

SafeWind

Multi-scale data assimilation, advanced wind modelling and forecasting with emphasis to extreme weather situations for a safe large-scale wind power integration



Scientific leader

Georges KARINIOTAKIS

CEP S

georges.kariniotakis@mines-paristech.fr

+ 33 (0) 4 93 95 75 01

SMALL OF MEDIUM-SCALE FOCUSED RESEARCH PROJECT
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ABSTRACT

The integration of wind generation into power systems is affected by uncertainties in the forecasting of expected power output.

Misestimating of meteorological conditions or large forecasting errors (phase errors, near cut-off speeds etc.), are very costly for infrastructures (i.e. unexpected loads on turbines) and reduce the value of wind energy for end-users.

The state of the art in wind power forecasting focused so far on the "usual" operating conditions rather than on extreme events. Thus, the current wind forecasting technology presents several strong bottlenecks. End-users urge for dedicated approaches to reduce large prediction errors or predict extremes at local scale (guts, shears) up to a European scale as extremes and forecast errors may propagate. Similar concerns arise from the fields of external conditions and resources assessment, where the aim is to minimize project failure.

The aim of this of this project is to substantially improve wind power predictability in challenging or extreme situations and at different temporal and spatial scales. Going beyond this, wind predictability is considered as a system design parameter linked to the resource assessment phase, where the aim is to take optimal decisions for the installation of a new wind farm.

The project concentrates on: using new measuring devices for a more detailed knowledge of the wind speed and energy available at local level; develop strong synergy with research in meteorology; develop new operational methods for the very-short-term for warning/alerting that use coherently collected meteorological and wind power data distributed over Europe to early detect and forecast extreme events; develop models to improve medium term wind predictability; develop a European vision of wind forecasting taking advantage of existing operational forecasting installations at various European end-users.

Finally, the new models will be implemented into pilot operational tools for evaluation by the end-users in the project.

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PARTNERS

PARTICIPANT NAME	COUNTRY	SCIENTIFIC LEADER
Association pour la Recherche et le Développement des Méthodes et Processus Industriels*	FR	Georges KARINIOTAKIS
Centro Nacional de Energías Renovables	ES	Ignacio MARTI
Technical University of Denmark (RISOE, IMM)	DK	Henrik MADSEN Gregor GIEBEL
University of Oldenburg – ForWind	DE	Detlev HEINEMANN
Energy & Meteo Systems GmbH	DE	Ulrich FOCKEN
OVERSPEED GmbH & Co. KG	DE	Igor WALDL
ENERGINET.dk	DK	Nina K. DETLEFSEN
European Centre for Medium Range Weather Forecasts	INT	Renate HAGEDORN
Electricité de France	FR	Thierry JOUHANIQUE
EirGrid p.l.c.	IE	Philip O'DONNELL
The Chancellor, Masters & Scholars of the University of Oxford	UK	Patrick McSHARRY
Universidad Complutense de Madrid	ES	Franciso VALERO
Universidad Carlos III de Madrid	ES	Julio USAOLA
Public Power Corporation SA	GR	Valy LIOLIOU
METEO FRANCE	FR	Philippe FRAYSSINET
The Energy and Resources Institute	IND	Shirish GARUD
ACCIONA EOLICA CESA	ES	Manuel PUMAR-PACHECO
System Operator of Northern Ireland	UK	Tom McCARTAN
Gestionnaire du Réseau de Transport de l'Electricite	FR	Vincent LEFIEUX
Institute of Communication & Computer Systems - National Technical University of Athens	GR	Nikos HATZIARGYRIOU
CSIRO	AUS	Peter COPPIN

