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# REDUCING IMBALANCE COSTS WITH EURO1k: UP TO 20% SAVINGS

The share of renewable energy in the electricity grid is growing, but the intermittent nature of solar and wind power is driving up balancing costs and increasing financial risks for companies. A major European energy company recently found that the EURO1k weather model from Meteomatics reduces imbalance costs by up to 20%, significantly outperforming other models.

## UP TO 20% REDUCTION IN IMBALANCE COSTS WITH EURO1k
**Consider a company with a 1 GW portfolio of solar, onshore wind, or offshore wind energy. Annual balancing costs for such a portfolio could reach several million euros.**

**EURO1k can reduce these costs by 20%, resulting in savings up to 2.5 million euros per year in certain situations and a strong return on investment.**

### What Makes EURO1k So Special?
- Native resolution of 1 km, with downscaling to 90 m
- Rapid-fresh model updates on a hourly base
- Temporal resolution of 20 minutes
- Exclusive integration of weather drone data
- Real-time data availability

## GRID STABILITY AND IMBALANCE COSTS IN ENERGY TRADING
The energy trading market dynamically balances supply and demand to ensure reliable grid operation. Significant changes from the planned balance can cause power shortage or overproduction. To prevent such issues, the system operator must take corrective actions, such as purchasing additional power, reducing generation, or activating reserve capacity.

These actions can be expensive, especially if done quickly. The market charges penalties — fees called "imbalance costs" — to those who don't provide the scheduled electricity or who use more or less than they intended. These penalties encourage accurate forecasting and alignment with the grid's real-time needs, ultimately contributing to a more reliable and efficient energy system.

## WEATHER FORECASTING'S ROLE IN ENERGY TRADING ACCURACY

Forecasting energy supply and demand is complex, with weather-related inaccuracies being particularly impactful, especially as the share of renewable sources grows. Solar power fluctuates with radiation, and wind energy depends on wind speeds, leading to increased market volatility. This instability causes sudden price shifts. For example, cloudy weather can reduce solar output and drive prices up, while an energy surplus can quickly push prices down.

In intraday and day-ahead markets, higher volatility causes larger price gaps between buying and selling, as traders try to manage the higher risks. Grid operators often have to step in to keep the system stable, relying on expensive backup power or storage, sometimes purchasing or selling energy to neighboring countries. This leads to increased balancing costs, sometimes reaching more than 1,000 EUR/MWh, which can easily result in losses of 100,000 euros per day or even more, depending on the portfolio and size you manage. These costs are passed on as imbalance charges to energy companies that fail to meet their scheduled supply, adding to their financial burden.

A proven way to reduce the risk of imbalances is by using accurate, up-to-date weather forecasts to adjust energy positions for day-ahead and intraday trading. A major European energy company recently found that the EURO1k weather model from Meteomatics significantly outperforms other models in reducing imbalance costs.

## EURO1k HAS SUPERIOR PERFORMANCE IN CHALLENGING WEATHER SITUATIONS
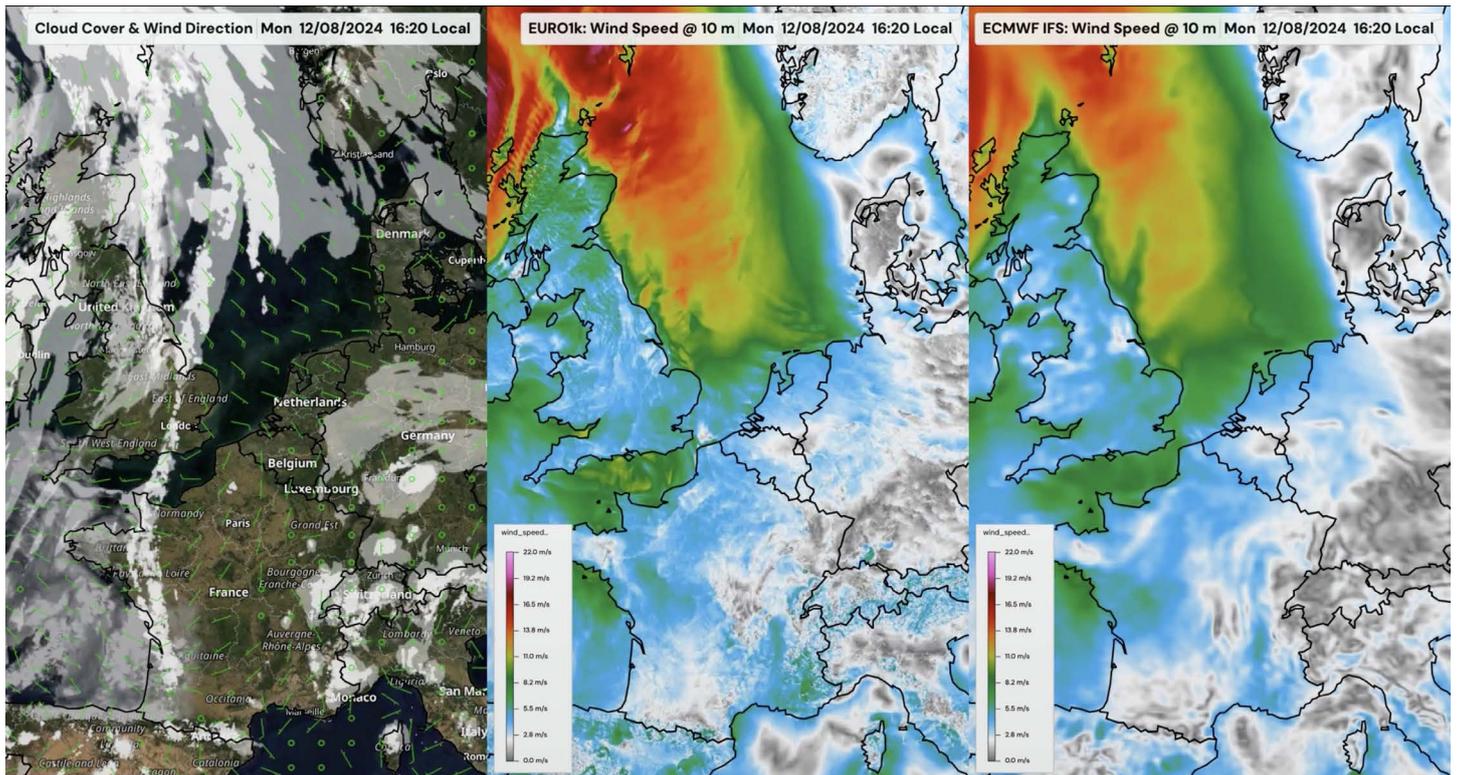
Meteomatics recently completed a benchmarking study for a leading European energy company, and the results confirmed that EURO1k is the solution they've been seeking.

## THE RACE FOR THE BEST POWER FORECAST

As a company's share of renewable energy capacity increases, so does the potential for higher imbalance costs. These costs are now reaching millions of euros annually, with traditional forecasting models struggling to keep them in check. In response, major market players are racing to secure the most accurate power forecasts for their wind and solar farms.

## EURO1k OUTPERFORMS ALL OTHER MODELS

EURO1k is a groundbreaking numerical weather model. It is the first and only model globally to offer forecasts with a native spatial resolution of 1 kilometer and a temporal resolution of 20 minutes, updated hourly. This unprecedented level of detail enables EURO1k to accurately capture even the most complex meteorological events—such as thunderstorms, fog,

| Cloud Cover & Wind Direction  Mon 12/08/2024 16:20 Local | EURO1k: Wind Speed @ 10 m  Mon 12/08/2024 16:20 Local | ECMWF IFS: Wind Speed @ 10 m  Mon 12/08/2024 16:20 Local |

and severe storms—that can critically impact wind and solar power production. The market is heavily influenced by forecasts from ECMWF-IFS, but EURO1k provides additional, differentiated insights, offering a substantial advantage.

In this study, EURO1k's wind power predictions for wind farms in three countries were compared with those of two other providers.

As explained above, the energy trading market is highly volatile. When weather conditions are stable and predictable, trading prices remain low. However, when forecasting becomes more challenging due to complex weather patterns, prices surge.

The key advantage of EURO1k lies in its superior performance during these high-stakes situations, i.e., its ability to detect key phenomena that other models overlook. Since such moments often coincide with the highest prices, EURO1k's stronger accuracy during these critical periods resulted in significant financial savings by reducing imbalance costs.

## Meteomatics' Energy Forecasts for Solar, Wind, and Hydro Power

Meteomatics is more than just a weather forecast provider. We are industry-focused, constantly developing relevant parameters to streamline our clients' workflows and improve efficiency. In the energy sector, we deliver power forecasts directly based on our weather data. For example, in the case of wind power, we incorporate wind parameter data along with information on wind turbine conditions (such as rotor area, hub height, turbine type, plant size, and alignment), as well as live production data, into our forecasts.

# EURO1k RESOLVES COMPLEX WEATHER SITUATIONS MORE EFFICIENTLY

EURO1k excels at predicting rapidly changing conditions, while conventional models struggle to capture these variations accurately. More accurate weather forecasts translate into more accurate energy forecasts, which helps reduce imbalance costs.

The animation below illustrates a complex weather situation caused by a low-pressure system approaching from the British Isles. Accurately predicting the arrival time of the system's cold front in Belgium and the Netherlands was challenging for the weather models, making it difficult to forecast when wind speeds would increase.

As shown in the left section of the chart, the IFS model (right) predicted higher wind speeds during the night and early morning hours, while the EURO1k model (middle) showed lower wind speeds, which aligned well with the actual conditions (left), as Belgium and the Netherlands were still under the influence of a ridge that kept wind conditions calm. Following the passage of the cold front, shown in the right section of the chart, the IFS model continued to predict higher wind speeds, even though wind speeds actually decreased. In contrast, the EURO1k model successfully captured this drop in wind speeds after the cold front's passage.

## WINDFARM IN BELGIUM – 2nd June 2024
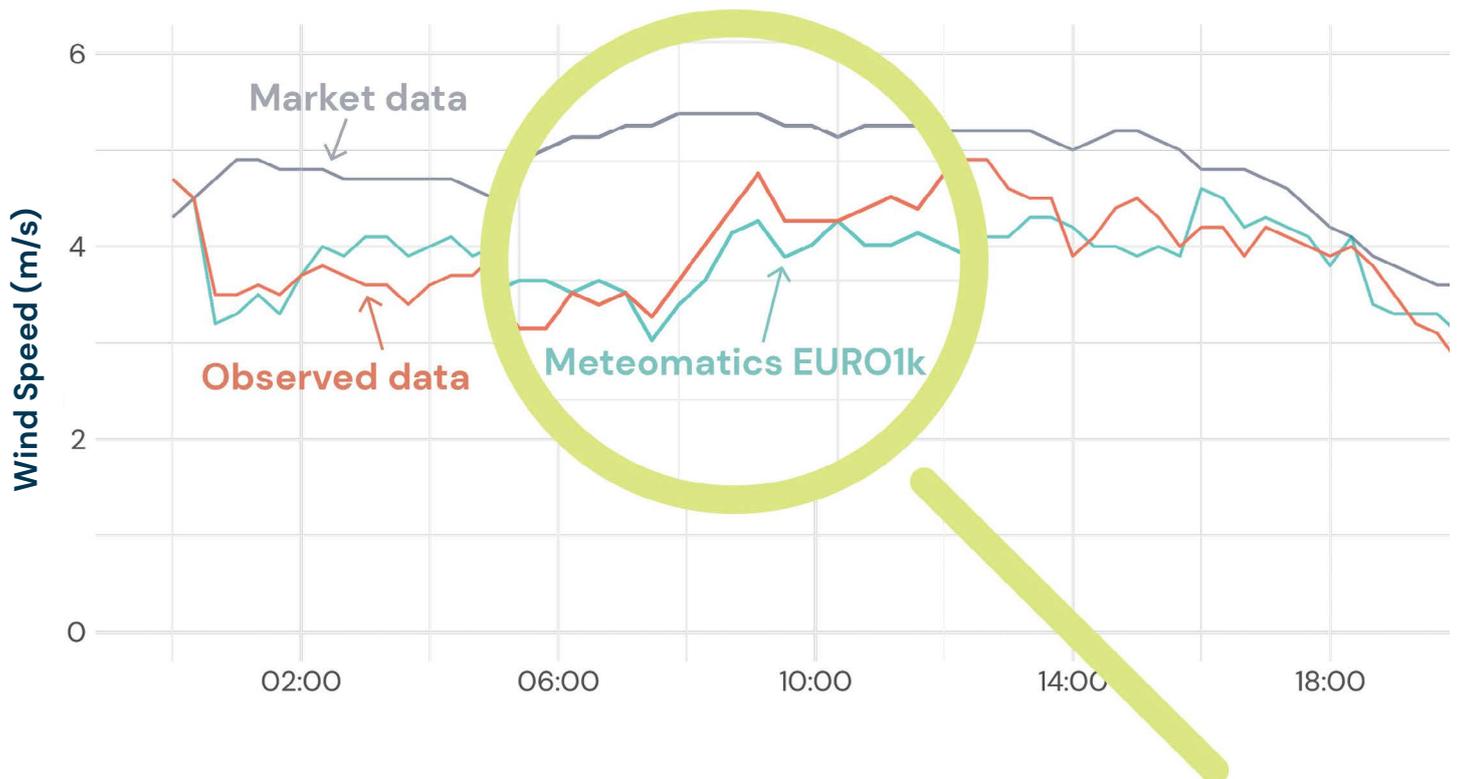
## CONTACT US – WE ARE HERE FOR YOU

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