

# ANEMOS.plus

Advanced Tools for  
the Management of Electricity Grids  
with Large-Scale Wind Generation



## Scientific leader

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SPECIFIC TARGETED RESEARCH PROJECT  
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## ABSTRACT

Nowadays, wind power has an increasing share in the electricity generation mix in several European countries. Due to the variable nature of wind, the large-scale integration of wind power causes several difficulties in the management of a power system. For example, often, a high level of reserves is allocated to account for wind power variability, thus reducing the benefits from the use of wind energy. Today it is widely recognized by end-users such as Transmission System Operators (TSOs), Utilities a.o. that forecasts of the power output of wind farms up to 48/72 hours ahead contribute to a secure and economic power system operation. The EU project ANEMOS has successfully addressed research in the field of short-term wind power forecasting for a wide range of end-user requirements.

The ANEMOS.plus project aims at the optimal management of electricity grids linked to large-scale wind power generation. For this purpose, the project develops new intelligent management tools for addressing the variability of wind power. Emphasis is given on the integration of wind power forecasts and related uncertainty in power system key management functions. The project demonstrates the applicability of such tools at an operational level both for managing wind penetration and for trading wind generation in electricity markets.

At a first stage the wind forecasting tools will be enhanced with new functionalities such as probabilistic forecasting. At a second stage new operational tools for managing wind generation and for trading in electricity markets will be developed. The project will then focus on demonstrations identified as the key challenges for large-scale integration of wind power into the electricity supply, including:

**1.** Reliable provision of advanced wind power forecasts through alternative technologies and at different scales ranging from single wind farm to regional/national scale. Focus will be on :

- ▶ The accuracy of forecasts provided by different modelling approaches.
- ▶ The on-line estimation of uncertainty in the forecasts.
- ▶ The ergonomics of the prediction tools.

**2.** Optimal integration of wind energy into power systems and electricity markets. The project will aim to demonstrate the benefits from the use of advanced tools for :

- ▶ Allocation of balancing power and definition of reserves for TSOs.
- ▶ Optimal scheduling of power systems with high wind penetration.
- ▶ Bottleneck management in large power systems as well as local grids.
- ▶ Management of storage associated to wind energy.
- ▶ Trading of wind power in electricity markets using advanced strategies.



[www.anemos-plus.eu](http://www.anemos-plus.eu)



SIXTH FRAMEWORK PROGRAMME

SUSTAINABLE DEVELOPMENT, GLOBAL CHANGE AND ECOSYSTEMS

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The tools will be demonstrated at two levels: the wind power prediction tools are brought in every day practice using their results for decision making, and on a highly integrated approach, welding together the worlds of fluctuating wind power and traditional energy systems. The use and integration of the needs and knowledge of end-users like operators and traders are key parts of this project.

The Consortium comprises major European TSOs, Utilities, wind farm developers and research teams with complementary, high quality expertise. Participants of the project have cooperated effectively in the previous ANEMOS project acquiring significant know-how and gaining world-wide recognition in this field.

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