Commercialization of a breakthrough wind resource assessment technology for automated planning of bankable wind farms

Results in Brief

Generating reliable wind data with AI and the cloud

Traditional methods for prospecting wind energy sites are laborious and expensive, however an innovative new approach could revolutionise the industry.

ENERGY

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Wind energy is a promising emerging power source that could help the European Union achieve its ambitious climate goals over the coming decades. This sector is already drawing in huge amounts of investment and could provide new opportunities for business and employment across Europe.

In order to get the most out of this renewable energy source, managers must seek out the best locations for installing wind farms. Yet traditional methods used for wind project prospecting rely heavily on manual processing, making overall development in the industry slow and expensive.

In the EU-funded WindSider project, researchers devised an innovative new approach to wind source modelling. By leveraging advanced wind modelling and

third-party data acquisition, the WindSider project generated high-resolution wind resource data, providing valuable insights for planning bankable wind farms.

“The project also aims to automate the long-term yield assessment process, allowing developers to optimise and speed up the planning and development of new wind farms,” says Grégoire Leroy, solution owner for 3E’s Wind Resource Data and WindSider project coordinator.

Virtual Met Mast

In the WindSider project, researchers developed an innovative product called the ‘Virtual Met Mast’, an automated and cost-effective solution for generating reliable wind resource data and analytics.

The Virtual Met Mast programme combines numerical modelling with deep learning and cutting-edge Earth Observation (EO) data from Copernicus Sentinel Missions, to generate long-term wind resource data at an unprecedented level of spatial and temporal resolution.

The software product uses up to 30 years of data to produce comprehensive wind parameters, including wind speed, wind direction, air density, turbulence intensity and other climate variables at the highest spatial and temporal resolutions available worldwide.

Developers can then use this data to analyse more sites, mitigate missed opportunities, and optimise projections faster than ever before.

“The computation process is incredibly fast, taking less than 24 hours to generate a comprehensive data set that includes comprehensive parameters such as wind speed, wind direction, air density, turbulence intensity, and more,” Leroy explains.

The system was developed through the WindSider project and then tested on 30 stakeholders from across the wind industry.

Heading towards commercialisation

“Throughout the project, we conducted an extensive validation of our new application, commercialising it through beta testing, rigorously verifying operational data accuracy, and scientifically validating it with comprehensive site assessments. Our dedication to thorough testing ensures the reliability and accuracy of our application,” says Leroy.

The product is currently available for use, and the next step for the project is to

achieve full commercialisation of the Virtual Met Mast and bring the product to market.

The team expects to add several new features in the near future, the most important being automated long-term yield assessment. “This will enhance the functionality of the product and provide even more value to its users,” Leroy notes.

Funding a greener future

The EU funding played a crucial role in enabling the development of Virtual Met Mast, providing the necessary resources for extensive market research and rigorous testing of the tool.

“The funding has also been instrumental in ensuring that the tool is fully equipped to meet the needs and demands of the market, while also providing users with the highest level of performance and functionality,” adds Leroy.

Keywords

WindSider | wind | energy | power | virtual | performance | software | data | deep learning | modelling

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WindSider

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