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Radiation and wind projections for Poland based on downscaled EuroCORDEX ensemble

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Forecasted trends of solar radiation and wind speed serve as an input for climate risk assessment as well as the estimation of renewable energy potential in the future climate.

In the frame of the project “Adaption strategies to Climate Change in Poland” the projections of solar radiation and the wind speed were developed based on the EURO-CORDEX. The RCM results for an area covering central Europe with a resolution of 0.11 ° (approx. 12.5 km) were used. The analyses were carried out for RCP4.5 and RCP8.5 scenarios.

To represent better the local variability the statistical downscaling was applied based on various historical gridded datasets (ERA5 and IMWM for the wind speed and ERA5, IMWM, and SARA-II for the shortwave solar radiation). Ensemble analyses were undertaken to assess the projection uncertainty.

Solar radiation in the future climate shows a slight downward trend. The annual sum of solar radiation at the end of the century will decrease by 12 kWh/m² to 40 kWh/m², depending on the scenario. The most significant change will occur in eastern and north-eastern Poland. Forecasts of average wind speed values do not indicate significant changes in the 21st century, although the wind speed distribution showed changes in individual months - an increase in the winter and a decrease in the summer months.

Results are available via the interactive climate web portal <https://klimada2.ios.gov.pl/klimat-scenariusze-portal/>.