Online windPRO Course - 5 sessions

Topics covered:

- windPRO project setup and BASIS
- Maps - height contours (including online import)
- The WTG Catalogue (WindCat)
- Layout design facilities
- Measuring the wind - fundamentals and best practice

- Importing and analyzing measured wind data
- The Wind Atlas method (WAsP)
- Wind speed profiles
- Long-term correction of site wind data: MCP techniques
- Full energy calculation using WAsP and estimating the wake losses
- Best practice using WAsP: knowing the limitations

- Introduction to WAsP-CFD
- Introduction to Loss and Uncertainty: the way to a bankable report
- Wind resource maps and micrositing
- Noise Impact
- Shadow flickering impact
- Zones of Visual Influence (ZVI)
- Photomontages

BASIC and Analyzing Wind Data

The purpose of the first part is for beginners to obtain a first understanding of windPRO and for the more experienced users to refresh their skills and get an overview of the latest improvements in windPRO.

The BASIS module is the platform on which all modules operate. No matter which modules of windPRO you are using or intend to use, you will need to get familiar with the BASIS facilities.

An extensive presentation of wind data measuring and analysis will also be a part of this first part. Instruction in the handling of the METEO object and its numerous data screening facilities will be given.

We conclude with WAsP, which is currently the calculation engine used as standard in wind energy calculations. We will prepare the background data to be used in the windPRO/WAsP calculations, like roughness, obstacles and height contours.

Energy Calculations

We start with the topic of vertical extrapolation by WAsP and/or measurements, making use of the wind shear matrix.

Then, MCP techniques, allowing to transform a local, short-term time series in a robust, long-term representative data set. We will go through several online wind reference datasets and different MCP methods.

This will lead us to the final energy calculation with the PARK module which includes the calculation and theory of the losses due to the wake effect between turbines.

The pitfalls and limitations of WAsP will also be reviewed, and a brief exercise introducing WAsP-CFD will be done.

Any energy yield assessment ends up with the estimation of losses & uncertainties and the calculations of P75, P90.

We will close the topic of energy assessment by looking at other important tools like wind resource maps and layout optimizations.

Environmental Impact Assessment

This part is aimed at getting familiar with the environmental calculations needed to provide the documentation required by the local authorities (for environmental permission).

The program will alternate between theoretical explanations of the various environmental impacts (noise, flicker, visualizations) and practical exercises on how to calculate and document them with windPRO.