QUICK GUIDE – START USING WINDPRO 3.2

Purpose:

To get started using windPRO 3.2.

Some basic features are presented to give an idea of the workflow and the interactions between maps, objects, tools and calculation modules.

Outline of Guide:

1. **Installation and activation**
2. **Start – create project with background map and elevation data**
3. **Design wind farm and study it**
4. **Prepare for a calculation**
5. **Perform a calculation**
6. **The objects in windPRO**

1. INSTALLATION AND ACTIVATION

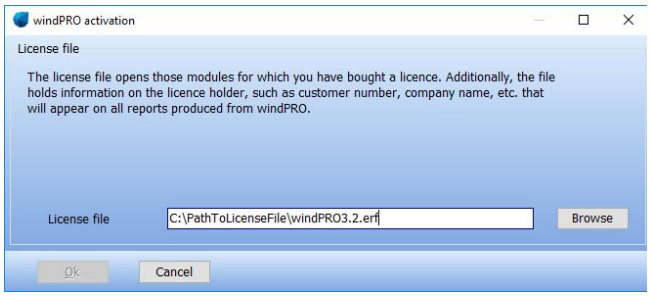
Link for installation file is found at:

http://www.emd.dk/windpro/downloads/

Once installed, open Windows start menu and find windPRO 3.2

Select your desired language and you will then be asked for license file called **WindPRO3.2.erf** which can be found on the WindPRO USB stick or in an email from EMD (emd@emd.dk).

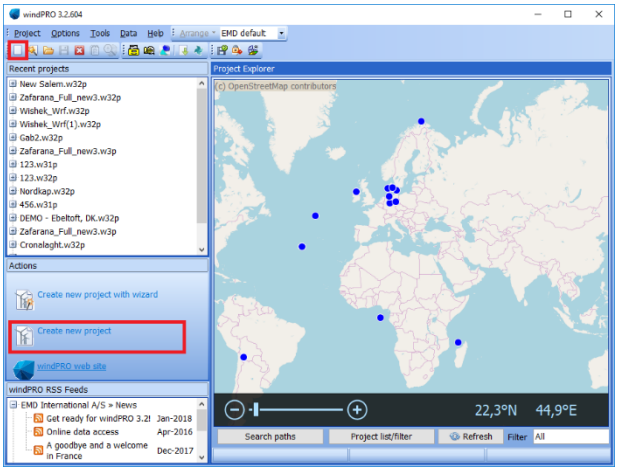
For newer versions 3.2, 3.3 etc. these will replace 3.1.



Then follow the instructions on the screen.

2. STARTING YOUR PROJECT

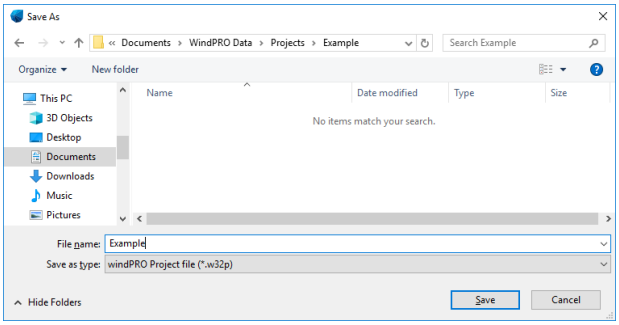
Opening windPRO will show you the start-up screen:



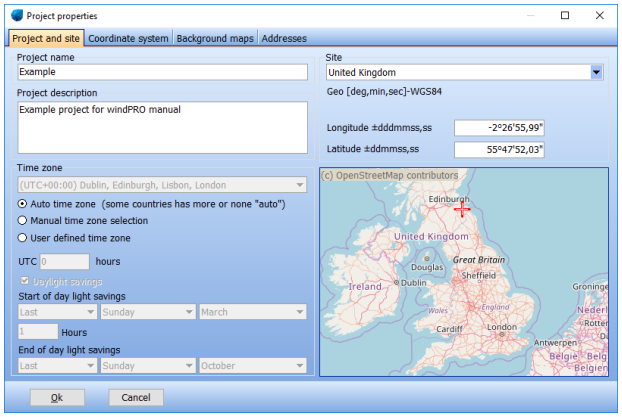
The globe shows the projects located on your PC (or server) and each project can be opened by double clicking it. Recent projects are listed to the left.

This quick guide shows how to create a project from scratch, not using the wizard.

First, click the **Create new project** button and specify where you want to save your windPRO project and all relevant data files:

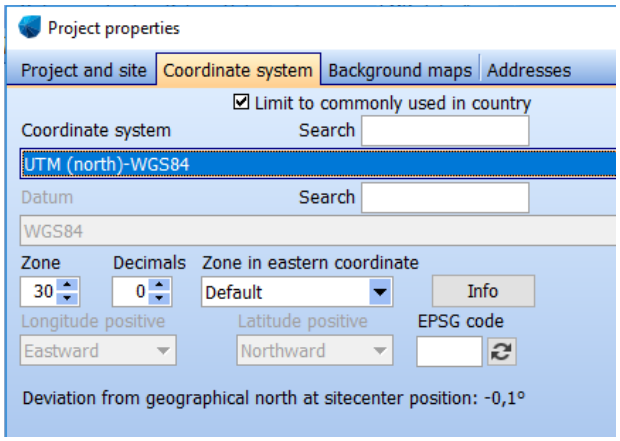


Click **Save** and next you will start selecting the geographic location for the project:

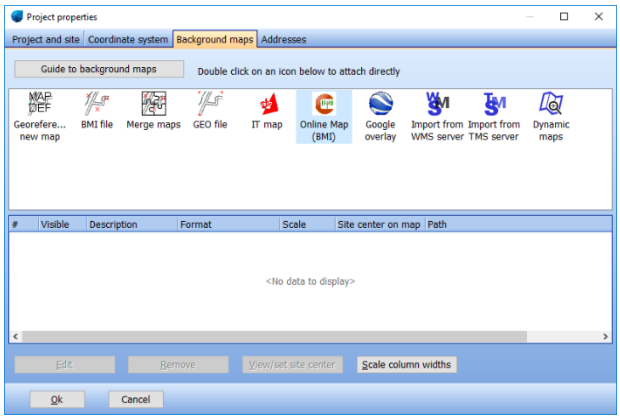


You can specify the location of your site by entering coordinates or using the map tool as background for fine tuning the position.

On the coordinate system tab, select the preferred system (the one you typical have coordinate info from):

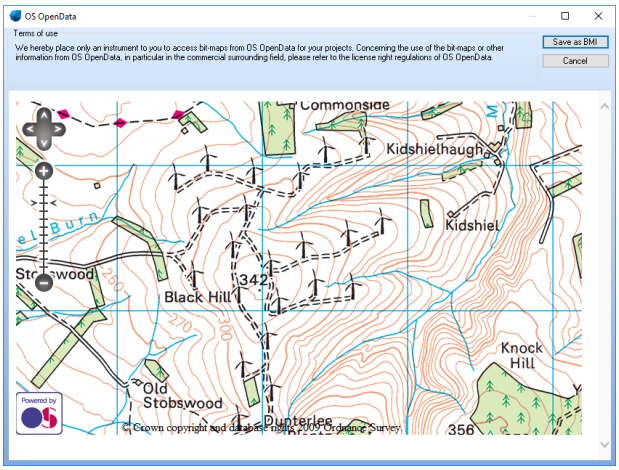


Next step is importing background maps:



In the Background maps tab, see which **Online maps, WMS and TMS server maps** and/or **Dynamic maps** are available for your project region. Your own digital maps (e.g. scanned) can also be georeferenced here or you can use Google Earth for georeferencing (add image layer), then save and import from here by the **Google overlay** importer.

In this example, we choose **Online Map (BMI)**, and select an *Ordinance Survey: OpenData* map.

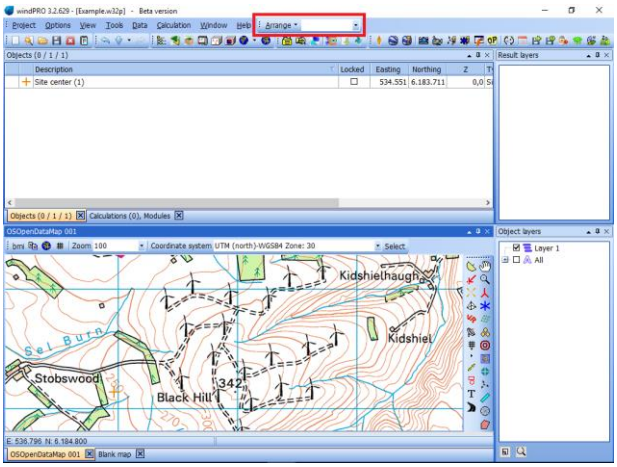


Zoom to the desired area and click **Save as BMI**. This will download the image and add it as a background map.

Many more maps are available. If you choose a **Dynamic map**, the maps are downloaded on the fly at many zoom levels. The content may change by location and over time (See more information here and here).

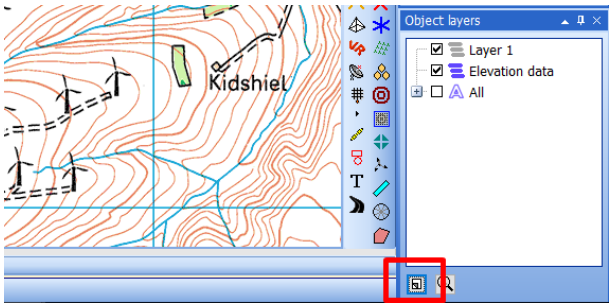
Clicking OK, will take you to the windPRO main window.

Different window arrangements can be imported using the **Arrange** button in the top and you can create your own prefered window layouts:



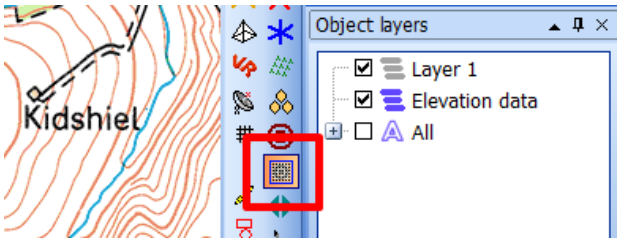
Now that you have created your project and loaded a map, it is time to import the most necessary data for your project, like elevation data.

Start by creating a new layer by clicking on the icon in the object layer window:



Name the layer "*Elevation data*".

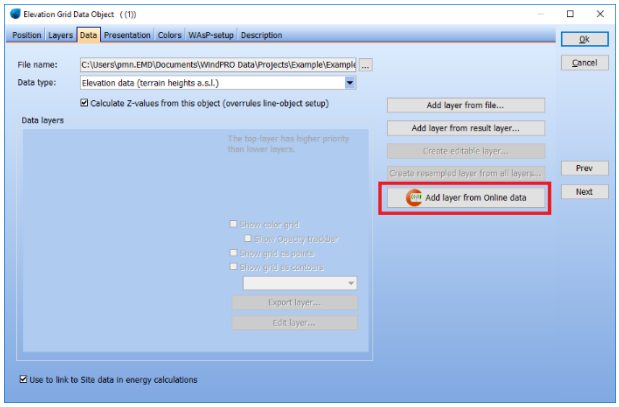
Now click on the symbol for Elevation Data as Grid:



Alternatively, choose the one above for contour data.

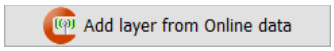
Place the symbol by left-clicking on the map (for this object type, the position is not important).

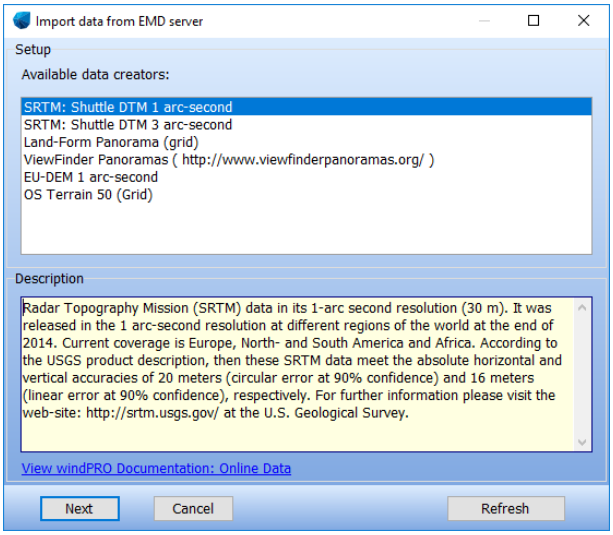
Once placed on the map, the properties window opens:



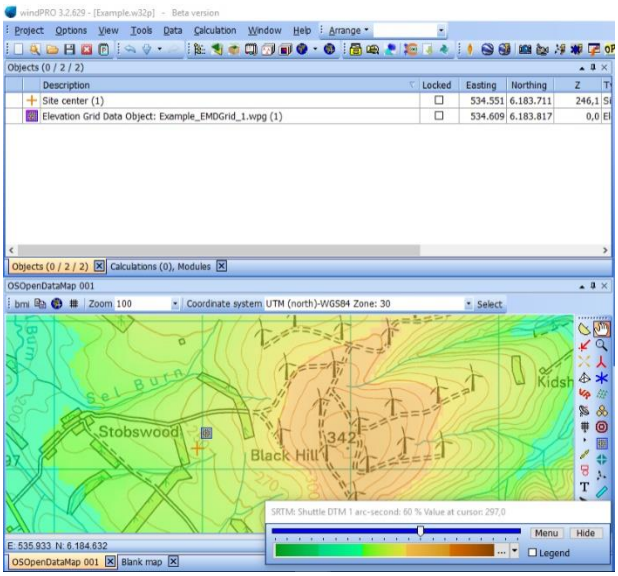
From here you can add your own elevation data, or simply use the Online data provided with windPRO.

Choose **Add layer from Online data**





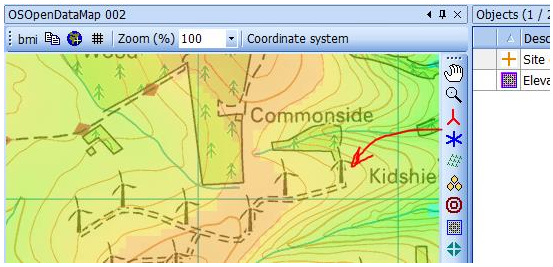
Pick the data source you find most suitable. The data is often country specific, and may not always cover your site (See more info here). SRTM or ViewFinder will together cover almost all the world.



Here SRTM 1 arc has been downloaded for 20 x 20 km.

Now your "working environment" is established and the project development can start.

3. DESIGN WIND FARM AND STUDY IT



windPRO offers to work 2 kinds of turbine:

New wind turbines

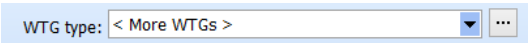
Existing wind turbines

This distinction is convenient when e.g. an existing wind farm is to be expanded. Then the new turbines are separately reported in documentations, while keeping the influence from the existing turbines. The existing turbine object can also store data on actual production.

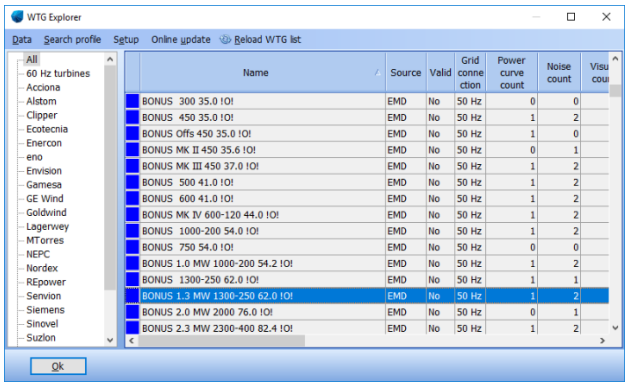
On the image shown above, an existing wind farm is shown on the background map. We will now put existing turbine objects on each symbol at the background map. It's a good idea to create a new layer for these turbines.

To "multi create" objects with the same properties, hold down the <SHIFT> key when clicking on the  object in the menu bar.

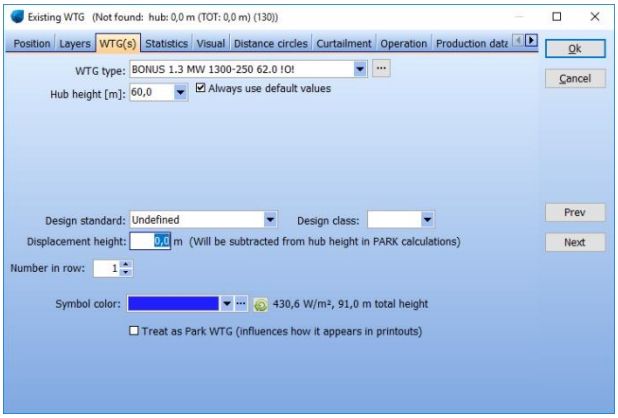
When adding the first "Existing WTG" on the map, the WTG selection form appears. To view all turbines in the Catalogue, choose **More WTGs** from the dropdown.



Then the wind turbine catalogue appears:

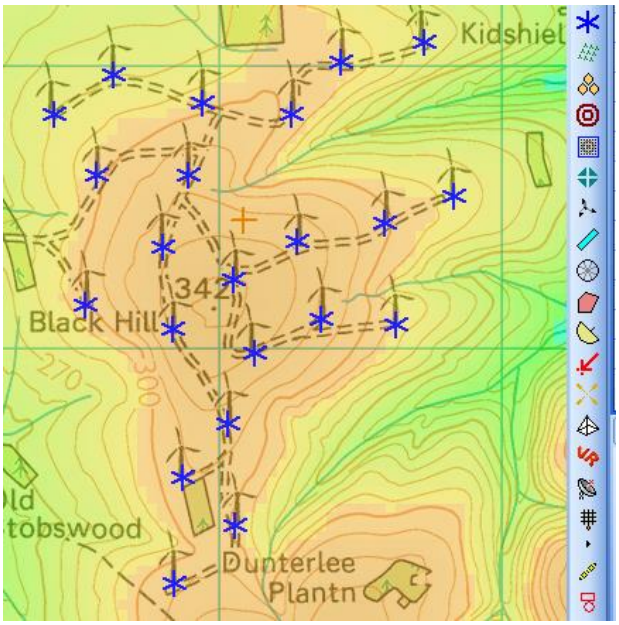


Choose **All** in left panel, then find the *BONUS 1.3 MW* (which is the actual turbine used in this project).



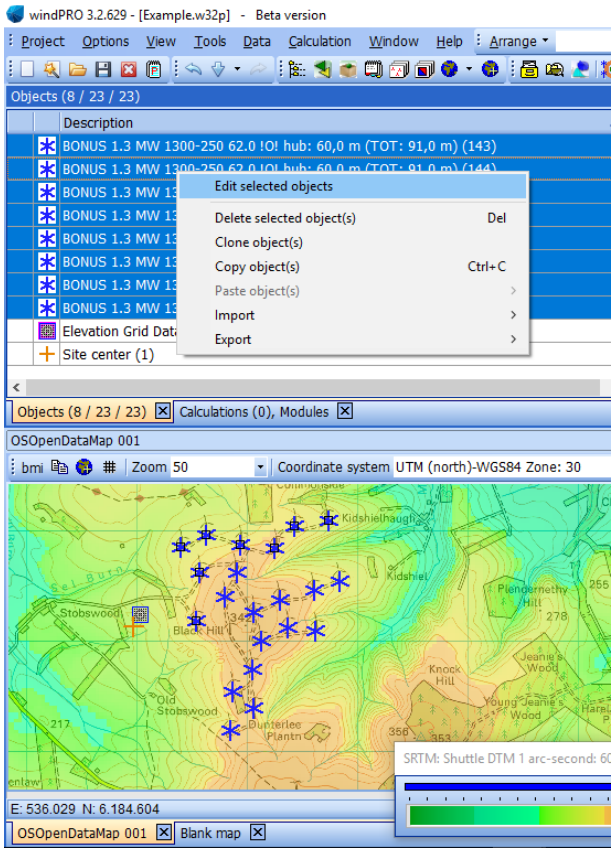
The default hub height for this turbine is 60 meters.

Click **Ok** and click on the map to add the remaining turbines. End with a right click:

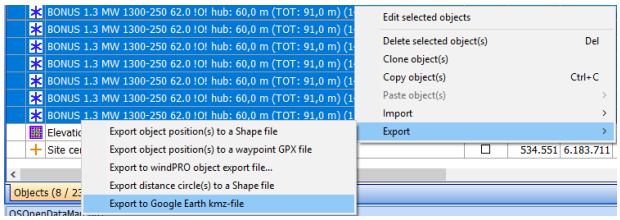


If one turbine is misplaced, simply click on it for selection, then drag with the mouse or use the arrow keys on your keyboard.

If you need to change the hub height or other properties for multiple turbines, simply select them in the object list like you select in Windows explorer, right-click and select **Edit selected objects**.



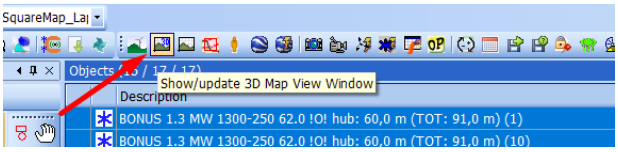
If you would like to see the selected turbines in Google Earth (if installed), simply right-click the selected turbine and select Export and Export to Google Earth kmz-file.



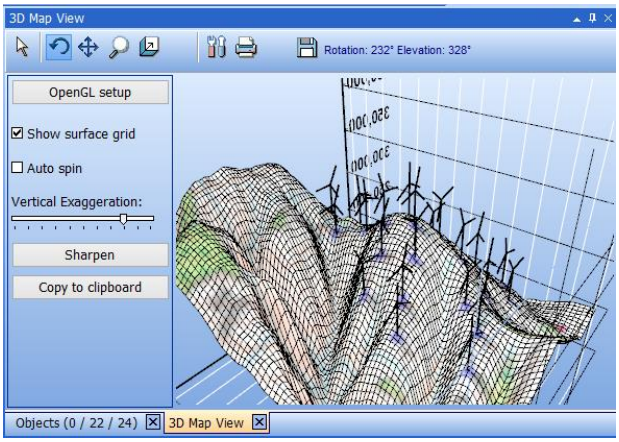
The turbines vizualized in Google Earth:

Here the turbine structures (foundations, roads etc.) can be seen on the google map, it is therefore easy to evaluate if the turbine positions are correct. You can also make them rotate in Google Earth by clicking the play button in the upper left corner:

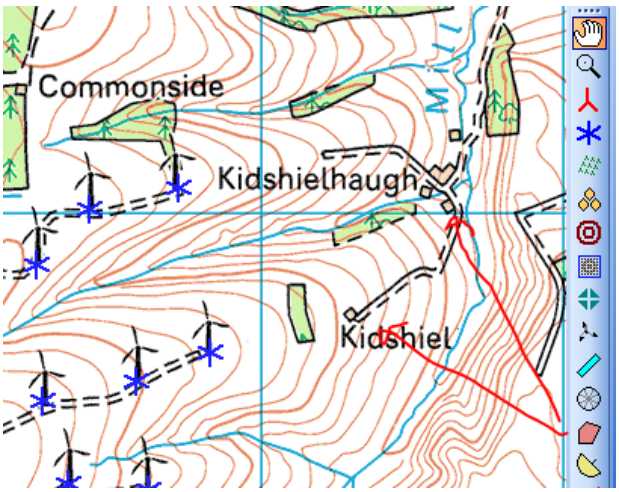
Another interesting view tool is the 3D viewer:



Here the site can be viewed exagerated and it is thereby possible to study how the terrain elevation differs at the different turbine positions:



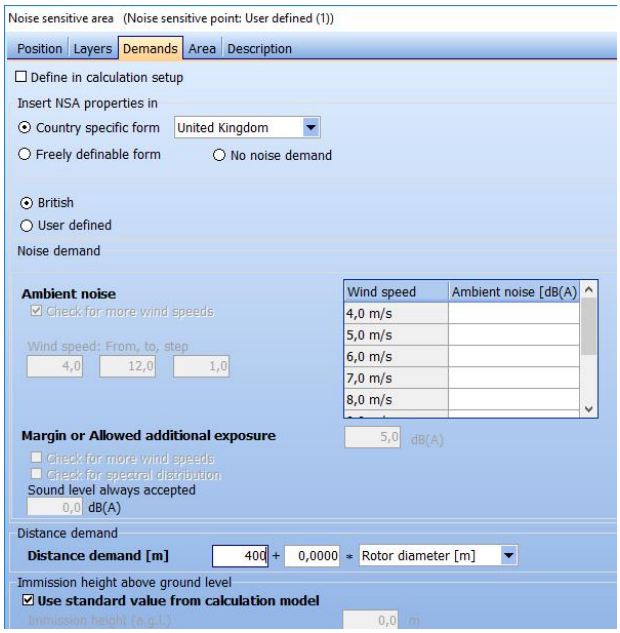
4. PREPARE FOR A CALCULATION



Most calculation types require extra data, most often entered by objects. This section will illustrate how to prepare for a noise calculation (DECIBEL module).

 The Noise Sensitive Area (NSA) object, holds the information on neighbors, such as coordinates and noise demands.

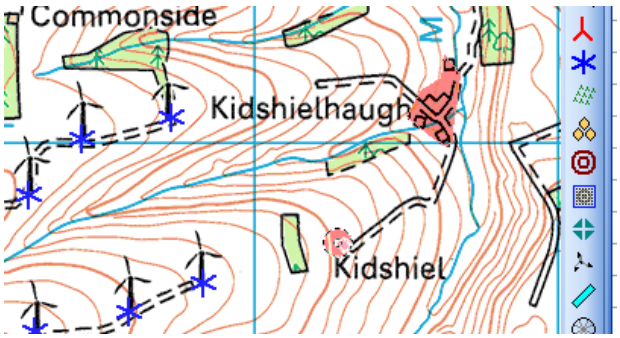
The NSA object can either be a point or an area. Click on the NSA object, then on map where the neighbor is located. If the neighbor is a point, double click on the map. If an area, clicking once, and then draw a polygon. When a NSA is established, this form appears:



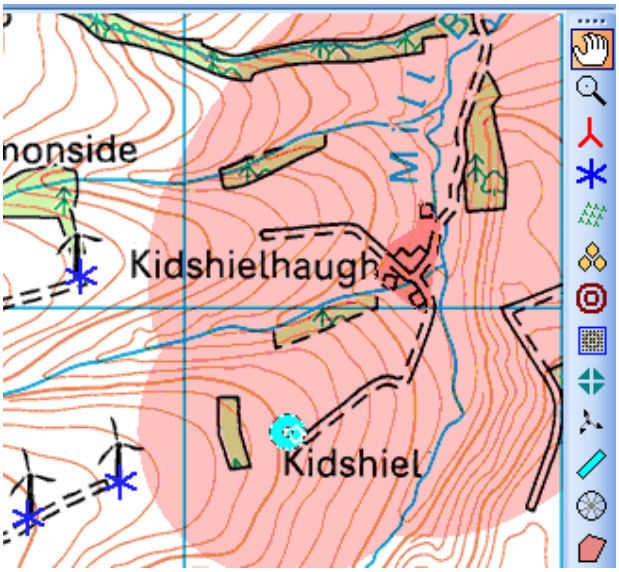
For several countries, specific regulations are available in windPRO, like here for the UK. These appear automatically based on the country of the site.

The main input needed here is the Ambient noise at a wind speed range from 4-12 m/s. Also distance demands can be entered.

First point at "Kidshield". Next the village is digitised.



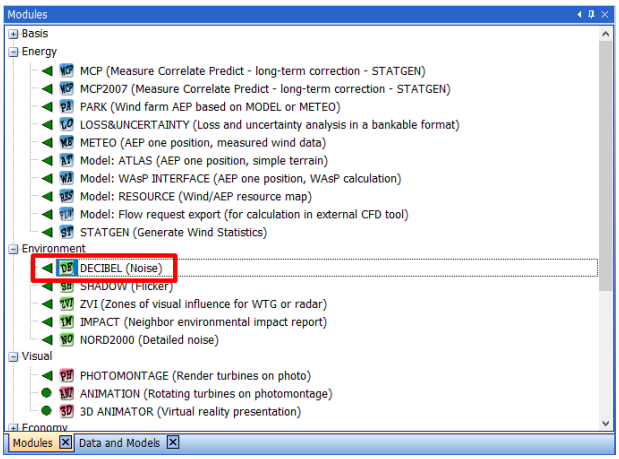
The point and the area is here seen in rosa colors. This can be edited.



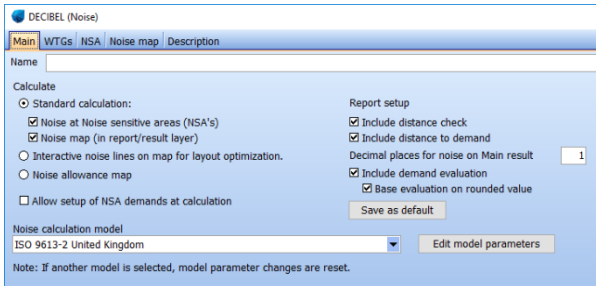
By setting a distance demand, this can be shown on the map. Here 400 m for the point and 600 m for the village is set. The point color can be changed to turquoise, so that neighbors can be grouped e.g. by noise demands.

5. PERFORM A CALCULATION

From the Modules window, a calculation can be started.

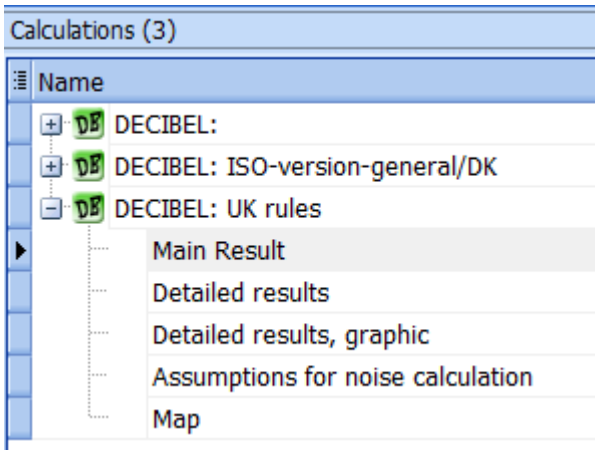


The green arrow shows that the module is licenced; non-licensed has yellow arrows. Double-click on the DECIBEL module and the calculation setup appears:

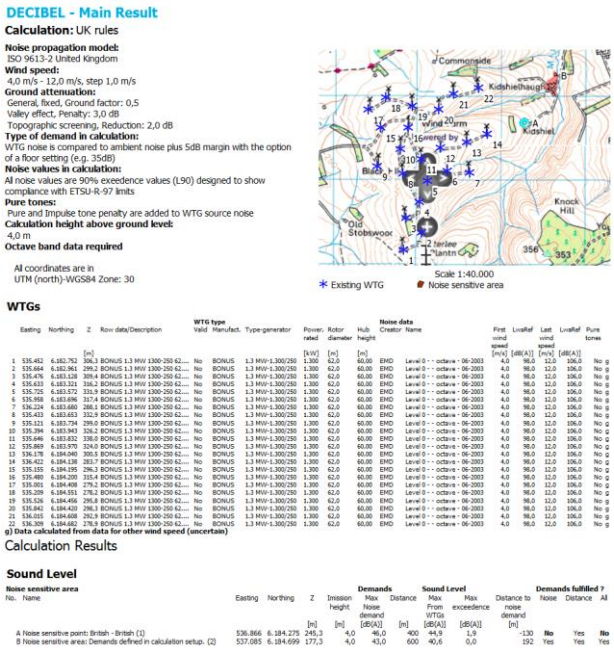


By default, everything is set up to be ready to go. When more different project designs or more specialized calculations are needed, there might be needs for special selections. Start the calculatation by clicking **OK**.

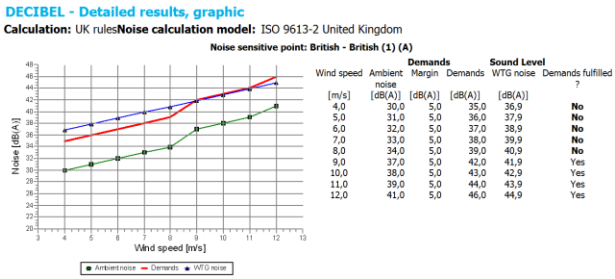
After calculation has ended, the "report tree" appears:



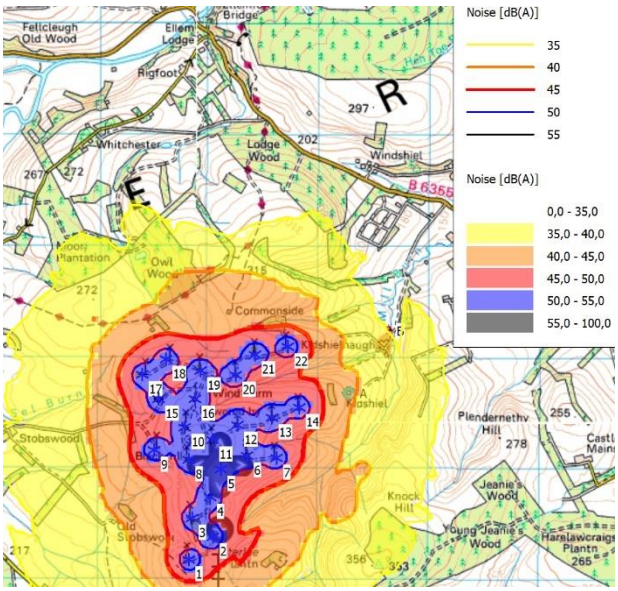
Double-clicking on e.g. **Main Results** opens the report:



Report: Part of the Main result page, with all the most important assumptions and results.



Report: Example on detailled results for the one of the neighbors calculated.



Report: Finally an example of a noise map at a specific wind speed.

The reports from windPRO are generelly accepted as documentation of environmental impact by the authorities, like the energy calculation reports are accepted by the investors.

With windPRO you will have the most comprehensive wind farm project development tool. The development is driven by active users and by highly experienced personal at EMD that has been in the wind business for several decades.

6. THE OBJECTS IN WINDPRO (DATA CONTAINERS)

	New WTG – creates a single WTG or row with equal spacing. Link to the comprehensive WTG catalogue, where all data for energy, noise, flicker, visualization and economic is/can be given.
	Existing WTG – actual energy production can be added and used to compare with calculated in e.g. Performance Check module. Existing WTGs has another status in calculation than new WTGs and is grouped separately in the PARK print out.
	Park Design – Only available with OPTIMIZE license. Create large wind farm layouts with multiple rows in strictly geometric patterns (for example off-shore). Together with the WTG area object, the Park design object can "auto-realize" WTGs limited to non-restricted areas.
	WTG Area – Creates boundaries for WTG projects. For each section design options can be set such as number of WTGs, installed power and minimum distance requirements. Used by OPTIMIZE and as multi-purpose object for defining sites.
	Line Object – makes it possible to digitize/edit contour lines on-screen for use as digital height contour lines, roughness lines etc. The Line Object can import lines from different databases/file formats.
	Elevation Grid Object – allows for importing irregular grid data (elevation) and comprehensive graphical representation of elevation data.
	Area Object – For digitizing areas (polygons), e.g. forests, water, cities, farmland. The data can be used for multiple purposes; export of roughness lines, for ZVI, forest model etc.
	Meteo Object – to import or enter measured wind data for generating wind statistics or directly for energy calculation based on the measured wind data. Plenty of data import and analysis features.
	WAsP Obstacle– to be used in energy calculations using WAsP as calculation engine.
	Site Data – input of local terrain (roughness etc.) and regional wind statistics. When WAsP is connected, it is possible to link digital height contour maps and roughness lines. Used for ATLAS, WAsP interface, RESOURCE and PARK).
	Noise Sensitive Area – for calculation of noise (DECIBEL or NORD2000) at specific positions (neighbors).
	Shadow Receptor – for calculation of flickering (SHADOW) at specific positions (neighbors).

	Camera Object – contains all data for a PHOTOMONTAGE, position and photo direction, the background photo, the camera parameters (focal length, film format), weather conditions etc.
	Control Point – to be used when calibrating camera models for PHOTOMONTAGE but also as multi-purpose object for reference points.
	3D-visualization Object – makes it possible to render figures drawn in SketchUp (*.DAE files) into a photomontage or 3D-animation.
	VR object (3D animation) – contains all data for a 3D-Animation, like size of area, sky background, surface texture etc.
	Radar object – for defining radar positions and restrictions by ZVI calculations
	e-Grid objects – Create electrical lines, bus bars, transformers and loads for electrical calculations.
	Ruler object – Create a measure tool for distance measurements. Basis for terrain profile.
	Shape tool – draw a rectangle or circle on the map as support for layout or measuring. The tools can be used for other features like the terrain profile.
T	Text object – Create a text on the background map.
	Road object – Create roads and calculate dig/fill and cost of roads. Optimization functions for minimizing costs included. Can also be used as an advanced measuring object and terrain profile viewer for fully flexible tracks.