

# The importance of wind yield forecasts in the age of the energy transition

**Words:** Sascha Bauer, CEO, 4cast

At a time when the energy transition is becoming increasingly urgent, accurate long-term wind resource forecasts are becoming an indispensable pillar of renewable energy planning. Not only do these forecasts serve as an indispensable tool for strategic decision-making by planners and project developers, they are also a fundamental prerequisite for fully realizing the potential of wind energy projects, even before the first sod is turned. After all, investing in a wind turbine, which can often cost as much as 5 to 7 million euros, requires sound and well-considered preparation to ensure efficient risk minimization and yield maximization.

In this context, wind power forecasts not only serve as a tool for optimizing technical operations, but also as a central means of

communication with all stakeholders. With the combination of accurate forecasts and the necessary charisma, the course can

be set for the success of future-oriented wind power projects in the age of energy transition.

## Why are long-term wind forecasts so important?

### Fundamental planning basis

Without reliable forecasts, wind turbine development is like flying blind. Long-term energy yield forecasts are essential because they provide a solid basis for several critical decisions. These include selecting investments, determining optimal sites and turbine models, and developing effective operations and maintenance plans. These forecasts are essential to minimize risk and maximize the efficiency and profitability of wind energy projects.

### Optimizing yield

The accuracy of long-term power forecasts is critical to the performance of wind turbines. Using automated wind data analysis, uncertainty management, and shading analysis, these forecasts provide a reliable basis for determining future energy yield. These detailed forecasts allow a more accurate assessment of the long-term potential of wind farms.

### Economic sustainability

Accurate energy yield forecasts are essential to ensure the financial viability and long-term profitability of wind energy projects. They help minimize financial risks and build confidence among investors and financiers.

A wind report, while detailed, is only a snapshot in time. In contrast, the long-term revenue forecast provides a financial guide that makes site selection much easier. It thus serves as a financial compass for the basic navigational task of planning and implementing wind projects, which is essential for mitigating risk and strengthening long-term viability.

### Considerations for accurate wind power forecasts

A complex network of factors must be considered to maximize the accuracy of long-term energy yield forecasts.

#### Site analysis

A thorough knowledge of the site conditions, particularly the terrain structure and wind conditions, is critical. Bringing together a variety of data sources and meticulously analyzing wind patterns is a key aspect of ensuring a complete understanding of the site and its specific characteristics.

#### Technical challenges

The assessment of technical losses and the consideration of regulations require advanced models and methods. When it comes to forecasting, we face a number of challenges that need to be overcome. The following are among the most important.

### Calibrating the wind profile to local wind conditions

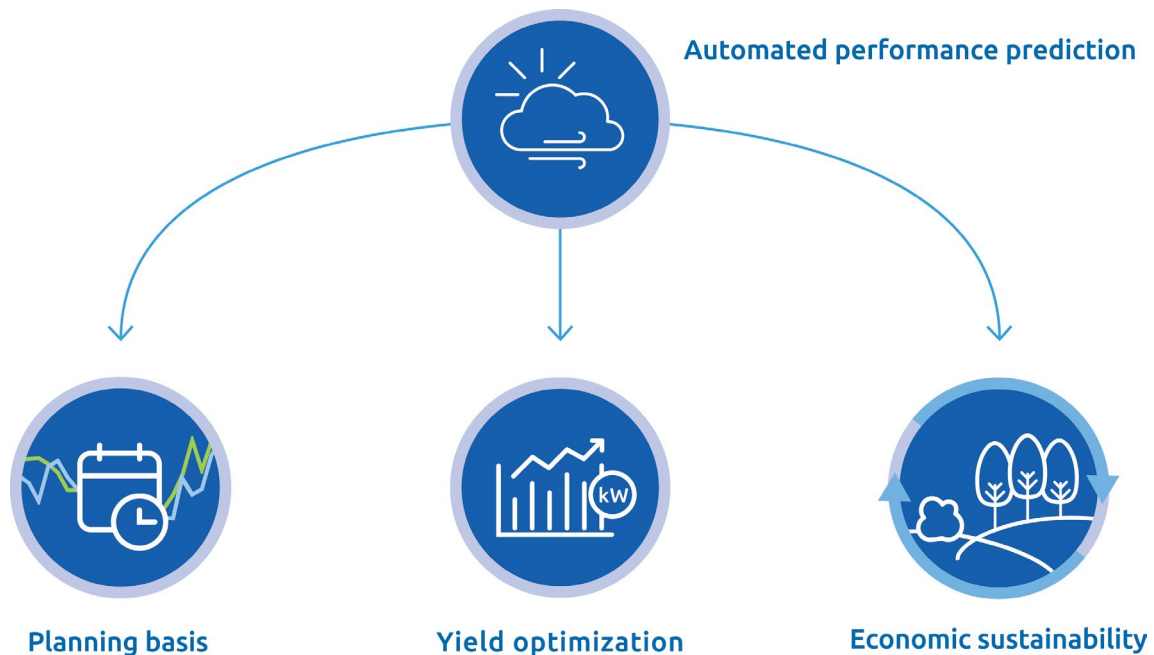
Weather analysis often provides only a general picture and is often unable to accurately represent local wind conditions. Calibration of the wind profile is therefore becoming increasingly important in order to adapt it to the specific site conditions. Such an adjustment can reduce possible inaccuracies in the forecasts, which contributes to a more reliable estimation of wind conditions and thus to optimized planning and implementation of wind energy projects.

### Taking surface conditions into account

The inclusion of surface conditions is critical for accurate wind forecasts. The various conditions of an area, such as topography, vegetation, or buildings, have a significant impact on local wind conditions. A detailed analysis of these elements allows for much more accurate wind forecasts. This is important for maximizing the efficiency of wind energy projects by improving the accuracy of resource estimation and optimizing the potential for wind energy generation in specific regions.

Calculating the interaction of wind turbines: When planning and positioning wind turbines, the consideration of the mutual influence of the turbines plays a central role.





The use of specific models to calculate these interactions is essential. They allow a more realistic prediction of the overall yield of a wind farm, taking into account the wake effects. This not only maximizes the efficiency of the wind farm, but also ensures the protection and longevity of the turbines.

**The importance of speed**

At the heart of the industry, analyzing and evaluating potential sites opens up a world of opportunity. However, the speed is largely determined by the methodologies we use.

**The industry standard**

Currently, the industry standard for wind energy project revenue forecasts is approximately 6 to 8 weeks per site. For a portfolio of 100 sites, the traditional method of site assessment would therefore require a timeframe of 600 to 800 weeks. Expressed in years, this is 11.5 to 15.4 years, a timeframe that is unacceptable given the growing demand for renewable energy and pressing climate targets.

**The transformative role of automated solutions**

The same 100 site assessments can be completed in an impressively reduced timeframe of 5 to 8 business days per site thanks to automation. The entire portfolio can therefore be assessed within 50 to 80 weeks. In a direct comparison with the industry standard, we see a reduction in time of more than a decade.

This incredible acceleration not only makes it possible to significantly shorten development cycles, but also gives decision makers the enormous advantage of time.

Time that can be used to be more responsive to market changes, time to carefully consider site selection, and, last but not least, time that benefits the environment.

In this context, where time really is money, or rather, an investment in a greener future, automation reveals its potential not only as a tool for efficiency, but also as a catalyst for accelerated change.

In this way, the automation of energy yield forecasting can play a key role in achieving the ambitious goals of the energy transition, faster, more accurately and with a clear view of the future.

**A compass in the world of wind power forecasting**


Yield forecasts are essential to the successful planning and implementation of wind farms. They play a critical role in informed decision making and contribute significantly to risk mitigation.

As the demand for sustainable and renewable energy sources continues to grow, investment in advanced and accurate forecasting technologies is essential.

4cast provides tools that can be decisive in mastering the tasks ahead of us. With our dedicated team and state-of-the-art technology, we strive to continuously improve the accuracy of our revenue forecasts.

I firmly believe that the key to a more sustainable future lies in the hands of those who are willing to adopt innovative technologies and lead the transition to renewable energy. Our mission is not only to lead the way, but to inspire others to join us on this journey.

🌐 [www.4-cast.de](http://www.4-cast.de)



**About the author**

Sascha Bauer is a passionate CEO at 4Cast, a leading renewable energy company.

With his experience in strategic direction and business management, he works to develop sustainable and innovative solutions for the energy transition.

Together with his dedicated team, he strives to create a greener future and move the world forward through clean energy sources.