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Climate information for the wind energy industry in the Mediterranean Region

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According to the World Wind Energy Association the total wind generation capacity worldwide has come close to cover 3% of the world's electricity demand in 2011. Thanks to the enormous resource potential and the relatively low costs of construction and maintenance of wind power plants, the wind energy sector will remain one of the most attractive renewable energy investment options.

Studies reveal that climate variability and change pose a new challenge to the entire renewable energy sector, and in particular for wind energy. Stakeholders in the wind energy sector mainly use, if available, site-specific historical climate information to assess wind resources at a given project site. So far, this is the only source of information that investors (e.g., banks) are keen to accept for decisions concerning the financing of wind energy projects. However, one possible wind energy risk at the seasonal scale is the volatility of earnings from year to year investment. The most significant risk is therefore that not enough units of energy (or megawatt hours) can be generated from the project to capture energy sales to pay down debt in any given quarter or year.
On the longer time scale the risk is that a project's energy yields fall short of their estimated levels, resulting in revenues that consistently come in below their projection, over the life of the project.

The nature of the risk exposure determines considerable interest in wind scenarios, as a potential component of both the planning and operational phase of a renewable energy project. Fundamentally, by using climate projections, the assumption of stationary wind regimes can be compared to other scenarios where large scale changes in atmospheric circulation patterns may affect local wind regimes.

In the framework of CLIM-RUN EU FP7 project, climate experts are exploring the potential of seasonal to decadal climate forecast techniques (time-frame 2012-2040) and regional climate scenarios (time horizon 2040+) over the Mediterranean Region as a tool for assessing the impact of changes in climate patterns on the energy output of wind power plants. Subsequently, we will give here a brief overview of these techniques as well as first results related to wind projections for different sites across the Mediterranean Region. We will highlight that regional climate models have a large potential for enhancing the quality of climate projections in the presence of complex orography and in the proximity of coastal areas.