



## EMD webinar:

### New Energy Calculation Method in windPRO 3.0 17/03-2015

EMD International A/S

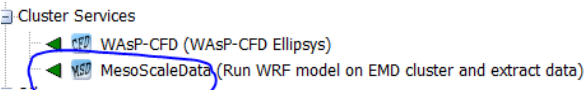
Niels Jernesvej 10

9220 Aalborg Ø, DENMARK

tel.: +45 9635 4444 fax: +45 9635 4446

e-mail: emd@emd.dk web: www.emd.dk

### Questions submitted during the webinars

Questions	Answers
convex data is available for country like India? If yes, what is annual subscription price?	<p>EMD-ConWx covers only Europe and is a subscription. EMD-WRF on the other hand has global coverage and is run on-demand via the cluster services.</p>  <p>A 10 year time series will cost 120 credits at 2€ =240€. The more credits you buy the cheaper they are.</p>
does the current version of windpro have implement the uncertainty estimation if we calculate weibull vs. time series -based energy in the "loss and uncertainty module" ?	No, there is no calculation on the uncertainty on the Weibull fit.
How is the wind speed calculated after wake?	That depends on the model. With N.O.Jensen the wake deficit from each turbine is calculated and combined. The results in a relative wind speed reduction, which is applied to the free wind speed.
How long should be the time series to have a reliable production assessment?	We recommend a 20 year period, though shorter periods may be enough in regions with very little long term variation
Is ConWX mesoscale data covers Ukraine?	Only the very western part of Ukraine. However on demand data covers the entire globe (see above)
Is it recommended to shorten the used measurement data to full years or is this done automatically?	It is recommended to reduce the period to full years.
Is there an evaluation of the uncertainty linked to the use of this new process (LT correction, scale, timeserie...)	Only as already implemented in the Loss&Uncertainty calculation. We are not automatically calculating uncertainty when using the model.



## EMD webinar:

### New Energy Calculation Method in windPRO 3.0 17/03-2015

EMD International A/S

Niels Jernesvej 10

9220 Aalborg Ø, DENMARK

tel.: +45 9635 4444 fax: +45 9635 4446

e-mail: emd@emd.dk web: www.emd.dk

Is WASP shear automatically fitted to ConWX shear??	We try to avoid using WASP shear by using the shear from the EMD/ConWx data. The starting point for the WASP transformation is at hub height so no vertical extrapolation from WASP is necessary.
My questions would be: (1) when will the user manual be available for v3.0? and (2) is the new calculation (using time series and removing errors due to Weibull fit) giving the same results as GH WindFarmer? Thanks	(1) The sections of the manual are published through our homepage as they are completed. We have to have it all ready in one or two month. (2) We have not checked. Since we are addressing the same problem we are likely to get a similar result.
What happens during scaling? How is it performed?	WASP (or WASP-CFD) calculates speed-ups and rotation for each direction and wind speed. These are applied to the source time series for each calculation point.
What happens if there is missing data in the mast time series due to icing, or sensor malfunction? Does PARK try to fill in those periods?	No, they will leave a gap in the time series. However WindPRO knows data are missing and takes that into account when calculating annual or monthly means.
Which Windpro Module do you need for having access to the online-data?	Meteo or MCP. For EMD/ConWx data you need an annual subscription or to download them on-demand (see above)
What is the difference in estimation in various wake models available in windpro 3.0?	The models themselves are the same as in 2.9. The large wind farm models will increase wakes a few percent depending on the wind farm size. Using turbulence data will not change much on the annual result if a proper annual average WDC is chosen, but may give large differences over short periods.



## EMD webinar:

### New Energy Calculation Method in windPRO 3.0 17/03-2015

EMD International A/S

Niels Jernesvej 10

9220 Aalborg Ø, DENMARK

tel.: +45 9635 4444 fax: +45 9635 4446

e-mail: emd@emd.dk web: www.emd.dk

<p>Hi. Regarding the Weibull distribution, they usually tend to get more accurate with more time observed. So if you can under/overestimate in a period of 1 year, over the course of 10 years weibull distribution usually gives a good result. So what is the advantage of time series calculation exactly, especially considering the sensitivity of the calculation to the outliers in the data? Does WindPro use WAsPs Emergent Weibull curves which are more valid for cases with several main wind directions?</p>	<p>We have observed that even very long observation periods fail to produce a perfect Weibull fit. There is a skewness in the data, which we have tried to compensate through an energy conservation fit, but we still find an error in the fitting. This is avoided with time series. We are not using WAsP Emergent Weibull curves</p>
<p>Is it possible to do a crossprediction comparison between the 2 proposed methods (Weibull vs Timeseries)?</p>	<p>You can calculate using both methods to test for errors.</p>
<p>In which situations do you think this new method could be convenient compared with the previous one?</p>	<p>Most obviously in regions with poor Weibull fit, but also where the time domain is important. The result is a historic production record that can be compared to actual production and measurements and can be used in tariff calculations.</p>
<p>Is it possible to calculate AEP of the wind farm using wind data from the WTGS accurately using this method?</p>	<p>You can in principle use any source of wind data. A method we have tested extensively is to use wind speed from SCADA data to calibrate EMD/ConWx data in order to predict new wind farms.</p>
<p>Can I use more than one measurement mast in a Time Series based calculation?</p>	<p>Yes.</p>





## EMD webinar:

### New Energy Calculation Method in windPRO 3.0 17/03-2015

## EMD International A/S

Niels Jernesvej 10

9220 Aalborg Ø, DENMARK

tel.: +45 9635 4444

fax: +45 9635 4446

e-mail: emd@emd.dk

web: www.emd.dk

<p>Can we use other Mesoscale data (like Merra) to run the PARK calculation using Mesoscale scaler? Thomas mentioned the scaler uses the mesoscale and microscale terrain data.</p>	<p>Yes, but you will lose a number of advantages. You cannot use mesoscale shear and none of the other datasets come with a terrain description. That means that you have to treat it as a measurement mast one the ground. Your microscale terrain description will be used on the measurement side of the transfer and that might require massive postscaling or cause outright errors. In that case it is probably better to use the mesoscale data as input in a MCP calculation and produce a time series from that as input for the scaling.</p>
<p>Do generated long term time series substitute other LT MCP methods like for example WindIndex Method?</p>	<p>We are not removing anything. But Wind Index and Weibull Scale do not produce a time series, only a wind statistics, and can therefore not be used as input to the scaler.</p>
<p>What happen if meso scale data and site data doesn't correlate well (referred to meteo analyzer)?</p>	<p>Then the correction factors may turn absurd and cause error. It is a first criteria for any use of reference data sets that they correlate at least decently. Otherwise it is best not to use them.</p>
<p>If I use temperature based PC correction, what's the recommended length of this series. Does it work reliable with less then one year of data?</p>	<p>It is best to use entire years. Keep in mind that if you are using a different timeseries for temperature than your primary one you will only be using the overlapping period in the calculation.</p>
<p>Is there a way to obtain the displacement heights calculated by Windpro for each turbine?</p>	<p>it is a new page in the report and can also be exported in the "result to file" option and it's sectorwise as well.</p>
<p>Will the displacement height calculation also be available for "traditional" WASP-calculations?</p>	<p>yes, it is available for all types of PARK calculations</p>