

Joint recommendations for action

Sustainable wind energy production in Europe

The energy transition is the foundation for successful climate protection. Wind energy plays an irreplaceable role in this transformation: global installed capacity is set to multiply from the current 900 gigawatts (GW)¹ to up to 10,300 GW² by the middle of the century. The European Union is aiming to more than double its current installed capacity of 221 GW in 2023³ to 510 GW⁴ by the end of the decade. To achieve this goal, at least 41 GW must be added annually – almost triple the current EU additions of 16.2 GW⁵.

The necessary scaling of wind energy on land and at sea increases the pressure on resources, people, and nature. For this reason, the supply and processing of raw materials in the context of a just transformation must be subject to the highest possible environmental and social standards and the circularity of the materials used must be implemented from the outset. It is also important that bottlenecks caused by partial dependencies on individual countries along the supply chains must be minimized. For example, 94 per cent of the production of rare earth permanent magnets are currently controlled by China⁶ and can only be checked for compliance with environmental protection and human rights to a limited extent.

To maintain and create attractive jobs, to contribute to climate protection and environmental protection and in the interests of resilience and sovereignty, a rapid expansion of wind turbine production capacities is needed worldwide, including in Europe. This expansion must be environmentally and socially responsible and cover all stages of the wind energy value chain, from the procurement of raw materials, production, transport, and assembly to dismantling and recycling.

Acceptance of wind energy has never been higher and faster expansion more essential than today. This is why climate, energy and industrial policy must be more effectively interlinked to strengthen the European wind industry.

The European wind industry is strong and able to use its competitive position to further advance a fair and sustainable energy transition in Europe and beyond.

Alliance for doubling wind production capacity in Europe to at least 50 GW by 2030

The signatories of these recommendations for action call on German and European policymakers to take swift and decisive action to double the European production capacity for wind turbines to at least 50 GW by 2030⁷. Safeguarding human rights and environmental protection in the associated supply chains is a top priority.

Specifically, we recommend:

- 1. Remove obstacles to accelerated wind energy expansion:** In Europe, a total of at least 20 wind turbines per day must be built on land and at sea in an environmentally friendly and unbureaucratic manner.
- 2. Increase EU production capacities for sustainable wind turbines:** Sufficient financial resources and Europe-wide, ambitious non-price and resilience criteria strengthen the value chain in Europe.
- 3. Create good working conditions for workers in the wind industry:** A large number of skilled workers are needed to realize the energy transition. They are entitled to fair wages, collective labor agreements and safe, reliable working conditions.
- 4. Minimize material requirements and dependencies through greater circularity:** Resources are saved by reusable components and recycled materials, high-quality dismantling, and a circular design.

Removing obstacles to accelerated wind energy expansion

The expansion and production of wind turbines must increase greatly. However, an expansion of production capacities is dependent on a constant and reliable order pipeline. In addition to the rapid **provision of sufficient and appropriately usable areas, the approval and realization procedures need to be accelerated in an environmentally friendly manner.** For example, transport permits for wind turbines from the manufacturing site to the project site should be standardized and simplified in future. In addition, further obstacles related to the grid connection or changes to the turbine type in ongoing procedures must be urgently removed. **The aim must be to install at least 20 onshore and offshore wind turbines per day in Europe⁸.**

Besides standardization and simplification in nature conservation, it is also important to address the lack of workforce and digitalization in regulatory agencies, which hinder the rapid expansion and use of wind energy. **The primary goal must therefore be to digitize, staff, and finance the approval authorities** to ensure thorough but swift procedures with high-quality public participation and environmental impact assessments.

Increase EU production capacities for sustainable wind turbines

To strengthen and develop European supply chains, **Europe-wide and non-discriminatory qualitative criteria are needed** that do not hinder the accelerated expansion of wind energy. The Net-Zero Industry Act (NZIA) is a step in the right direction here and must be further developed on a technology-specific basis and implemented nationally as quickly as possible. For example, there needs to be a **higher weighting of non-price and resilience criteria in all public tenders** to promote environmental protection and fair working conditions. **The focus should be on a European, uniform, unbureaucratic and easily controllable solution** that prioritizes social and ecological criteria with the greatest steering effect, such as a “CO2-footprint” or a “Nature Inclusive Design”.

To enable companies along the entire value chain to invest in CO2-neutral and more sustainable processes right now, they need targeted financial support in the short term. Measures such as **CAPEX and OPEX funding, but also temporary start-up funding and other security measures** must be considered. In addition, **green lead markets, and climate protection contracts for responsibly manufactured (primary) products** such as green steel and a favoring of repair, reuse and recycling are needed as quickly as possible. A **European funding pot for green climate industries** should be created at EU level. At the same time, the European **Carbon Border Adjustment Mechanism (CBAM) for basic materials such as steel or cement** should be upgraded and extended as quickly as possible to products that have already been processed, such as components for wind turbines. A well-designed mix of these measures is needed to ensure that additional investments in low-emission production facilities will also pay off in the long term, despite initially higher operating costs.

Creating fair working conditions for wind industry professionals

A skilled workforce for the production, transportation, assembly, maintenance, dismantling and recycling of wind turbines, as well as for research and development is the key to the further expansion of wind energy and value creation in the EU. This requires **high-quality jobs and training positions that cater to individual needs** and explicitly address young talent, women, foreign workers, people with disabilities and career changers. Attractive **further training opportunities** and a wide range of **retraining options** can prove to be very helpful, especially for those interested from other sectors. A broad-based **information campaign** would help to further increase the far-too-low training rate for transformation professions.

Alongside **fair wages through stronger, nationwide collective labor agreements**, the **individual organization of working hours** and clear employment prospects through more **permanent employment contracts** can also provide appropriate incentives. In addition, more attention must be paid to occupational health and safety, for example in the case of extreme operations for wind turbines on offshore sites. Rescue platforms and larger teams can help here.

A **swift introduction of the EU Corporate Sustainability Due Diligence Directive (CSDDD)** can ensure that the entire supply chain is aligned with the goal of climate neutrality and that climate protection, environmental protection and human rights are strengthened worldwide.

Minimize material requirements and dependencies through greater circularity

It is estimated that the needed annual addition of 41 GW of wind turbines will require approximately 13.5 million tons of concrete and almost 5.5 million tons of steel and iron⁹. This underlines the need to minimize the use of resources as much as possible right now and to lay the foundations for the almost complete reuse and recycling of the corresponding components of decommissioned wind turbines.

First and foremost, this requires a design of wind turbines that is tailored to the circular economy. In line with resource conservation, **the use of materials is optimized, old components are reused, and products are manufactured using recycled materials** from end-of-life wind turbines. At the same time, all components of a wind turbine must be characterized by their **longevity, ease of repair and low maintenance costs, their reusability, and their recyclability**. A **digital product passport** should provide all actors in the life cycle with a well-founded data basis on the composition of installed materials, in particular the rotor blades and the nacelles.

In addition to the Critical Raw Materials Act (CRMA), the **National Circular Economy Strategy** can quickly set the course for reducing the use of resources for wind turbines. The primary goal must **be to create requirements and incentives that reduce the use of primary materials, in particular through the reuse of components and the utilization of recycled materials**.

The basic prerequisite for the recovery of recyclable materials when dismantling wind turbines should be a **dismantling plan** ("Pre-Demolition-Audit"). At the same time, a harmonized dismantling standard for wind turbines should be developed quickly at European level. Regulatory guidelines for the dismantling, processing and utilization of rotor blade waste can help to improve the framework conditions for successful recycling.

Actively promoting **research and development** to reduce raw material intensity and explore alternative technologies and materials can also help to strengthen circularity and reduce raw material dependencies along supply chains.

Working together for a sustainable and strong wind industry in Europe

A strong and responsible wind industry worldwide and especially in Europe is a basic prerequisite for a successful energy transition and the achievement of climate targets. As signatories to these recommendations for action, we are working in the form of a cross-sector and cross-association alliance for the expansion of environmentally and socially responsible wind production in Europe covering the entire life cycle of at least 50 GW by 2030. We call on all political decision-makers to make their contribution to this.

Origin of the paper

From November 2023 to January 2024, Deutsche Umwelthilfe initiated a three-part workshop series entitled "Wind Industry in Europe" to discuss the current challenges in the European production of wind turbines with experts from politics, science, business, and civil society and to identify solutions for an environmentally and socially just expansion of the industry in Europe. These recommendations for action are the result of this process.

Supporters (as of June 2024)



¹ WindEurope. (2024). *Wind energy in Europe: 2023 Statistics and the outlook for 2024-2030*. <https://windeurope.org/intelligence-platform/product/wind-energy-in-europe-2023-statistics-and-the-outlook-for-2024-2030/>

² International Renewable Energy Agency (IRENA). (2023). *World Energy Transitions Outlook 2023: 1.5°C Pathway*. <https://www.irena.org/Publications/2023/Jun/World-Energy-Transitions-Outlook-2023>

³ European Commission. (2024). *EU wind energy*. https://energy.ec.europa.eu/topics/renewable-energy/eu-wind-energy_en

⁴ Tapoglou, E., Tattini, J., Schmitz, A., Georgakaki, A., Długosz, M., Letout, S., Kuokkanen, A., Mountraki, A., Ince, E., Shtjefni, D., Joanny Ordonez, G., Eulaerts, O.D. & Grabowska, M. (2023). *Clean Energy Technology Observatory: Wind energy in the European Union - 2023 Status Report on Technology Development, Trends, Value Chains and Markets*. <https://publications.jrc.ec.europa.eu/repository/handle/JRC135020>

⁵ International Renewable Energy Agency (IRENA). (2023). *Renewable energy statistics 2023*. <https://www.irena.org/Publications/2023/Jul/Renewable-energy-statistics-2023>

⁶ Global Wind Energy Council (GWEC). (2023). *Global Wind Report 2023*. <https://gwec.net/globalwindreport2023/>

⁷ Rystad Energy. (2023). *The State of the European Wind Energy Supply Chain*. <https://www.rystadenergy.com/insights/the-state-of-the-european-wind-energy-supply-chain>

⁸ According to data from WindEurope. (2024). *Wind energy in Europe: 2023 Statistics and the outlook for 2024-2030*, the average capacity of onshore wind turbines installed in Europe in 2023 was 4.5 MW and offshore wind turbines 9.7 MW. As significantly more turbines will be installed onshore, an average value of 6 MW was assumed below for all wind turbines and applied to the amount still to be installed by 2030 (target: 510,000 MW - current status: 221,000 MW = expansion requirement 289,000 MW within 7 years). This results in an expansion requirement of 18.85 wind turbines per day with an average output of 6 MW. Due to the uncertainties with regard to the expected actual output in the onshore and offshore sector, a conservative expansion requirement of 20 wind turbines per day was subsequently assumed.

⁹ German Mineral Resources Agency (DERA). (March, 2022). *Chart of the month: Raw materials for wind turbines*. https://www.deutsche-rohstoffagentur.de/DERA/DE/Produkte/Chart_des_Monats/cdm_node.html