Comparison of Resource and Energy Yield Assessment Procedures 2011-2015: What have we learned and what needs to be done?

From 2011 to 2015, the European Wind Energy Association arranged four open exercises to benchmark the wind resource and wind farm energy yield assessment procedures of the wind energy industry. Two case studies were for land-based Scottish wind farms in hilly to complex terrain, and two case studies for medium- to large-scale offshore wind farms in the Irish Sea. A total of 157 submissions were received, 97 land-based and 60 offshore, and all four exercises were analysed and presented previously by DTU Wind Energy.

Results are summarised here for each of seven specific steps in the resource and energy yield assessment procedure: Site wind observation, long-term extrapolation, vertical extrapolation, horizontal extrapolation, wake modelling, technical losses estimation, uncertainty estimation and calculation.

For each step and each wind farm a summary is given of the magnitude of the effects, the spread of the predictions, the methodologies used, and some general, qualitative conclusions. For one offshore wind farm, Barrow, the predicted yield was found to be 104% of the observed yield, with a spread of predictions of 3%.

Based on the results of the four case studies and the statistics of the submitted data, two prioritised lists of actions that could be taken in order to improve the overall process in the most cost-effective way are given; one for land-based and one for offshore wind farms.