



Feature list

What's new in windPRO 3.3

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PARK and LOSS & UNCERTAINTY

- Control the turbine’s operation modes with prioritized rules.
- Take wake effects into account and quantify losses.
- No double-counting of curtailment losses.
- Trace when an operation mode has been changed in the time series.
- Transfer losses to LOSS & UNCERTAINTY
- Handle new Geostrophic Shear parameters from WASP 12.1.
- Better handling of many CFD tiles in Scaler calculations.

New WTG (Siemens Gamesa SWT-2.625-120 2625 120.0 I0! hub: 85.1)

Position Layers WTG(s) Visual Distance circles **Curtailment**

Use	Priority	Name	Type	Action	Conditions
<input checked="" type="checkbox"/>	1	Bats	Bats	Shut down	SunRiseSet [
<input checked="" type="checkbox"/>	2	WSM	Wind sect	Level 3 - C	WS [10;75],

PARK - Production Analysis

WTG: 1 - Siemens Gamesa SWT-2.625-120 262
Directional Analysis

Sector		0 N	1 NNE
Gross	[MWh]	626.6	1,114.2
-Decrease due to curtailments	[MWh]	35.4	44.5
Bats	[MWh]	34.3	36.9
WSM	[MWh]	0.4	0.0
Heat Protection	[MWh]	0.8	7.5
-Decrease due to wake losses	[MWh]	86.4	0.0

- Assign specific Meteo objects to WTGs in Scaler calculations.
- WDC = TI x Factor can be user-defined in wake setup. Recommended factor for offshore: 0.67 for PARK1, and 0.8 for PARK2.

1: North Mast
 2: South Mast
 3: North East Mast

Link to nearest: ▾

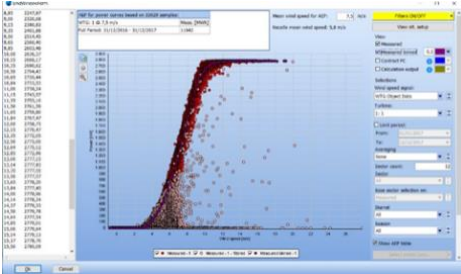
WTG	1	2	3
T24 T24	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
T26 T26	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
T27 T27	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

WDC = TI x factor

From model User defined

- Individual data sources can now be selected as input for each calculated loss in Loss & Uncertainty. The selections are documented in reports.

PERFORMANCE CHECK

- Perform loss evaluation of operating wind farms using SCADA data only. The industry standard method based on nacelle wind, with no flow or wake models involved.
 
- Import error codes from error log data and merge with production data.
- Identify sub-optimal performance when error codes are missing and establish USER error codes.
- Auto-generate power curves from error free data for each turbine based on nacelle wind. These can be used for loss calculation.
- Analyze losses to identify energy-expensive error codes in terms of frequency, lost production, mean time between failure and mean time to repair.
 - Generate potential production (100% availability) & export to Gross monthly production.
 - Long term correct potential production.
 - Predict future NET production from normalized production and losses (measured or entered).
 - Generate reports for future NET production including assumed future losses.
- Work on full dataset or only on concurrent data (saves RAM)
- Create/update PARK calculations directly within Performance Check tool improving the work flow of performing model validations. Options for power curve choice etc.

SITE COMPLIANCE

- Supports IEC 61400-1 Ed. 4 (2019)
- Certification pending

Design standard: IEC61400-1 ed. 4 (2019)
 WTG design class: II A

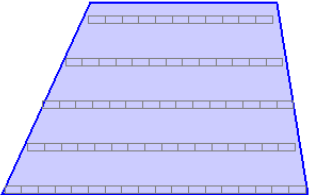

Result legend

OK	No WTGs exceed IEC limits
Caution	≥1 WTG exceed IEC limits - exceedance not considered critical
Critical	≥1 WTG exceed IEC limits - exceedance potentially critical

Checks and analyses	Include / Clear	Setup/Calculate	Result	Comment
A: Main IEC checks				
Terrain complexity	<input checked="" type="checkbox"/>	Edit	Caution	
Fatigue/Normal conditions	<input checked="" type="checkbox"/>	Edit	Critical	Check Design Load Case: DLC1.2* (+DLC3.1,DLC4.1,DLC6.4)
(a) Wind distribution	<input checked="" type="checkbox"/>	Edit	Caution	
(b) Effective turbulence	<input checked="" type="checkbox"/>	Edit	OK	
(c) Flow inclination	<input checked="" type="checkbox"/>	Edit	Caution	
(d) Wind shear	<input checked="" type="checkbox"/>	Edit	OK	
(e) Air density	<input checked="" type="checkbox"/>	Edit	OK	
Ultimate/Extreme conditions				
(a) Ambient 90% turbulence [NTM]	<input checked="" type="checkbox"/>	Edit	OK	
(b) Extreme wind	<input checked="" type="checkbox"/>	Edit	OK	
(c) Ambient extreme turbulence [ETM]	<input checked="" type="checkbox"/>	Edit	Critical	DLC1.3
(d) Max centre-wake 90% turbulence [ETM]	<input checked="" type="checkbox"/>	Edit	OK	
B: Other IEC checks & analysis				

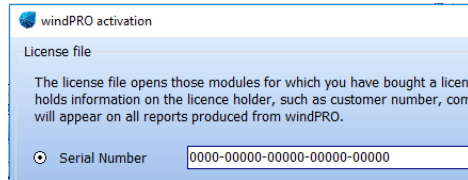
(Re)calculate all ID for objects: Description User label *) DLC1.2 is implemented in LOAD RESPONSE. DLCs 3.1,4.1,6.4 are less significant.

SOLAR PV - NEW

- Free module for all windPRO 3.3 users through 2019.
- Draw areas to fill with solar PV panels and exclusion areas
 
- Export layouts to shape or kmz files to use in e.g. Google Earth.
- Use PHOTOMONTAGE to create visualizations
 
- Import custom .dae models of solar panels and substructures.
- AEP and LCOE calculation will come in later versions

BASIS

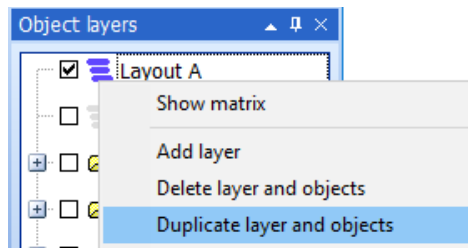
- Use a serial number to activate windPRO. Any updates to your license can be activated immediately in windPRO



- Draw a polygon or box to select and move multiple objects on the map.



- Duplicate layers and objects directly from Object layers list.



- Objects given a manual Z value are highlighted in the objects list, as this value is not used by WASP.

Objects (1 / 17 / 28)				
	Description	Z	Type	S
*	11054	300.0	Existing W	
*	11055	Height is set manually		

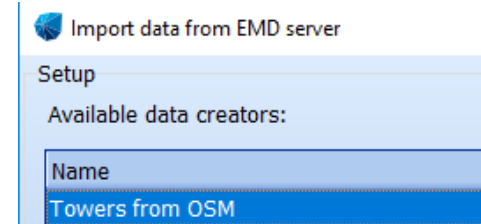
- WTG object improved:
 - Turbine selection list reduced to the most recent 12 turbines.
 - Multi-edit now supports setup of individual WTG noise data.
 - Multi-edit now shows the values of identical properties across identical WTGs.
 - Objects can be batch-deleted much quicker.

- Road lines can be exported to .shp and .kmz files, which can be loaded in e.g. Google Earth.



- New projects start with a Dynamic map pre-loaded.
- Multiple .kmz files can be imported at once for faster import of placemarks.
- Error logs can now always be viewed before sending error reports for data protection transparency.

- Import various towers from OpenStreetMap as Control Points to use as reference points.

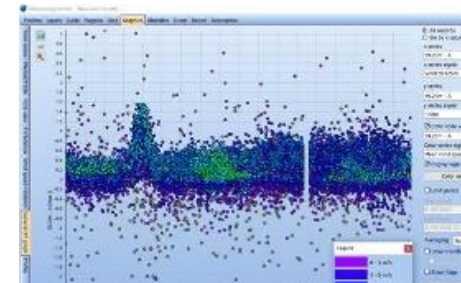


MCP – Measure-Correlate-Predict

- Use Scaler and select multiple meteo objects as long-term references to scale them to the point of the local measurements. Take the four nearest mesoscale datasets and downscale for long-term correction or simply take nearest Merra2 points and create distance weighted average (no terrain scaling)
- Compare to other references (LT Bias,) now included in "Evaluate long term reference":
 - Based on the selected reference and possible time limit (ref. period truncated to e.g. last 10 years), LT Bias is calculated against other chosen alternative reference series.
 - You get a value telling how much more/less gearing of your local data you would get with an alternative reference relative to the chosen reference.
 - The evaluation is given for the two situations:
 - 1) The chosen time period for your reference is used as long-term representative (100% wind energy index)
 - 2) The long-term reference's "native" period (typically 1993-2012 for EMD pre-run data sets) is used for the alternative.
 - This gives a clear picture of the consequences of the choice of reference as well as chosen period length – how much would the gearing change if an alternative reference was chosen.
- Displacement heights now handled.
- Neural network gives consistent values.
- STATGEN report available when creating a wind statistic output.
- St.Dev. on slope and intercept included in statistic output.
- Correction factor added when scaling local data, to handle situations where local data exceeds the reference.
- Option to resample reference from e.g. hourly to 10 min data to expand the number of datapoints for the model training.

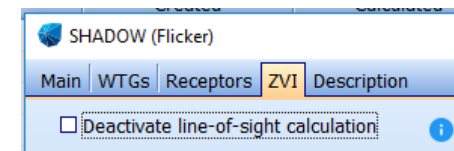
METEO – Wind Data Analysis

- Flags can be displayed in X-Y graph and wind speed relations.
- Flags handle crossing 360° and 0° better; comparison of co-located sensors is possible.
- Meteo objects created in MCP now have the type "From MCP".
- METEO export files show time zone information.
- A third dimension can be shown in X-Y graphs in Meteo object, Meteo Analyzer and also Performance Check.



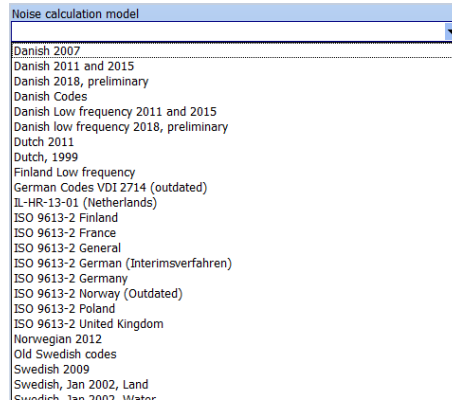
SHADOW - Environment

- SHADOW can now handle areas larger than 500.000 m².
- Line-of-sight calculation can be deactivated inside SHADOW to reduce calculation time.

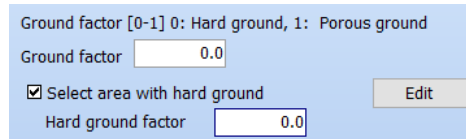


DECIBEL – Environment

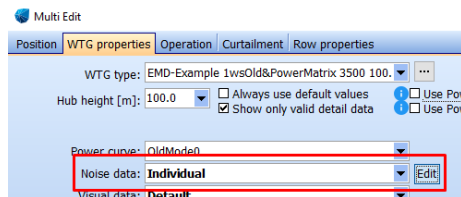
- Updated noise codes:
 - Noise reflections for Germany and general ISO 9613-2.
 - Dutch new 2018 wind distribution included.
 - New 2018 Danish noise model.



- Hard ground factor can be adjusted, instead of just locking it to 0.



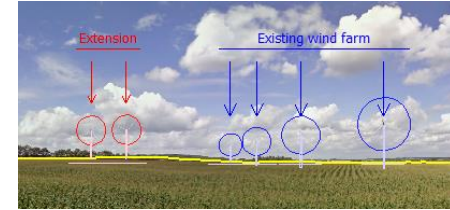
- Individual WTG noise data sets can be set up when multi-editing WTGs.



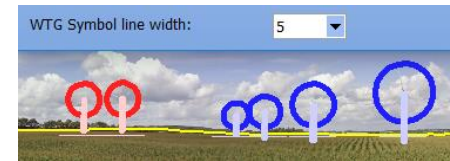
- The resulting octave band distribution can be exported to Result to File.
- DE Interimsverfahren: Pure tone penalty now shown in detailed results.

PHOTOMONTAGE – Visualization

- Display surrounding wind farms with lines which can be user-styled.



- Possibility of adjusting the thickness of the Symbol Layer rotors of WTGs.



- Photomontage full size mode now allows opening of all image sizes – even those that are too big.
- Pan angle is now displayed relative to true north independent of selected coordinate system.

Miscellaneous

- Checks for external files have been improved.
- Faster recovery if network access to "last used" files is lost.
- Old projects created before windPRO 2.7 will be updated to use the latest coordinate system engine when saved in 3.3.
- wpStart.exe has been integrated with windpro.exe.