



Assessing climate change impact on the european wind power production by applying a wind power generation model to an ensemble of Regional Climate Model projections

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Wind energy industry is experiencing worldwide rapid growth and is expected to play a key role in future energy supply since it provides a part of the answer to climate change mitigation and to the security of energy supply. In this context, the issue of the climate change impact on wind power production has to be addressed. Some recent studies have come to the conclusion that wind energy density in Europe will not undergo significant changes in the projected future climate. The present work proposes to gain further insight into this issue by developing a simple model aimed at converting the 10 m-wind field simulated by Regional Climate Models (RCM) to electricity production over Europe. The calculation involves characteristics of the current wind turbine fleet (wind farms locations, turbine hub height, power capacity), an extrapolation of the 10m-wind to the wind at turbine hub heights, the use of wind turbine power curves and wind biases correction. By applying this model to the ENSEMBLES climate projections, projected changes in european wind power mean production and its variability along with associated uncertainty is assessed. Within the IMPACT2C european FP7 project, a focus is made on the time period where models reach a global increase of 2°C relative to preindustrial in order to evaluate these impacts in a highly mitigated socio-economic scenario.