



Report 2023

Austria

Photo: Ecowind.

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In Austria, 70 wind turbines with an output of 331 MW were built and 10 wind turbines of 19 MW were dismantled in 2023. At the end of the year, there were 1,426 wind turbines with a nominal output of 3,885 MW on the grid.

This output enabled electricity production of 8 TWh, corresponding to around 12% of Austrian electricity consumption. Some of the calls for projects under the financial scheme of the EAG (Erneuerbaren-Ausbau-Gesetz) in 2023 received no applications at all due to increased interest rates, price increases and regulatory issues, among others. Additionally, there was a slight decrease in public funding of research

in wind-energy. Important steps to increase the growth rate of wind turbine installations will have to be done by the federal state to reach Austria's goal of 100% renewable electricity in 2030: declaration of respective wind installation targets, the nomination of respective zones for wind energy and the enhanced staffing within the authorities.

Table 1. Key National Statistics 2023: Austria

Total (net) installed wind power capacity	3.885 GW
Total offshore capacity	N/A
New wind power capacity installed	0.331 GW
Decommissioned capacity (in 2023)	0.0186 GW
Total electrical energy output from wind	8.036 TWh
Wind-generated electricity as percent of national electricity demand	12%
Average national capacity factor	26%
Target	100% renewable electricity in 2030
National wind energy R&D budget	2.2 million Euro

Highlight(s)

- More than 300 MW of new capacity installed, but still waiting for major installation growth.
- Hopes are on the new financing scheme (EAG) to provide stable conditions.
- Improvements in federal state regulatory conditions are needed to unlock potential.

Market Development

Targets and Policies

The Austrian scheme to support the production of renewable energy (EAG), approved by the European Commission in 2022, should provide the framework for reaching Austria’s goal of 100% renewable electricity in 2030. Some of the calls for projects under the financial scheme of the EAG (Erneuerbaren-Ausbau-Gesetz) in 2023 received no applications at all due to increased interest rates, price increases and regulatory issues, among others.

Austria produces around 87% of its electricity production from renewable energy [3]. Furthermore,

the ambition is to make Austria climate-neutral by 2040. As a step forward, concrete targets have been implemented, such as an additional 10 TWh of wind power, 11 TWh PV or 5 TWh of hydropower by 2030. While the expansion of wind power almost came to a standstill in 2020, expansion continued in 2021 and 2022 and to a low degree in 2023.

newly built and 10 wind turbines with 18.6 MW were dismantled in 2023 (see Figure 1). Of the total 70 systems, 44 systems of 227.6 MW were built in Lower Austria and 23 systems with 90.5 MW were built in Burgenland. 4 wind turbines with 12.8 MW were built in Styria. At the same time, around 10 wind turbines with 18.6 MW of wind power output were dismantled and replaced with modern systems. At the end of 2023, there were 1,426 wind turbines producing a nominal output of 3,885 MW on the grid.

Progress and Operational Details

In Austria, a total of 70 wind turbines with an output of 330.9 MW were

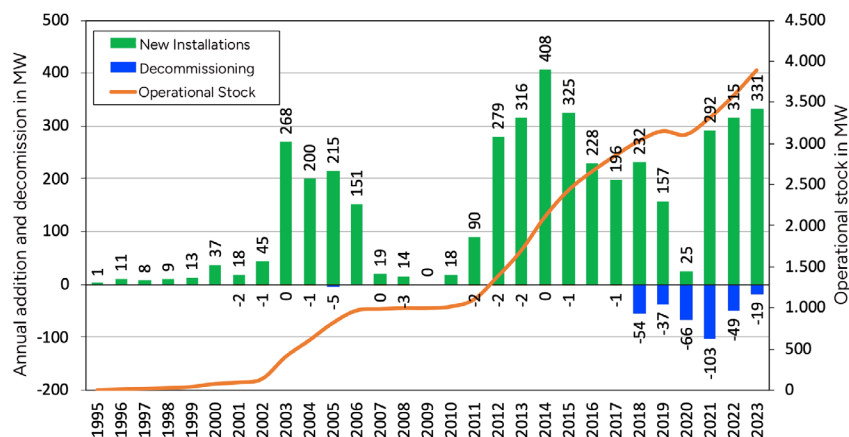


Figure 1: Market development of wind power in Austria.

The average power per new plant installed increased to 4.7 MW, as shown in Figure 2. The development shows a remarkable increase over the last decades. Decommissioning due to repowering naturally plays an important role in this progress.

Figure 3 displays the development of the average rotor diameter of new installations in the period between 1994 and 2023. In addition, an increase in the last decades can clearly be observed.

Matters Affecting Growth and Work to Remove Barriers

Until today, most of the wind-projects are focused in the east of Austria. Initial project suggestions from the west will still need some time to get permits and receive funding.

With the improved law on environmental impact assessments (Umwelt-Verträglichkeits-Prüfungs-Gesetz), the sector now has a framework on a federal level, which supports a swift expansion. Through the new Austrian scheme to support the production of renewable energy (EAG), it is expected that the expansion of wind energy will be enhanced. In 2025, about 80 new wind turbines are expected to be installed and the amount of wind-powered electricity increase by approximately 1 TWh. Still, the expansion will focus on the east of Austria.

Currently, some of the most important opportunities to enhance the speed of new installations are in the hands of the federal countries. New areas for wind power plants need to be determined, the process of permitting new installations has to be accelerated and the number of personnel in the respective authorities needs to increase.

Many excessive and redundant legal prerequisites hinder an efficient expansion of renewable energy sources and their positive effects. Specifically, discussions on the landscape impacts of wind power through

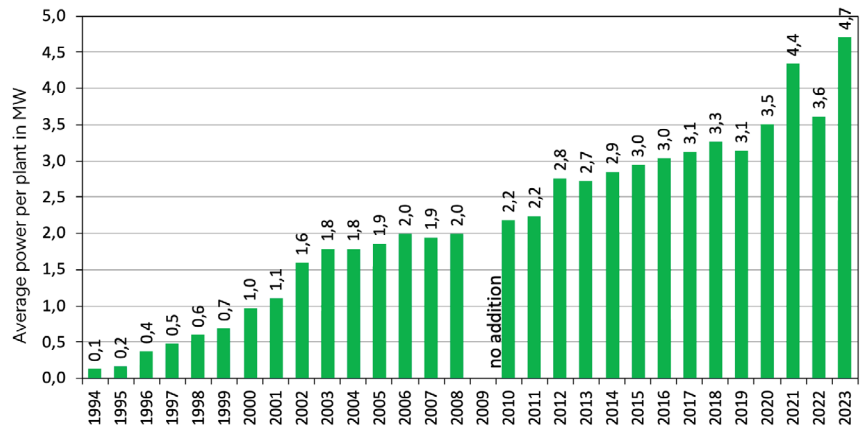


Figure 2: Average power of new turbines installed.

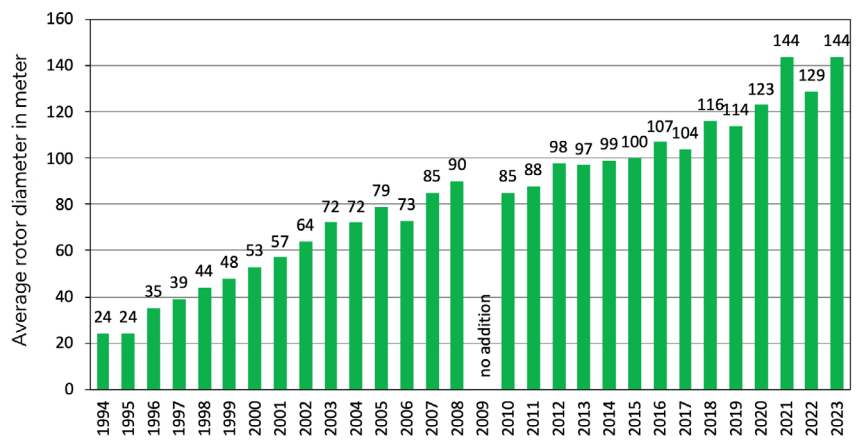


Figure 3: Average rotor diameter of new installations.

different administrative processes significantly delay the permission of wind power projects and hinder the progression of renewable energy. Therefore, it is important to take the positive impacts of wind power into consideration and balance them with possible negative ones. Furthermore, permission processes have to speed up significantly, as the average process lasts up to 10 years and, therefore, constitutes a high barrier for wind power.

In this respect, hopes are pinned on current EU regulations that will accelerate regulatory processes. In particular, the Renewable Energy Directive (RED III) holds potential. Acceleration areas for the expansion of renewable energy, including wind power, must be defined for its implementation. In addition, a list

of mitigation measures is needed to compensate for the effects of installations. This can be based on a mixture of current methods as well as new ones. Ideas for new methods were, for example, collected at an event on compensation areas organised by the Austrian Wind Energy Association at the beginning of this year. The year 2024 can and must point the way forward in terms of accelerating the energy transition while at the same time combating the biodiversity crisis.

RD&D Activities

National RD&D Priorities and Budget

Publicly funded R&D activities decreased slightly in 2022, constituting

around 2.2 million Euro. 67% of this came from the federal ministry, 23% from the federal countries, while the Austrian Research Promotion Agency provided 6%. Finally, universities and universities of applied sciences contributed 4% (see table 2). Since the corporate structure in this area is influenced by the supplier industry for components of wind turbines, R&D expenditure tends to be underestimated. Many material and component developments are not categorised as energy research, although they are used for wind power plants (materials for blades, generators etc.) [1].

Austrian wind companies' innovations have had an influence on the wind industry both in their own country and worldwide. They contribute to improving the efficiency and reliability of wind turbines and enable the implementation of the global energy transition. An example in this innovative field is the Carinthian company Green-Tower Entwicklungs GmbH, which is a daughter company of the Hasslacher Group. The firm is working on a project for the construction of wind-towers based on wood. According to the plan, the towers shall be used for 20 years in this function. Afterwards, they will be used in other static constructions for a further 50 years. Within this total of 70 years, the used resource will have already regrown. According to calculations, approximately 1,000 tons of CO2 can be saved in comparison with current towers [3].

National Research Initiatives and Results

The Austrian Research Promotion Agency funds a range of research projects in the wind energy field. Some projects are named here as examples.

- **AI4Wind** investigates the impact of climate change on wind power, using artificial intelligence (AI). Among other results, this project aims to provide spatially and temporarily highly resolved

Table 2. Distribution of public research funding wind energy in 2022 [1].

INSTITUTIONS	EURO	%
Federal Ministries	1,471,346	67%
Federal Countries	500,000	23%
Austrian Research Promotion Agency (FFG)	130,442	6%
Universities of Applied Sciences	20,567	1%
Research outside universities	1,631	0%
Universities	72,656	3%
Total wind energy	2,196,642	100%

fields of wind speed over the past 30 years using AI methods. It plans to downscale climate scenarios by using new wind analysis fields and find alternatives to the use of power curves for a better simulation of wind power capacities [2].

- **SOWINDIC** is a research project with the aim of developing intelligent rotor blade heating, which incorporates various information, like weather data, meteorological forecasts, as well as market data [2].
- **Space4Wind** aims to develop a system for the highest prediction accuracy of electricity yield for successful planning and operation of small-scale wind energy applications [2].

Collaborative Research

Austria has been involved in the Wind TCP (Technology Collaboration Programme) of the IEA since 2009. Austria is currently involved in four TCP Tasks:

- Task 41. Enabling Wind to Contribute to a Distributed Energy Future.

- Task 51. Forecasting for the Weather-Driven Energy System.
- Task 52. Large-Scale Deployment of Wind Lidar.
- Task 54. Cold Climate Wind Power.

Impact of Wind Energy

Environmental Impact

Wind power is supposed to play a dominant role in Austria's current and future climate and energy strategy, providing additional potential to achieve the demanded climate goals. Therefore, around 4.5 million tons of CO2 are estimated to be saved in 2023 [4].

Austria has very strict rules on the natural impact during the permitting procedures, which fulfil the European requirements of environmental protection. During the last year, a significant number of studies on birds and wildlife around wind power plants have been published and show the functioning of their coexistence. As a result of those strict rules as well as the growth of knowledge, most populations of big birds have been growing within the last few years.

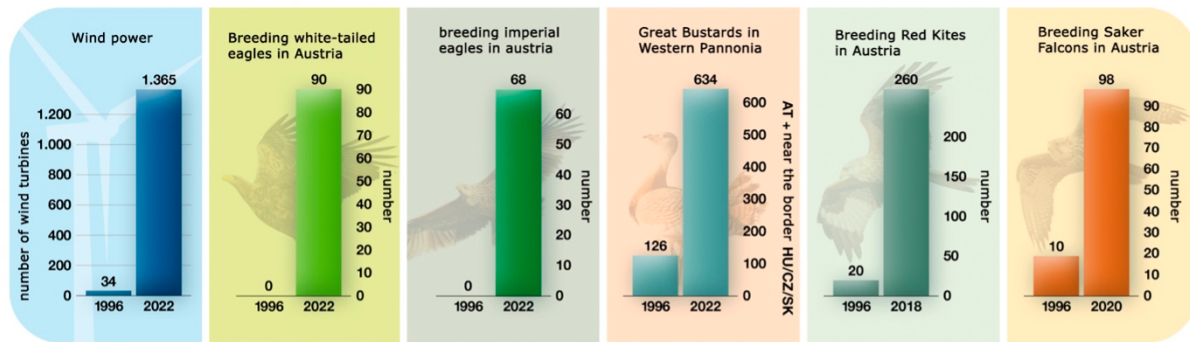


Figure 4: Wind turbines and Birds of Prey Development. Source: IG Windkraft.

Special attention is also paid to bats. In order to avoid conflicts with wind turbines, surveys on their behaviour at the project site are carried out in advance and during the first years of turbine operation. Possible roosts are protected and new ones are made available.

Economic Benefits and Industry Development

The Austrian wind power industry consists of over 180 companies with around 6,000 employees, including wind turbine operators, planning offices, and component suppliers for international wind turbine manufacturers [3]. In 2023, the annual turnover of existing wind park operators was overall 729 million EUR (782.2 million USD), which is a decrease of about 54% compared to 2022 due to the significantly lower electricity price in 2022. Cooperatives and private companies own 60% of Austria's existing wind turbines, while the other 40% are owned by utilities.

One wind turbine (5 MW) contributed 3.2 million EUR (3.4 million USD) of domestic added value. Furthermore, it generates more than 5.2 million EUR (5.6 million USD) in added value, as well as two permanent jobs through its 20-year life span. In 2023, the establishment of 331 MW turbine created an investment volume of 482 million EUR (517.2 million USD). Local Austrian companies are successful in both the land-based and offshore sectors, and Austrian crane companies,

planning offices, and software designers work intensively abroad. Austrian wind energy companies of the supply chain are industry leaders e.g. in the fields of electricity conduction, wind power generators, wind turbine generator design, and high-tech materials. Several wind power operators have successfully implemented projects and are operating on an international level, mainly in neighbouring countries in Central and Eastern Europe and some outside Europe. There are no major wind turbine manufacturers in Austria, though there are manufacturers of small- and micro-sized wind turbines.

Austrian component suppliers serve in several fields in the international wind turbine market. Bachmann Electronic GmbH is a leading manufacturer of turbine control systems. Hexcel Composites GmbH develops and produces materials for blades. Elin EBG Motoren GmbH supplies generators for the global market. There are also several global players with competence centres in Austria, e.g., SKF GmbH.

In the field of innovation, Austria has several start-ups of relevance to the wind energy industry. For example, Eologix implemented an innovative ice detection system on rotor blades, and Aero-Enterprise offers drone inspection services for wind turbines. The recently founded Speedpox also made promising developments, researching new processes for the production of fibre composites for wind turbine blades. MIBA AG produc-

es parts of brakes, gears, rotor main bearings, and electronics. In addition, it produces machines for the construction of offshore wind towers [6].

Next Term

An important development regarding legislation is the new Electricity Industry Act (Elektrizitätswirtschaftsgesetz, ElWG). The proposed act is currently under discussion. Hopes are high that this law will improve the situation regarding flexible grid connection, optimise the topic of energy storage and grid expansion etc. Current projections regarding new installations are of approximately 80 wind turbines and 400 MW in the year 2025.

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