EMS Annual Meeting Abstracts
Vol. 11, EMS2014-303, 2014
14th EMS / 10th ECAC

An assessment of onshore wind energy potential in Iberia under climate change

Carlos Rochinha (1), João A. Santos (1), Margarida L. R. Liberato (2,3), and Joaquim G. Pinto (4)

(1) Centre for the Research and Technology of Agro-Environmental and Biological Sciences, Universidade de Trás-os-Montes e Alto Douro, UTAD, 5000-801 Vila Real, Portugal, jsantos@utad.pt, (2) Universidade de Trás-os-Montes e Alto Douro, UTAD, Quinta de Prados, 5000-801 Vila Real, Portugal, mlr@utad.pt, (3) Instituto Dom Luiz, Faculdade de Ciências, Universidade de Lisboa, 1749-016 Lisboa, Portugal, (4) Department of Meteorology, University of Reading, UK, j.g.pinto@reading.ac.uk

The onshore wind energy potential in the Iberian Peninsula is assessed for both a recent past period (1961-2000) and under future climatic conditions (2041-2070), following the SRES A1B scenario. For the first period, a COSMO-CLM (regional climate model) simulation driven by ERA-40 reanalysis is used, while for the second period the COSMO-CLM is driven by ECHAM5 (global climate model). In these simulations, the spatial resolution of the fields is of approximately 20 km. A wind turbine, with rated power of 2 MW, is considered for estimating the wind energy potential at the seasonal time scale. For more detailed regional assessments, several target areas are also taken into account separately. For the recent-past conditions, the highest daily mean potentials are detected in winter and over northern and eastern Iberia, mostly over either high-elevation areas or along some coastal regions. The Gibraltar Strait region reveals high potentials throughout the year, while the Ebro valley and the central-western coast show relatively high summertime potentials. Using a control run in the period 1961-2000, COSMO-CLM is calibrated and climate change projections of the wind energy potential are generated. These projections highlight significant decreases in winter and spring over most of the peninsula, but some regional increases in summer are also detected. Furthermore, the strengthening of the wind potential in the Gibraltar Strait area is still worth noting.

ACKNOWLEDGMENTS
This work was partially supported by FEDER (Fundo Europeu de Desenvolvimento Regional) funds through the COMPETE (Programa Operacional Factores de Competitividade) and by national funds through FCT (Fundação para a Ciência e a Tecnologia, Portugal) under project STORMEx FCOMP-01-0124-FEDER-019524 (PTDC/AAC-CLI/121339/2010).