Climate Risk Report 2023

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Vestas Wind Systems A/S – Company reg. no.: 10403782 Hedeager 42, 8200 Aarhus N, Denmark



Purpose

The Vestas Climate Risk Report outlines the process, scope, methodology, and result of the yearly risk and scenario analysis. The impact of climate change on Vestas is determined in the analysis. The analysis supports our understanding of the inherent risk profile of our business activities, identification of weaknesses and vulnerabilities, and inform strategic decision making around resilience building.





Analysis

We annually apply scenario analysis to assess the resilience of our business against climate change. The analysis is conducted in line with international best-practice and is built on recommendations from the Task Force on Climate-related Financial Disclosures (TCFD). We take a data-driven approach when identifying and analysing the most material climate-related physical and transition risks, and how those risks may manifest themselves in various future looking scenarios.

The climate risk analysis is led by Global Sustainability and the results are integrated in the annual risk review by Enterprise Risk Management (ERM) as well as in our EU Taxonomy reporting. Climate risk assessment is also being integrated as an important element in the selection of new facilities and development locations. The process ensures the impact of climate change is considered as part of corporate strategic decision making. In 2023, the scenario analysis was conducted in collaboration with third-party experts.

Scope

The analysis covers all our revenue generating business activities as well as our most critical suppliers. As such, the analysis covers our manufacturing, construction, development, and service activities and the suppliers that have been identified as critical suppliers.¹

The analysis of physical climate risks covers the chronic and acute climate-related hazards included in Appendix A to the EU Taxonomy, excluding those hazards which have been deemed irrelevant such as avalanche, saline intrusion and permafrost thawing. The physical risks are assessed on site-level using geospatial coordinates for our manufacturing facilities, warehouses and critical suppliers, while they are assessed on national level for our construction and service activities. Detailed desktop analysis including assessment of a wide range of climate metrics is always conducted in the initial phase of development.

The analysis of transitional climate risks follows TCFD's recommendations and covers the company at entity level, the supply chain, and stakeholders such as customers and investors.

1 Critical suppliers are suppliers who either: 1) could cause a turnover impact of more than EUR 7 million to Vestas in case of e.g., production stop, 2) have a lead time to ramp-up capacity higher than 26 weeks, or 3) are single source suppliers.

Approach

Physical climate risks

Physical climate risks are assessed using third-party software that allows site-level analysis of a wide range of acute and chronic climate hazards and projections of climate variables across multiple future looking scenarios.

A site-level risk profile is created for our manufacturing facilities, spare part warehouses and critical suppliers, while a national-level risk profile is created for our service, construction, and development activities. Individual risk scores for each risk indices are given on a relative risk scale of 0 to 10 (where 0 indicates the greatest risk), giving a comparable indication of the risk exposure for each location and country.

For each risk index, a recommended materiality threshold is set. This supports identification of locations where exposure to a hazard may be significant enough to warrant further investigation. The threshold is based on recognised threshold standards.

The combined risk-level of the acute and chronic physical risks is determined based on the potential impact on Vestas using a consequence/likelihood rating scale.

In addition to the risk profile, projected changes in specific climate variables are assessed using three different Representative Concentration Pathways (RCP) (developed by the World Climate Research Programme (WCRP) in the Coupled Model Intercomparison Project (CMIP5) and used by the Intergovernmental Panel on Climate Change (IPCC)), across three different time horizons.

Time Horizons

The time horizons are chosen as they are in line with international best-practice standards. Projecting climate change over the medium- and long-term is most relevant for physical risks, as the risk of drastic environmental changes is most significant when looking longer into the future.

The average lifetime of our assets, except our service contracts, do not stretch far ahead into the future. Therefore, the short-term material risks are more strategically relevant. Nonetheless, considering physical risks on the medium-term is also important when we for example assess the location of new manufacturing facilities.



Scenarios

The RCPs represent possible future trends in how concentrations of greenhouse gases in the atmosphere will change as a result of human activities. They are each associated with a range of physical impacts depending on the concentration of GHG emissions and the resulting temperature increase assumptions.

The climate variables assessed across the three scenarios and time horizons include drought lenght, extreme rainfall, precipitation, sea level rise, heating and cooling degree days, and flooding, among other variables. Recommended materiality thresholds are set for each variable. These variables cover a wide range of underlying physical climate hazards.

> RCP2.6 is an aggressive mitigation scenario that assumes global GHG emissions peak between 2010-2020, with emissions declining substantially thereafter.

RCP4.5 is a strong mitigation scenario that assumes global GHG emissions peak around 2040 and then decline.

RCP8.5 is a 'business-as-usual' (high-emission) scenario that assumes global GHG emissions continue to rise throughout the 21st century.

Transitional climate risks and opportunities

Transitional risks and opportunities are identified through a comprehensive literature review, subject matter expert engagement, and involvement of third-party experts. A long list of sector-specific risks with respect to policy, technology, market, and reputation were identified and a long list of sector-specific opportunities with respect to resource efficiency, energy sources, products and service, and markets were identified. These risks and opportunities were then ranked based on their potential impact on Vestas using a consequence/likelihood rating scale.

The assessment of the potential impact of the most material transition risks and opportunities is based on two different scenarios and assessed across three different time horizons:



Time Horizons

Transition risks and opportunities are difficult to predict far into the future. Especially political developments can have significant impact on Vestas and change the predicted business outlook. As such, looking at the short- and medium-term is most relevant when considering transition risk.



Scenarios

These scenarios are most relevant to Vestas as they cover both a very optimistic and a more realistic future scenario. Opposite to physical risks, transition risks and opportunities are more extreme in scenarios that assume successful mitigation of the worst effects of climate change, as drastic political and market measures are necessary to change the current path. As such, these scenarios prepare companies well to adapt to changes in status-quo.

> IEAs Net Zero Emissions (NZE) by 2050 scenario describes a pathway for the global energy sector to achieve net zero CO₂e emissions by 2050 by deploying a wide portfolio of clean energy technologies. The scenario is consistent with limiting global temperature rise to 1.5-degree Celsius (with at least 50% probability), in line with emissions reductions assessed in IPCC's Sixth Assessment Report. The scenario prioritises an orderly transition that aims to safeguard energy security through strong and coordinated policies and incentives.

IEAs Stated Policies Scenario (STEPS) is designed based on a detailed review of existing policies and measures as well as those under development. It provides a conservative benchmark for the future, not taking for granted that governments will reach all stated goals and energy-related objectives. Where policies are time-limited, they are generally assumed to be replaced by measures of similar intensity. The scenario neither assumes future strengthening – or weakening – of future policy action.

Results

The analysis in 2023 led to the identification of a few material transition risks, while no physical risks have been deemed material. The results are elaborated in the sections below. The measures implemented to mitigate the risks are highlighted on page 8.

Physical risks

No physical risks have been deemed material to Vestas in a shortand medium-tern perspective considering their likelihood and impact, and the measures already in place to reduce their consequences.

However, the analysis did highlight some inherent physical risks that are very likely to impact Vestas' locations and suppliers. Some of the facilities and suppliers most exposed to these risks are highlighted in the illustration on page 7.

Inherent physical risks:

- Water stress: In the short-term, almost 50 percent of Vestas' owned facilities are at extreme risk of water stress, whilst 30 percent of Vestas' leased facilities, and 40 percent of Vestas' critical suppliers are at either extreme or high risk of water stress.
- Heat stress: In the short-term, many of Vestas' facilities and critical suppliers are exposed to heat stress, and more facilities are expected to be exposed in the future. Furthermore, many of the currently exposed sites will experience heat wave duration increases of more than 100 percent towards 2070 under all scenarios. Heat stress and heat waves are also likely to impact several of the areas that Vestas construct and service wind farms towards 2070.
- Extreme rainfall: Significant changes in extreme rainfall patterns are expected over the medium- and long-term, elevating the risk of flooding. It may manifest itself as severe storms or tropical and extra-tropical cyclones. This effect is particularly pronounced during the winter months in the northern hemisphere, with seasonal precipitation expected to increase by more than 10 percent in many locations by 2070 (RCP 8.5).

• Subsidence: Vestas has five facilities located in Tainjin (China) in an area at high-risk of subsidence.

Transitional risks and opportunities

The analysis led to the identification of several transition risks, two of which have been deemed material to Vestas.

Material transition risks:

- Carbon taxes and tariffs: Fast introduction and increasing global carbon taxes are necessary to meet climate targets, as it will further improve the cost competitiveness of renewable energy sources in comparison with fossil counterparts and encourage sustainable decision making. Under the NZE scenario, this presents an opportunity as high carbon taxes are implemented fast, however, under scenarios like STEPS, too slow and fragmented introduction of carbon taxes and tariffs presents a risk, as it will slow down our business outlook.
- Decarbonisation impact on commodity prices: Fast decarbonisation of CO₂ intense materials, such as steel, is necessary to reduce our scope 3 emissions and as such important to reach our sustainability targets. This transformation requires significant investments throughout our value chain. Delivering more sustainable solutions will, at least in the short- and medium-term, impact the price of our products and thus their cost-competitiveness in comparison with lower decarbonisation options.

Other important transition risks:

- Supply chain disruptions: With a higher probability of physical risks, including extreme weather events and natural disasters, the likelihood and consequences of supply chain disruptions increase.
- Regulatory development: Companies such as Vestas are experiencing increasing and more demanding sustainability reporting requirements from national and international institutions. To comply with these regulations, Vestas is required to invest in human resources and new processes and data systems. Non-compliance with requirements can have significant financial and reputational consequences.



Global hotspots

The analysis led to the identification of several facilities and suppliers exposed to inherent physical climate risks. A few of these are illustrated below.

South America

Fortaleza Large leased assembly factory located outside Fortaleza. Extreme exposure to climate change (1,31) and heat stress (1,15). Expected increase in average heatwave duration of more than 500 percent

towards 2050 (RCP 8.5).

Santa Fe

Wind turbine tower supplier located outside Santa Fe. At high risk of severe storm hazard (2,90). Expected increase in average heatwave duration of more than 200 percent and expected increase in extreme rainfall of more than 15,5 percent towards 2050 (RCP 8.5).

Buenos Aires

Wind turbine tower supplier located in Buenos Aires. At high risk of severe storm hazard (3,15). Expected increase in extreme rainfall of more than 20 percent towards 2050 (RCP 8.5).

Asia

__ Chennai

Large assembly factory located in Chennai. Extreme risk of heat stress (0,96) and water stress (0,09). Expected increase in average heatwave duration of more than 500% towards 2050 (RCP 8.5).

- Tianjin

Five large manufacturing facilities (blades, generators and assembly) located in Tianjin. At extreme risk of water stress (0,00) and high risk of severe storm hazard (4,55). Expected increase in heatwave duration of more than 600 percent and expected increase in extreme rainfall of more than 25 percent towards 2050 (RCP 8.5).

- Ho Chi Minh City

Wind turbine tower supplier located close to Ho Chi Minh City. Extremely exposed to climate change (1,71) and at extreme risk of severe storm hazard (2,34) and heat stress (1,06). Expected increase in extreme rainfall of more than 15 percent towards 2050 (RCP 8.5).





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Risk management is an integral part of the decision-making process at Vestas and is supported by our corporate ERM framework.

Mitigating measures

As a global company, Vestas faces various risks inherent to the industry and countries in which we operate. These include climate risks such as the physical and transitional risks highlighted in this report. To manage these risks, ensure risk awareness, and support our operational and strategic objectives, the Global Sustainability Department works closely together with ERM.

Risk management is an integral part of the decision-making process at Vestas and is supported by our corporate ERM framework. We regularly identify, record, assess, monitor, and manage risks, including sustainability risks. Key risks are reported biannually by appointed risk officers and owners throughout the organisation. Once they are reviewed, these risks are challenged and consolidated by Global Risk Management and presented to and discussed by the Risk Committee. To work systematically with the various types of risks identified, we follow the framework of the Vestas ERM annual wheel (See page 44 in our Annual Report 2023).

Mitigation of physical risk

To mitigate the impact of physical climate risks on Vestas from both a safety and financial perspective, Vestas has both overarching global procedures and individual local processes in place.

Generally, physical risks such as extreme weather, flooding or subsidence are identified through Environmental Impact Assessments or other reports conducted or studied prior to setting up a new facility or deciding where to develop a wind farm. As such, facilities or wind farms will rarely be placed in areas at high risk of climate events that could significantly damage profitability of projects and put human safety at risk, and mitigation measures will be taken in case any risks are present.

As an example, to mitigate the risk of subsidence at manufacturing facilities in Tianjin in China, all floors were designed with advanced pile cap tops to make the floors self-carrying in the event of ground subsidising. During the construction, subsidence tests were performed by the local Quality Supervision Bureau. The Bureau stated that the TEDA area was currently not in scope for regular testing.

To mitigate the effects of changing temperatures and weather, all manufacturing facilities have climate control in the main process areas, ensuring optimal working conditions regardless of the temperatures outside. All manufacturing facilities are constructed with consideration to local known weather conditions i.e., wind, snow precipitation etc., as per our manufacturing building guidelines.

To mitigate the risk of extreme weather events like tornadoes or catastrophes like fire, all facilities and locations have local emergency plans that cover relevant scenarios and evacuation of employees. In high-risk areas of e.g., tornadoes in the USA, facilities have tornado classified shelters to protect employees. To limit the financial consequences of extreme weather events, Vestas has insurance coverage of both its facilities and construction projects.

Mitigation of transitional risk

Mitigating transition risks can be more complex and challenging than mitigating physical risks, as the risk and outcome of transition events often is impacted by multiple stakeholders such as suppliers, society, political leaders and public and private institutions. Consequently, our approach to mitigating transition risks is dependent on the risk.

Vestas is deeply involved in climate policy discussions, consistently advocating for positive change. Both our top-line messaging and direct engagement with policymakers strongly support the energy transition, particularly the expansion of renewable energy. We adopt high-level supportive positions on key EU climate regulations, and in 2023, we supported, among other initiatives, the global pledge to triple renewables and double energy efficiency by 2030. Vestas also takes active membership of several industry associations such as WindEurope, to actively push a positive climate and energy policy agenda. Through this approach, Vestas consistently tries to mitigate political and legal transitional risks such as too slow uptake of renewables and their enabling infrastructure.

Next step

Understanding, mitigating, and adapting to the impact of climate change has always played an important part of the way Vestas does business. We constantly innovate and adjust our turbine solutions to withstand changing and extreme climate conditions.

Although adaptation to climate change is deeply rooted at the core of our product, integrating climate risk analysis and adaptation in all parts of the business is still an area under development, gaining increasing focus and significance. The importance of addressing climate change is obvious, highlighted both from the extreme weather events and rising temperatures seen across the globe, and from its inclusion in international regulation such as the CSRD and EU Taxonomy.

In 2024, we will work towards maturing climate risk analysis in all areas of our business, with a primary focus on establishing stronger governance and processes for climate risk analysis in our manufacturing and development business.



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Vestas Wind Systems A/S Hedeager 42 DK-8200 Aarhus N

Tel: +45 9730 0000 vestas@vestas.com

vestas.com

