



windPRO

# STANDARD course windPRO

*(5 half-day online sessions\*)*

**Join our course to master the standards tools in windPRO!**

**This course guides you through energy yield calculations as well as environmental impact assessment, both being the most common use cases of windPRO.**

## **Structure of the course:**

Each subject begins with theoretical and practical considerations, which are supported by a demonstration and followed up by a hands-on exercise, where the teacher is available for guidance and help.

There is room for discussions related to specific issues the participants face in their daily work within the boundaries of the course syllabus.

### **1.a. Get you started on setting up a project!**

Get a comprehensive understanding of the BASIS module, which serves as the foundation for all modules in windPRO. Upon completion, participants will be able to:

- Understand the BASIS module and its role as the platform on which all modules operate in windPRO. Learn about structure of windPRO and how to import and export objects
- Load online data such as roughness and height contours as preparation for flow modelling

### **1.b. From onsite short-term wind measurements to long-term wind climate**

Get the wind data ready as input to the flow model:

- Understand the principles of wind data measurement
  - Handle the METEO object to import and analyse wind data
  - Understand the vertical wind speed profile
  - Extrapolate the wind from measurement to hub height using measured shear
  - Learn MCP techniques that allow you to transform a local, short-term time series into a robust, long-term representative data set.
- You will also go through several online wind reference datasets and different MCP methods

### 1.c From long-term wind climate to energy production

The grand final: Use the long-term corrected wind data to perform energy yield assessments (EYA).

- Understand the Wind Atlas Method (WASP method), which is currently used as standard in wind energy calculations
- Learn about the pitfalls of WASP with a short excursion to WASP-CFD
- Introduction to time-varying energy calculations and their advantages
- Get insight into wakes
- Use a map of wind resources to optimise a layout
- Introduction to losses and uncertainties

### 2. Environmental Impact Assessment

This part is aimed to assess the environmental impact of the project as far as the noise, flicker effect (shadow) and zones of visible impact (ZVI) of the wind turbines are concerned.

- Understand the basic concepts of how **noise** from wind turbines is expressed and how it propagates
- Get an introduction into some country-specific requirements
- Set-up noise-sensitive areas
- Theory about noise-modes for wind turbine operation
- Calculate noise impact at the receptors using ISO 9613-2 as well as preparation of a noise map
- Choose the size and orientation of **shadow** recipients
- Perform a complete simulation using real case statistics including production of a flicker map
- Identify spots from where WTGs are visible (**ZVI**), taking topography and obstacles into account
- Prepare a **photomontage** and an animation of your wind farm with windPRO

#### Who should attend?

The course is recommended for new windPRO users or users who want to refresh their knowledge. The course outline does not specify any prerequisites for the course, but it is helpful if the participants have a basic understanding of wind resource assessment.

Participants without knowledge of wind resource assessment are encouraged to do some online reading. As a starting point, the following links are suggested:

1. [Wind resource assessment](#)
2. [Guidelines for wind resource assessment: Best practices for countries initiating wind development](#)

*\*Each online half day corresponds to a 4.5-hour session*