High resolution climatology
- towards climate change services

WIRE: Weather Intelligence for Renewable Energies

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Renewable energies such as wind and solar energy will play an important, even decisive role in order to mitigate and adapt to the projected dramatic consequences to our society and environment due to climate change. Due to shrinking fossil resources, the transition to more and more renewable energy shares is unavoidable. But, as wind and solar energy are strongly dependent on highly variable weather processes, increased penetration rates will also lead to strong fluctuations in the electricity grid which need to be balanced. Proper and specific forecasting of 'energy weather' is a key component for this. Therefore, it is today appropriate to scientifically address the requirements to provide the best possible specific weather information for forecasting the energy production of wind and solar power plants within the next minutes up to several days.

Towards such aims, Weather Intelligence will first include developing dedicated post-processing algorithms coupled with weather prediction models and with past and/or online measurement data especially remote sensing observations. Second, it will contribute to investigate the difficult relationship between the highly intermittent weather dependent power production and concurrent capacities such as transport and distribution of this energy to the end users.

Selecting, resp. developing surface-based and satellite remote sensing techniques well adapted to supply relevant information to the specific post-processing algorithms for solar and wind energy production short-term forecasts is a major task with big potential. It will lead to improved energy forecasts and help to increase the efficiency of the renewable energy productions while contributing to improve the management and presumably the design of the energy grids.

The second goal will raise new challenges as this will require first from the energy producers and distributors definitions of the requested input data and new technologies dedicated to the management of power plants and electricity grids and second from the meteorological measurement community to deliver suitable, short term high quality forecasts to fulfill these requests with emphasis on highly variable weather conditions and spatially distributed energy productions often located in complex terrain.

This topic has been submitted for a new COST Action under the title "Short-Term High Resolution Wind and Solar Energy Production Forecasts".