EMS Annual Meeting Abstracts
Vol. 12, EMS2015-100, 2015
15th EMS / 12th ECAM

Wind and solar energy potential in Bulgaria – some computer simulations results

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In 2007 the European Council set ambitious energy and climate change goals for 2020 – to reduce greenhouse gas emissions by 20%, to increase renewable energy to 20% and to reach 20% energy efficiency. These targets were reconfirmed in the Europe 2020 Strategy. The statistics for Bulgaria shows that renewable energy share is currently decreasing from 13.8% in 2011 to 9.3% in 2012, meaning EU renewable energy 20% by 2020 target would not be met and that new measures are needed.
Another important aspect of the renewable energy is the reduction and the trade of CO_2 emissions, which determines its great ecological and economic importance and the need of better utilization of the country potential. That is why the renewable energy resources of the country, including wind and solar energy, and their geographic pattern have to be well studied.
Detailed study of the wind and solar energy potential of the country – spatial distribution, temporal variation, mean and extreme values, fluctuations and statistical characteristics; evaluation from a point of view of industrial applicability is the objective of the present work.
The computer simulations were performed applying the 5th generation PSU/NCAR Meso-meteorological Model MM5 for years 2000-2007 with a spatial resolution of 3 km over Bulgaria. Some evaluations of the country renewable energy potential, based on the simulation output are demonstrated in the paper. For future work is planned to continue the simulations for 7 years more using WRF (Weather Research and Forecast model) with 2km resolution.