Extrapolation of the measured wind data using CFD model implemented in the WindSim Software package

Dj. Klisic, M. Zlatanovic, I. Radovanovic, I Popovic
Outline

 › WindSim CFS Model
 › Location Šušara fields
 › Measurement results
 › Simulated results
 › Future research
Computational Flow Dynamics (CFD) - numerical model for solving fluid dynamics equations

Model implemented solving simplified RANS - time-averaged equations of motion for fluid flow

The main idea - Reynolds decomposition, instantaneous quantity is decomposed into its time-averaged and fluctuating quantities

Wind speed map at 100m
Šušara fields location

› Area with the greatest wind potential in South-East (SE) Banat

› Unique geo-morphological configuration 10km long and 50 m wide cultivated sand dune, heights 40m – 100m

› Hardware: two 50m measurement masts NRG TallTower, anemometers NRG #40C placed at 30m/40m/50 m, wind wanes NRG #200P at 30m/50m

4th International Conference on Renewable Electrical Power Sources, Belgrade, 17th and 18th October, 2016
Results

› Measurement stations data gathered during the 5 year period

› Data processed in OWC wizard (module of WAsP wind assessment tool)

› Resulting wind roses for both masts.

› Used as referent measured value compared with the simulated wind roses
Results

› Mean wind speed from at the location of two measurement masts
› Wind speed prediction at 30m above the ground
› Area around the mast A - the greatest wind potential
› Area around mast B - the lowest wind potential
Conclusion

› Results confirmed superiority of the CFD model in case of rugged complex terrain

› Measurement masts approximately situated at locations with highest and lowest wind potentials

› Important for future wind power harvesting and climatology conditions analysis

› Future model analysis - sector testing and climatology extrapolation to different heights
Thank you for your attention!!!