-repowereu-goals

Conclusion

With the last research question answered, it is possible to draw the three conclusions from each research question together, to answer the main problem formulation.

The goal was to answer: **How has the recent global destabilization impacted Vestas so far, and what is the outlook of the company going forward?**

Looking at the first part, it was concluded that there have been several different events that have had an impact on the macro-environmental factors in the last few years. Before these, Vestas saw an increasing top line growing steadily, and with positive decent margins on both their wind turbine and smaller service-segments.

Unfortunately, supply chain issues already started creeping in around the time COVID came. But when the virus hit, the problems went from bad to worse. Layoffs were required in the R&D department, and production sites had to be temporarily stopped, due to health reasons. This period also saw a surge in distribution costs, further hindering the margins for the company.

Though as these negatives hit, many parts of the world decided to help stimulate the economy with different incentives and stimulus packages. As many of these are fairly long-sighted, the impact of the virus and following supply chain issues, combined with higher interest rates and higher overall inflation has meant that the company is now even with high revenue, showing worsened margin on their wind turbine business.

2022 was expected to be another difficult year but on the path to recovery, but the crisis in Ukraine involving Russia unfortunately for Vestas put an end to that goal.

This further increased the supply chain issues, while making these two markets impossible to operate within, and also saw the need to write-off assets in Russia following the aggression. 2022 therefore ended up being a year with negative bottom-line results, and with a cash flow also suffering. The company also saw issues with some investments in their offshore platform which had to be written off, and also saw a significant increase in warranty provision following poor quality and cost increases, leading to another negative P&L impact.

It is therefore safe to say that many different elements played a negative effect on the company in the last five years. Effects were so great that they also showed up quite clearly in their financials, but there was light in the dark, as financials also showed a bigger backlog measured in future revenue than ever before.

Turning the focus to the second part of the question, and looking instead at the future ahead, some of the conclusions from the past can also be interesting for the future.

Inflation has been high in the recent period, but is being combated by higher interest rates, which following economic theory should eventually bring it down. Because of that, expectations are that both inflation and interest rates should in time go down to lower and more usual levels.

The aggressive targets set by governments are also set to boost the industry significantly, both in Europe, Americas, Africa and Asia. While hydroelectricity in 2022 accounted for 48.7% of global renewable energy, compared to Wind power's 25.5%, the expectation for the future is actually that wind power will take over and become the biggest.

Digging deeper into the wind turbine industry, Vestas is currently the biggest in the game when combining onshore and offshore, but the competition in the industry is tough, and is only growing. Price is a big factor for the customers, and seeing the potential future growth in the sector, Vestas can only expect to be pushed more and more by their competitors, even though they have the best place in the market currently. Supply chain issues have meant that the bargaining power is currently on the supplier side, and as mentioned before, a bigger competition in the industry will also boost the bargaining power of the customers.

While the industry has extremely high barriers to entry due to the technology required as well as the heavy capital needed, the expected growth of the industry will likely mean that more and more will try to compete in the sector.

So, while Vestas currently is in a very good position, being the lead player in the wind turbine game, which is also expected to become the biggest renewable energy source, the market conditions are increasingly tough to operate in.

To put the expectations into more tangible numbers, one can look at the stock development in this 5-year period. In this, an ETF tracking the developed world, hedged to euro, delivered a return of 41,92%. In comparison, Vestas stock including the paid-out dividends instead returned an astonishing 190,22%. This shows that despite the difficult recent times, the expectations for the company are huge, and they are expected to be able to deliver positive results from a dominant position in the future.

While expectations for the industry and Vestas is huge, and the company has great strengths such as their market position, especially on onshore, as well as a strong brand a profitable service-segment, there are also weaknesses and threats that must be addressed, and opportunities that will need to be mitigated to help the company be even more successful.

Some examples are the current challenged margins, where the supply chain issues have caused a lot of trouble for the company. While this has been an issue for the whole market, it may be worth reviewing anyway, and look to go through supplier contracts, increase the number of suppliers, and the like.

Other examples could be to diversify their revenue streams, as offshore is set to grow more in percentages than onshore, as well as boost their development and service segment. This can also be looked at from a geographical diversification standpoint, where Americas and Europe are currently the dominating markets for Vestas, but where Asia and Africa could also see more focus.

If the future is only half as unpredictable as the last 5 years have been, another important tool to bring out of the toolbox would be scenario analysis. Many forecasts predict many different elements, but simply basing all actions on one set of future expectations is likely to be a flawed strategy.

This can for example be in terms of expecting interest rates to go down at a certain time, or that governments will follow their environmental targets 100%, and the demand it creates.

Instead, preparing both pessimistic, realistic and optimistic targets can help keep the company agile, and be quicker at adapting to changes in expectations, which may reward them more than usual given these very uncertain times. Staying agile might be difficult when Vestas is the company with the most market share, but the alternative might be competitors, old or new, getting a step or two ahead of them.

Based on the above, the future of Vestas looks as positive as it looks uncertain. There are plenty of arguments made as to why the company shall succeed, but there are also many unknowns and expectations built into it. The scene however is set for Vestas, and if they can capitalize on their strengths and opportunities and mitigate threats and limit weaknesses, the growth is likely to simply keep going.

Literature:

Books:

Bell - Bryman – Harley – Business Research Methods, Fifth Edition

Frank – Bernanke – Atonovics – Heffetz – Principles of Economies, Seventh Edition

Salung and Bergfors – Erhvervsøkonomisk Metode

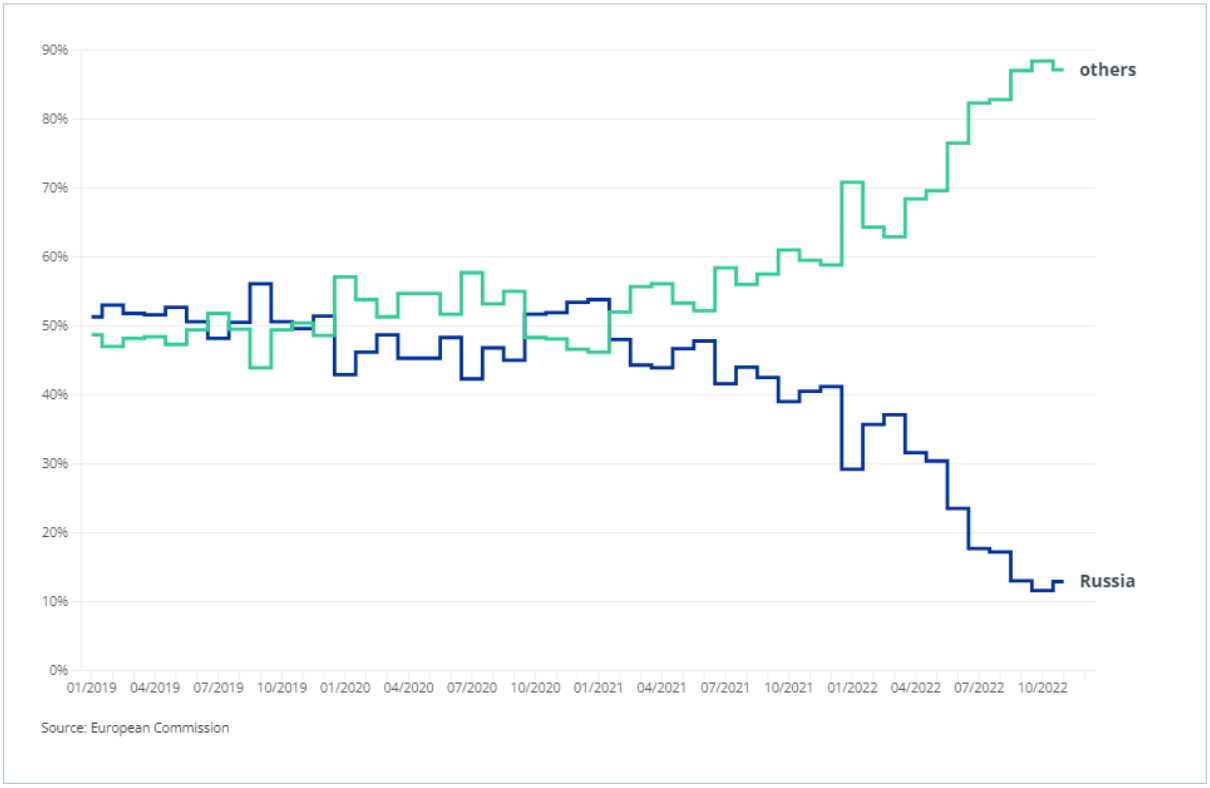
Peng and Meyer – International Business, Third Edition

Hirschey – Bentzen – Scheibye – Managerial Economics

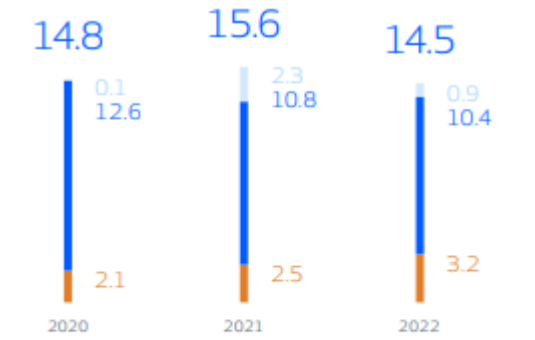
John Thompson - Jonathan M. Scott – Frank Martin – Strategic Management

Tables and graphs:

Russian Gas Supply to Europe



Vestas Revenue by Channel

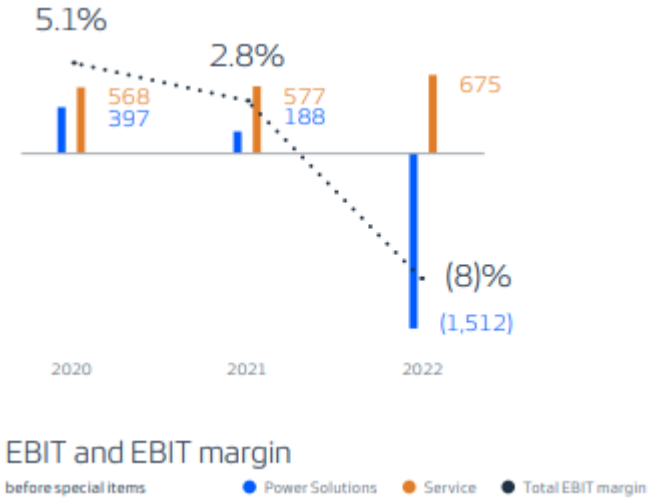


Vestas Revenue by Geographic Region

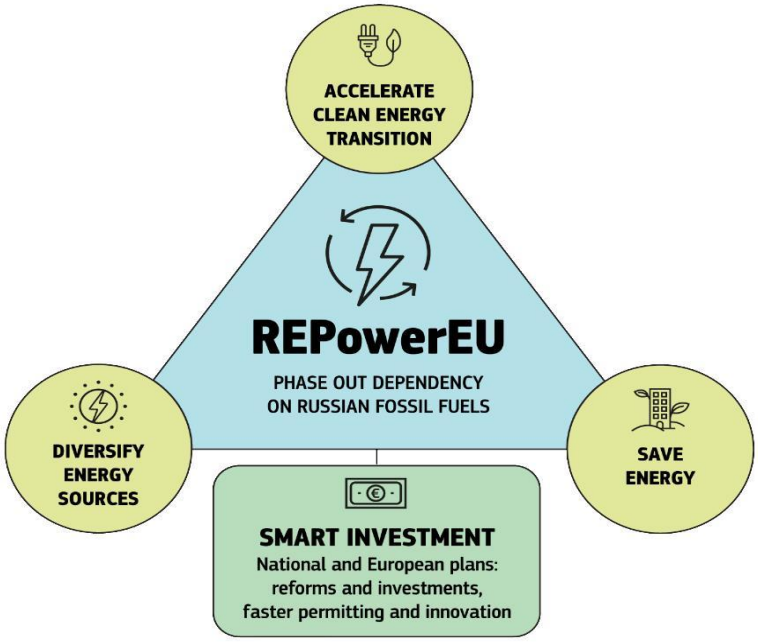
Geographical distribution of revenue

mEUR	2022	2021
EMEA	7,826	8,818
Americas	5,111	4,807
Asia Pacific	1,549	1,962
Total	**14,486**	**15,587**

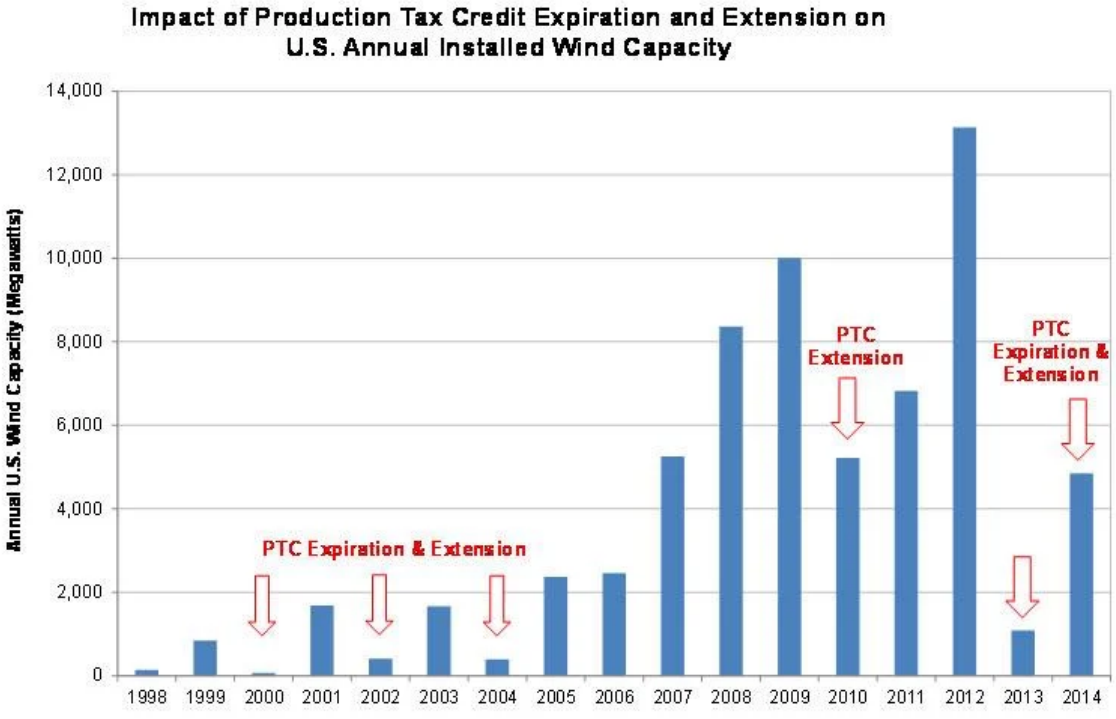
Vestas EBIT and EBIT Margin by Channel



REPowerEU points



Impact of PTC in US

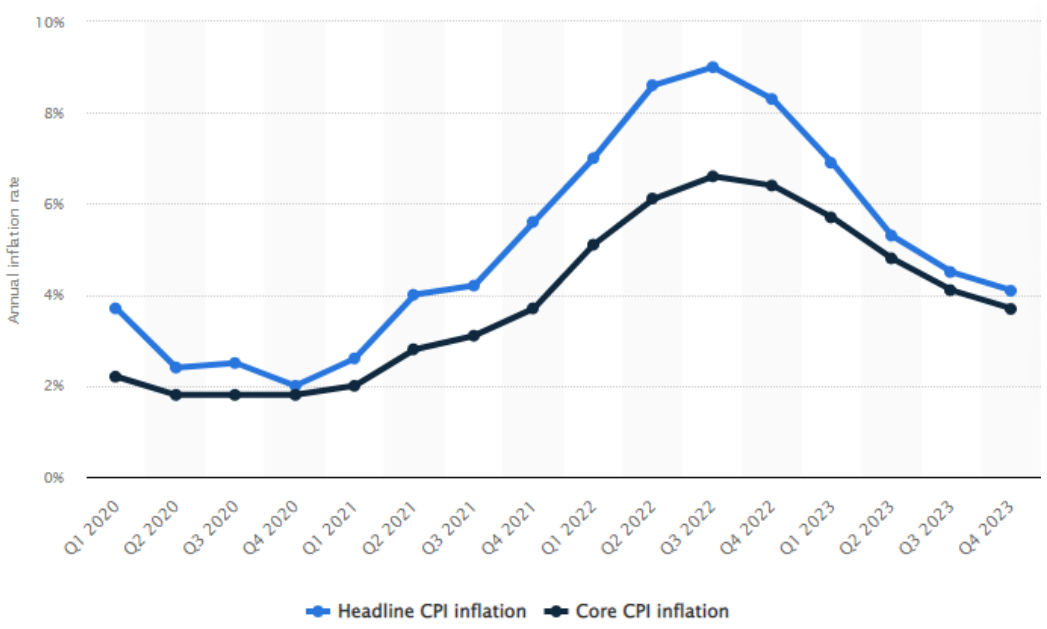


Expected wind power investment costs in China

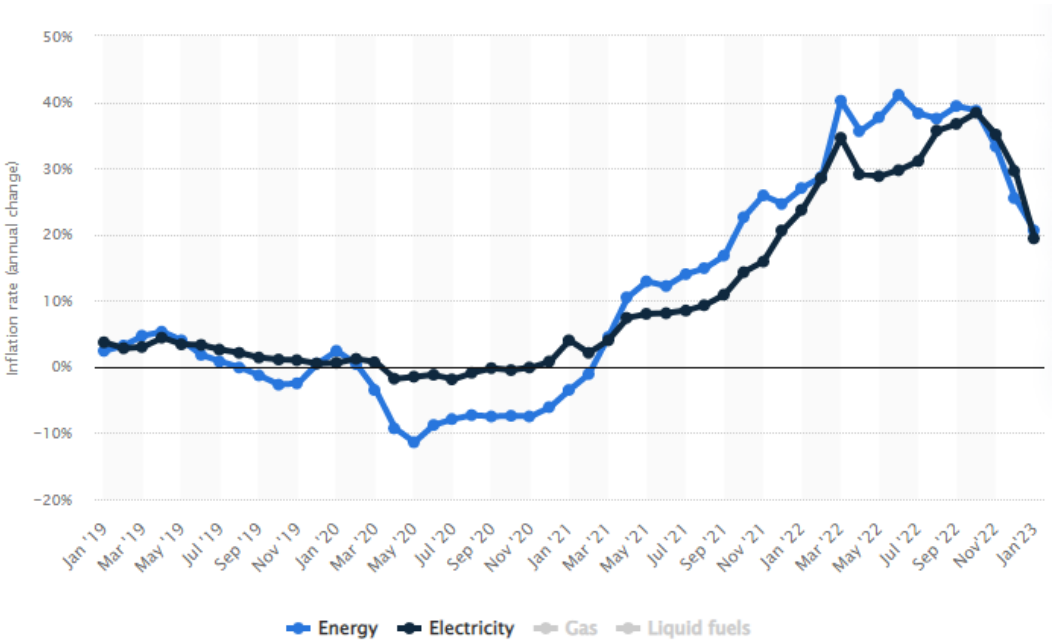
Table 11. Expected wind power investment costs (in 2010 constant prices)

		2010	2020	2030	2050
Projected average tariff (CNY/kWh) without taking into account of transmission and storage cost.	Land-based	0.57	0.51	0.48	0.45
	Near offshore	0.77-0.98	0.77	0.60	0.54
	Far offshore	-	>2	2	1
Total investment in the year (CNY billion)		**123.4**	**136.2**	**298.2**	**427.6**
Total accumulated investment (CNY billion)		**313.1**	**1 777.3**	**3 833.8**	**12 096.2**

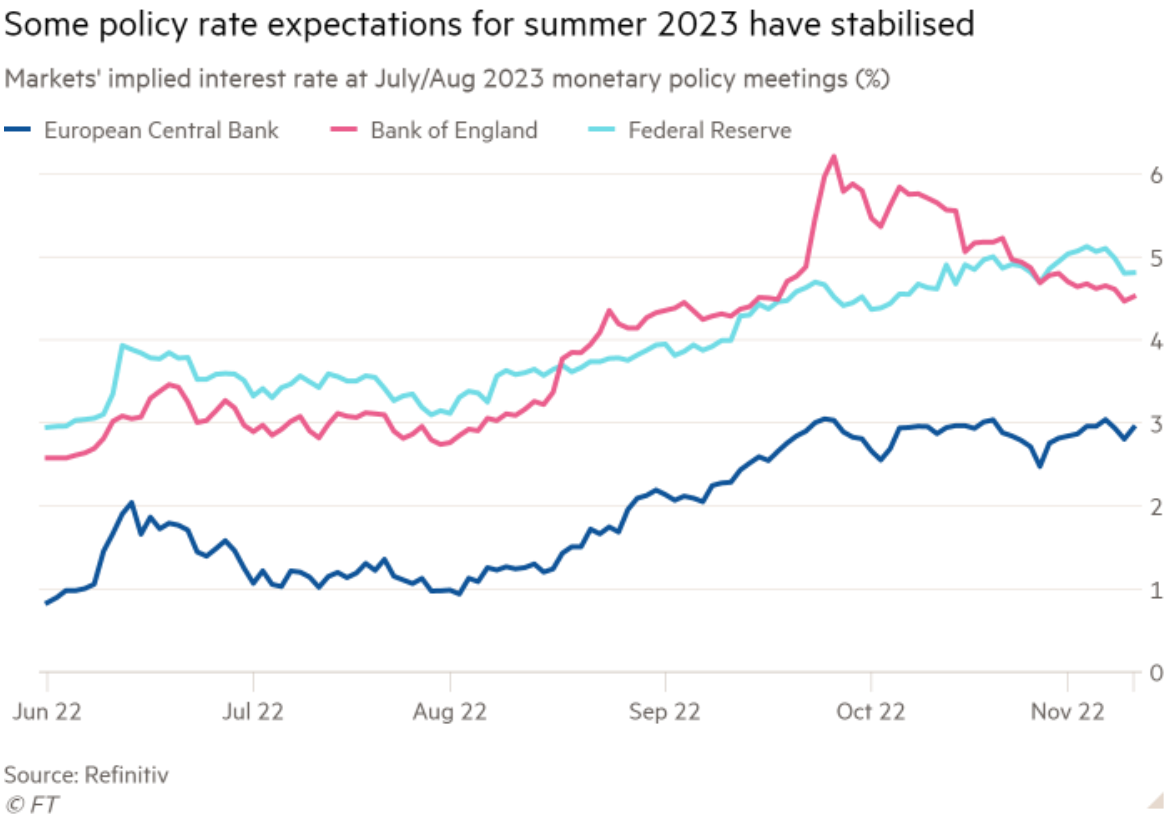
World Inflation 2020-2023



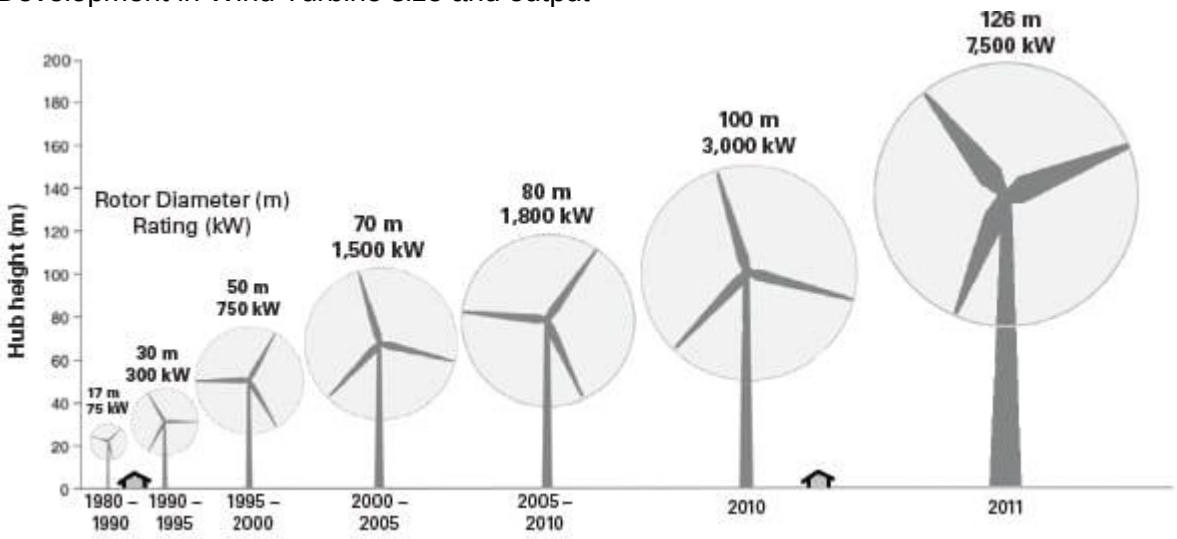
Inflation for Energy



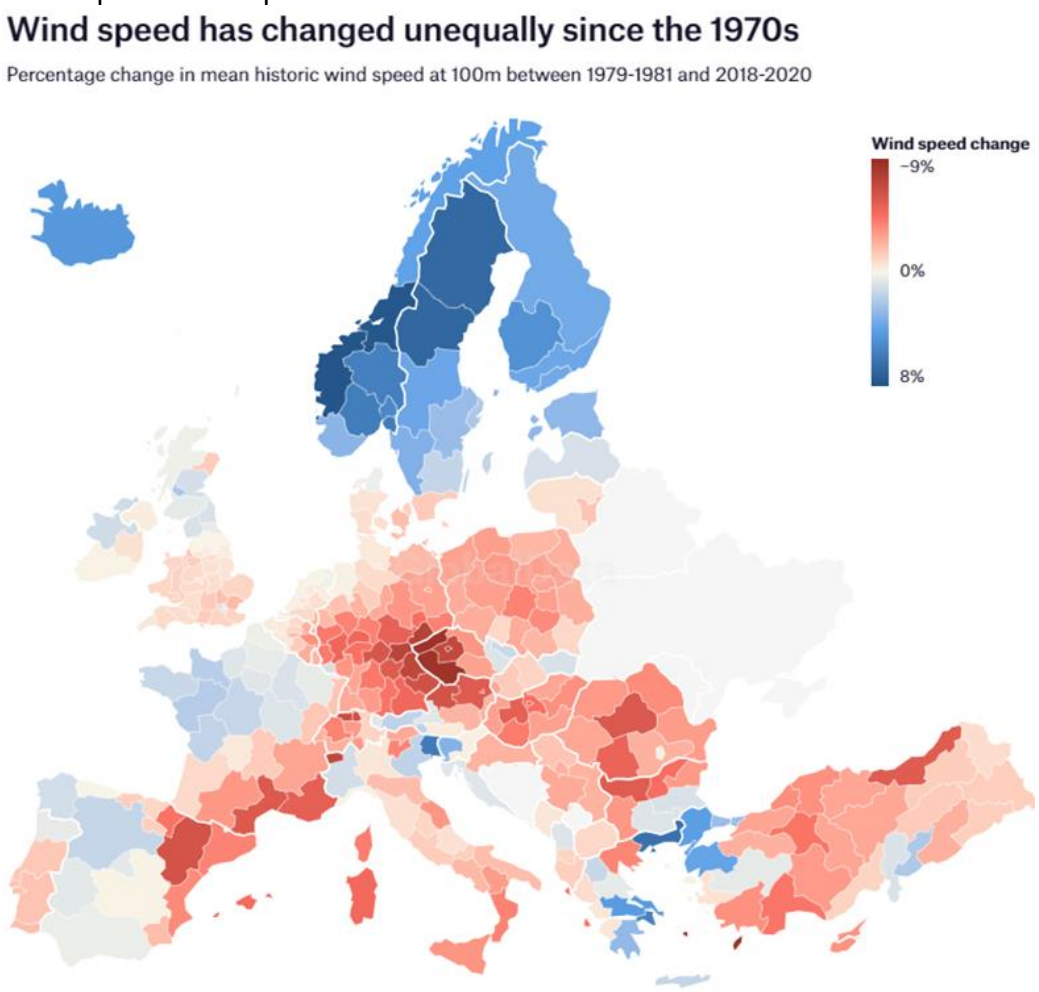
Interest rates for FED, ECB, England



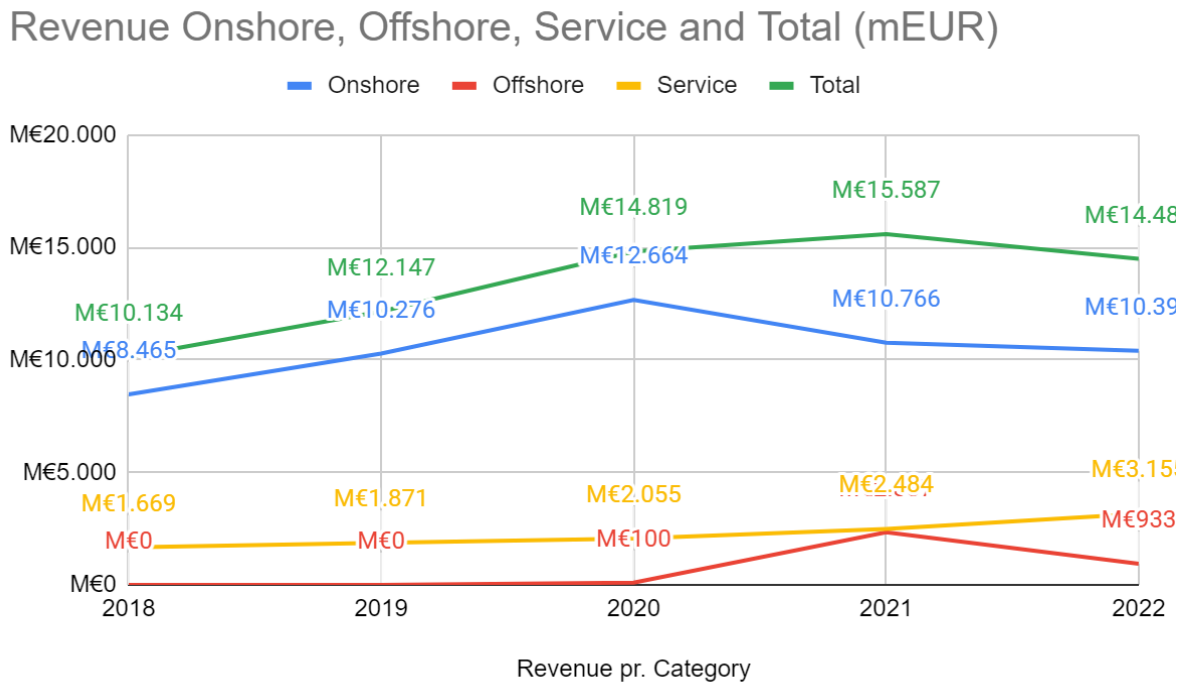
Development in Wind Turbine size and output



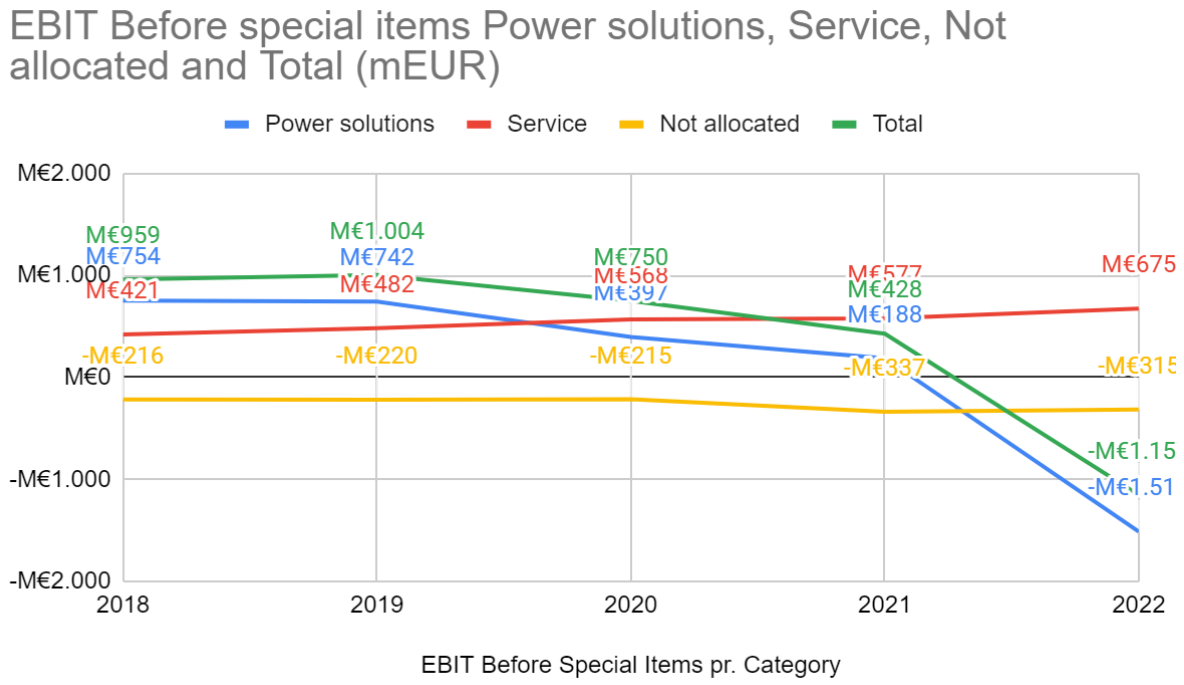
Wind Speed in Europe



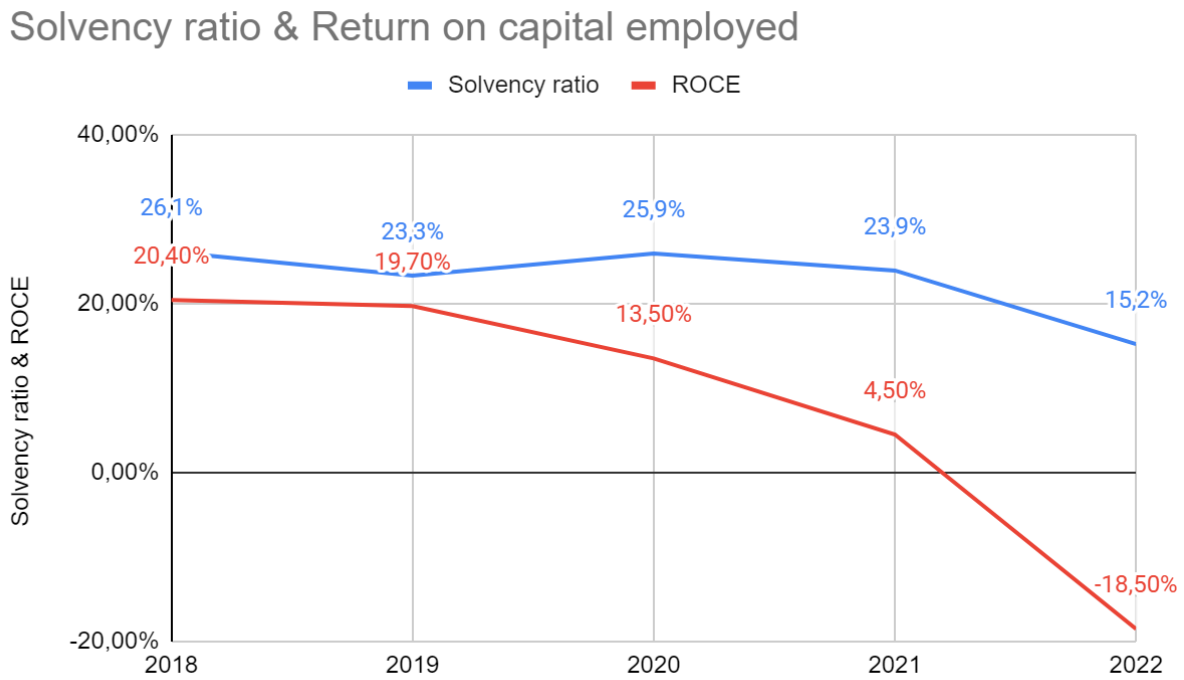
Vestas Revenue by Channel 2



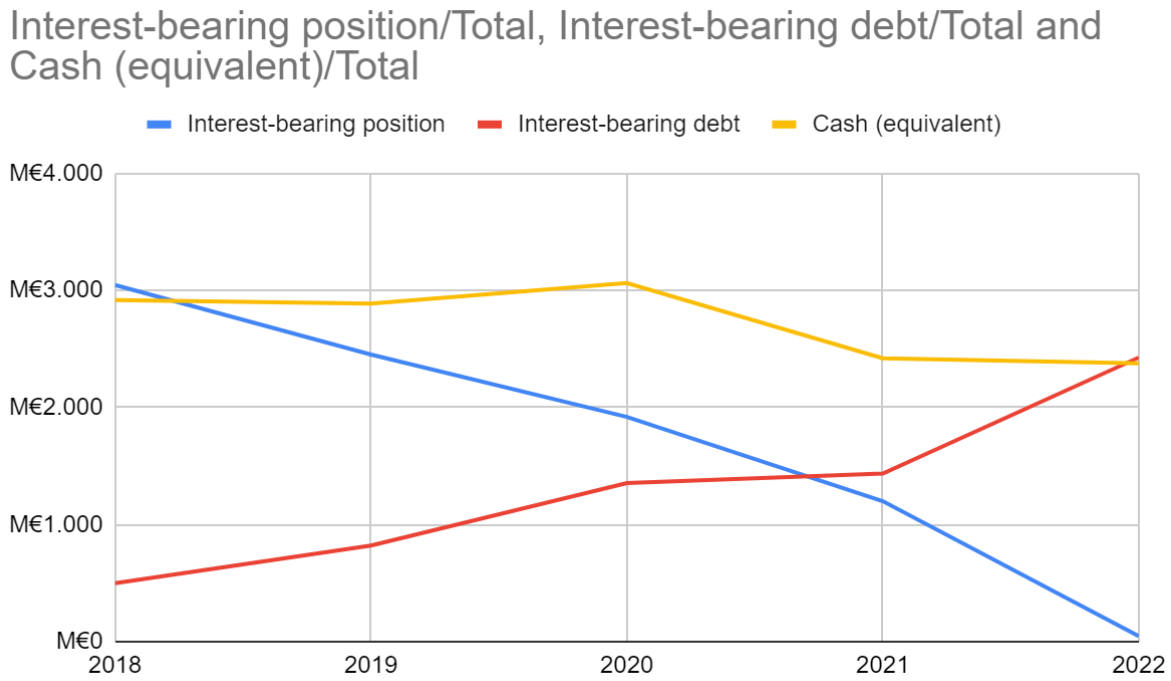
Vestas Ebit by Channel 2



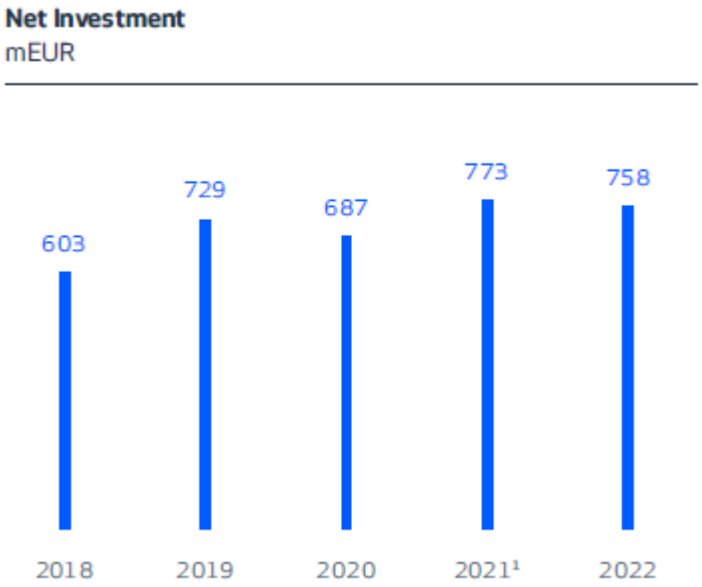
Vestas Solvency and ROCE



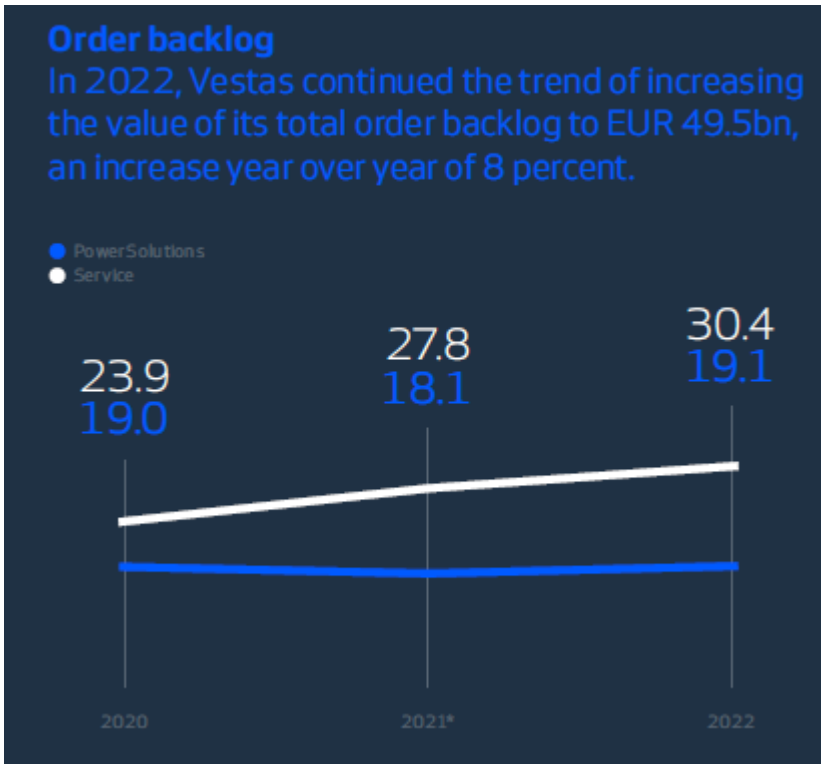
Vestas Interest-bearing position and Debt and Total Cash



Vestas net investments



Vestas Backlog by Channel

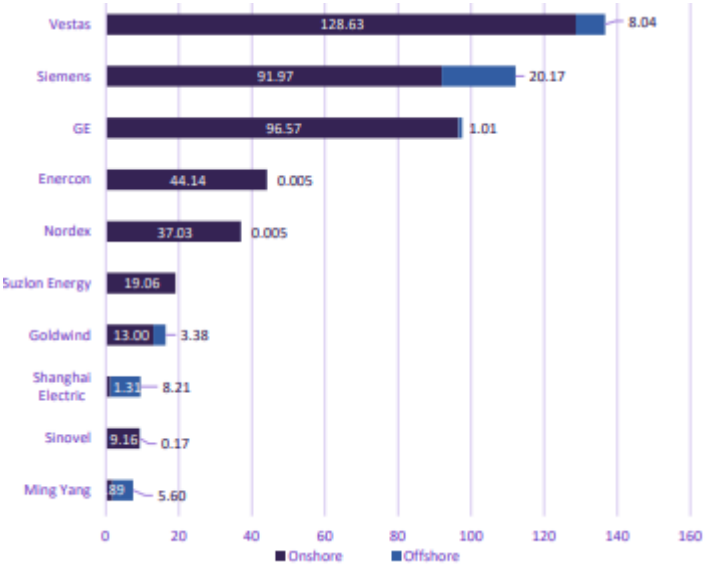


Raw Material prices historical and forecast

Commodity	Unit	2020	2021	2022f	2023f	2024f	Percent change from previous year 2022f	Percent change from previous year 2023f	Differences in levels from April 2022 projections 2022f	Differences in levels from April 2022 projections 2023f
Metals and Minerals										
Aluminum	$/mt	1,704	2,473	2,700	2,400	2,434	9.2	-11.1	-700	-700
Copper	$/mt	6,174	9,317	8,700	7,300	7,361	-6.6	-16.1	-1,400	-2,400
Iron ore	$/dmt	108.9	161.7	120.0	100.0	98.0	-25.8	-16.7	-20	-5
Lead	$/mt	1,825	2,200	2,100	1,900	1,917	-4.6	-9.5	-200	-200
Nickel	$/mt	13,787	18,465	25,000	21,000	20,708	35.4	-16.0	-3,000	-1,000
Tin	$/mt	17,125	32,384	31,000	22,000	22,257	-4.3	-29.0	-10,000	-13,000
Zinc	$/mt	2,266	3,003	3,500	2,800	2,771	16.6	-20.0	-200	-400

Vestas Average Sell Price

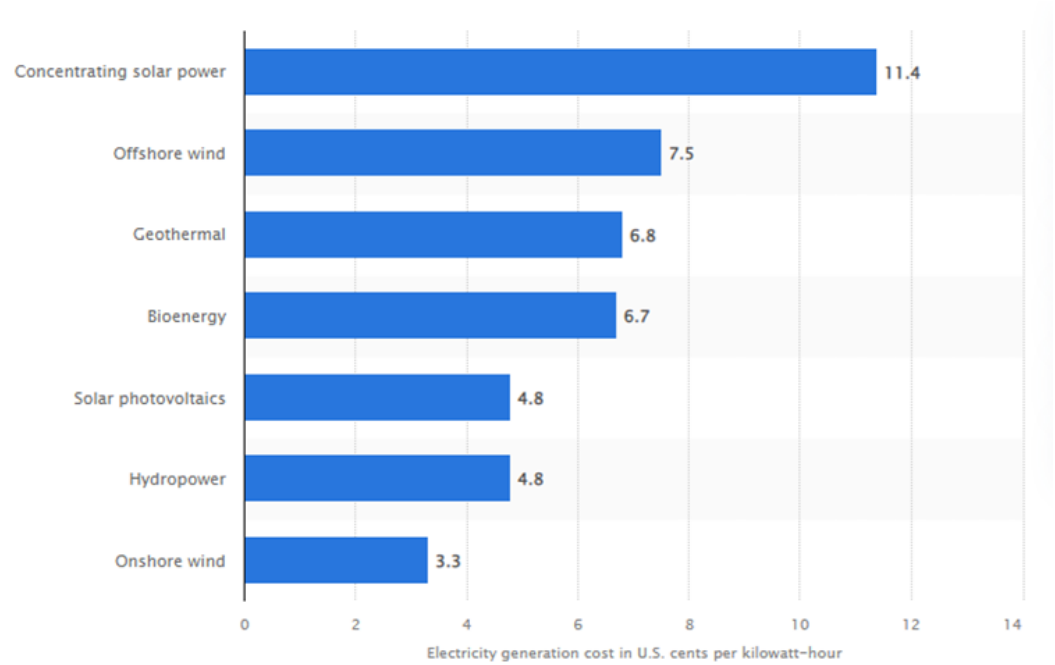
Top 10 Wind Turbine Manufacturers



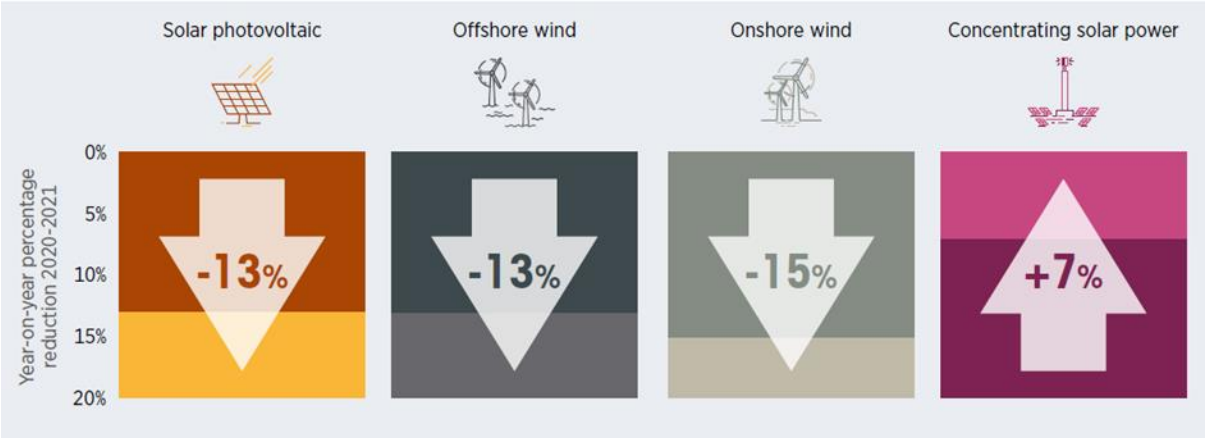
Global renewable energy market share by category

Table 3: Global renewable energy market category segmentation: % share, by volume, 2017–2022						
Category	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**
Hydroelectricity	61.9%	59.6%	57.1%	54.8%	50.8%	48.7%
Wind	19.7%	20.6%	21.8%	23.0%	25.0%	25.5%
Solar Pv	7.8%	9.5%	11.1%	12.6%	14.3%	16.2%
Biopower	9.4%	9.1%	8.9%	8.6%	8.8%	8.7%
Geothermal	1.2%	1.1%	1.1%	1.1%	1.0%	0.9%
Total	100%	99.9%	100%	100.1%	99.9%	100%
SOURCE: GLOBALDATA					**© GlobalData**	

Price of energy by category

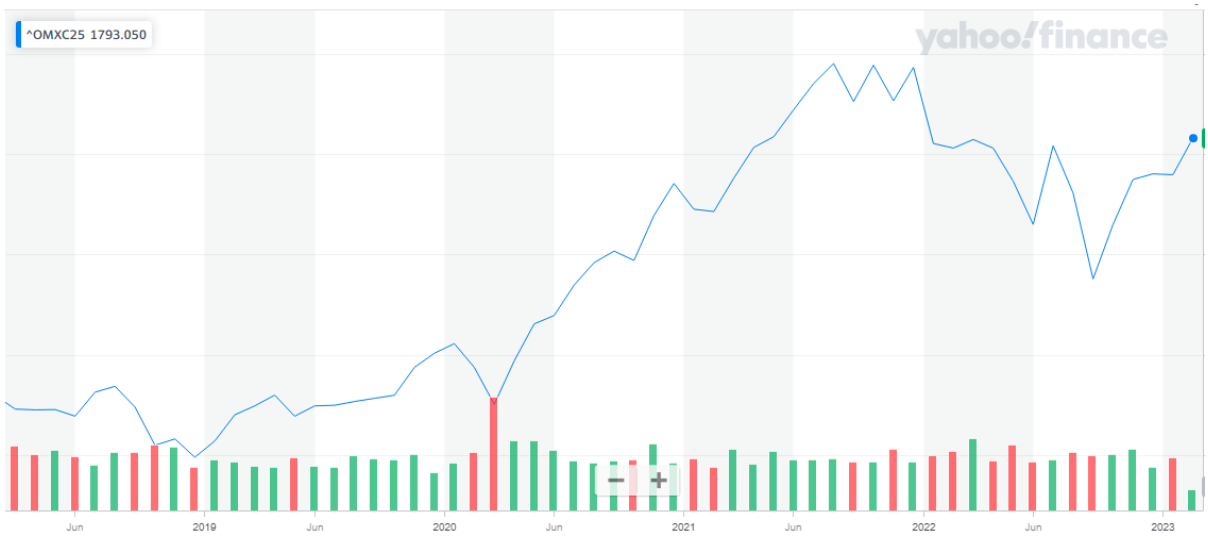


Expected Energy Price Development by Category

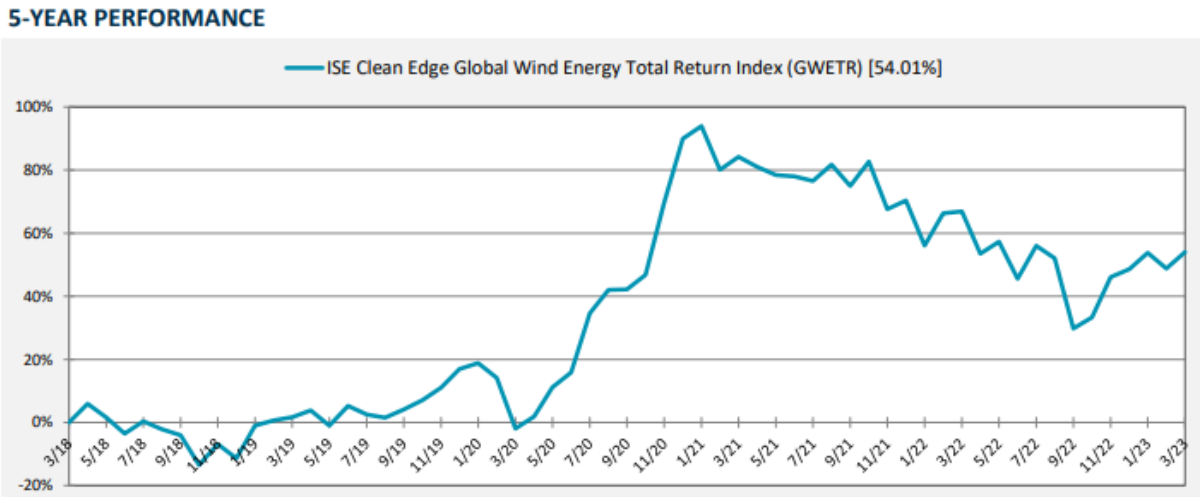


iShares MSCI World EUR Hedged UCITS ETF stock development

Danish stock market OMXC25 development



ISE Clean Edge Global Wind Energy stock development

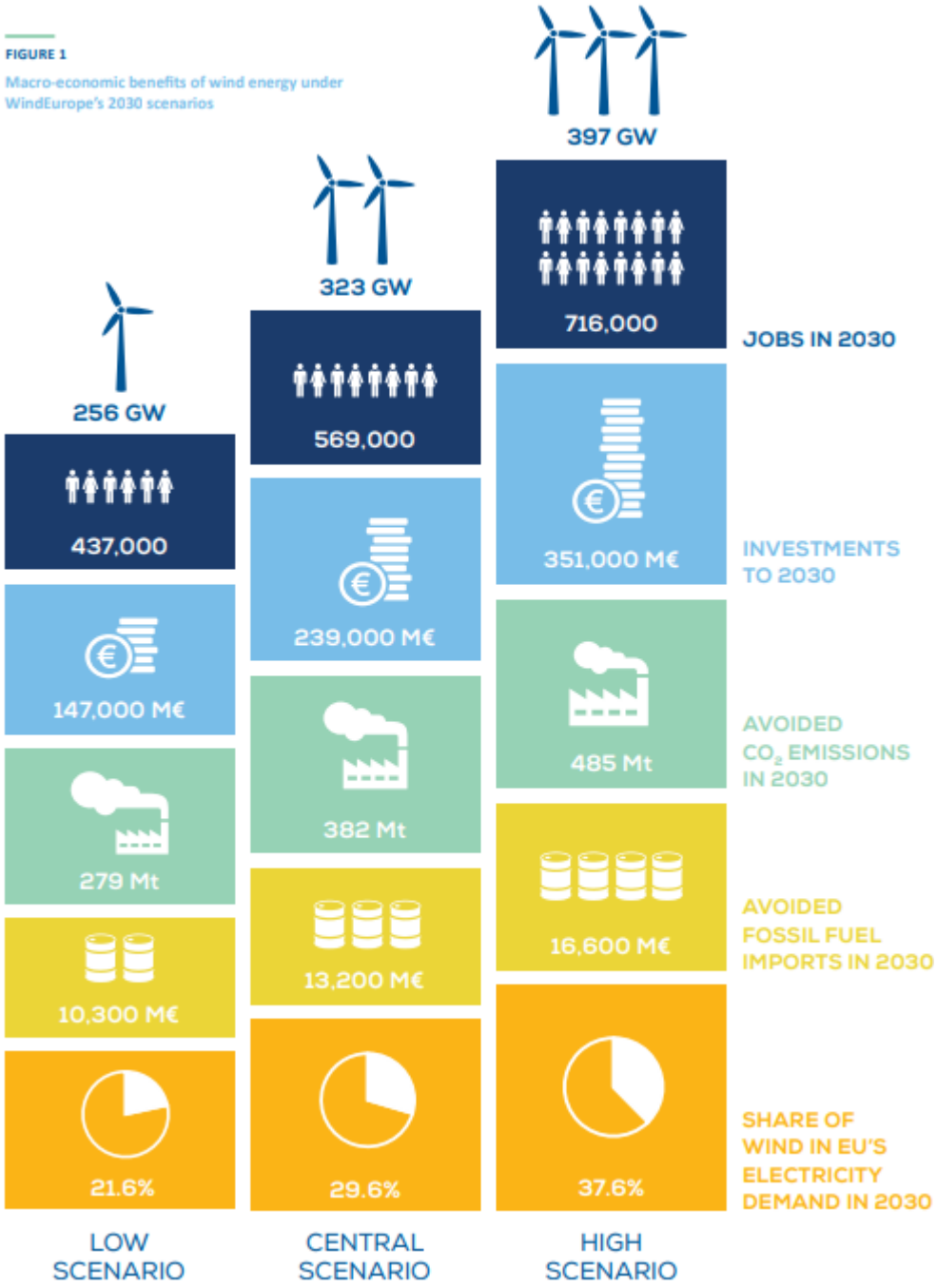


Vestas stock development

Vestas SWOT

Internal Situation	
Strengths	**Weaknesses**
* Market Position * Onshore Market * Big Backlog * Strong Brand * Increasing Service-segment * Stock Development	* Challenged Profitability * Worsened cash position * Supply chain issues * Delayed projects with low margins * Offshore market * Position in China * Quality issues
External Situation	
Opportunities	**Threats**
* Political support * Offshore market * New developing market * Increasing demand in energy * High entry barriers	* Threat of substitution * Inflation * Interest rates * Tough competition

European Energy Scenarios



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