WINDAR PHOTONICS

# Wind Scotland workshop

## 20-21 October, 2026 in Edinburgh

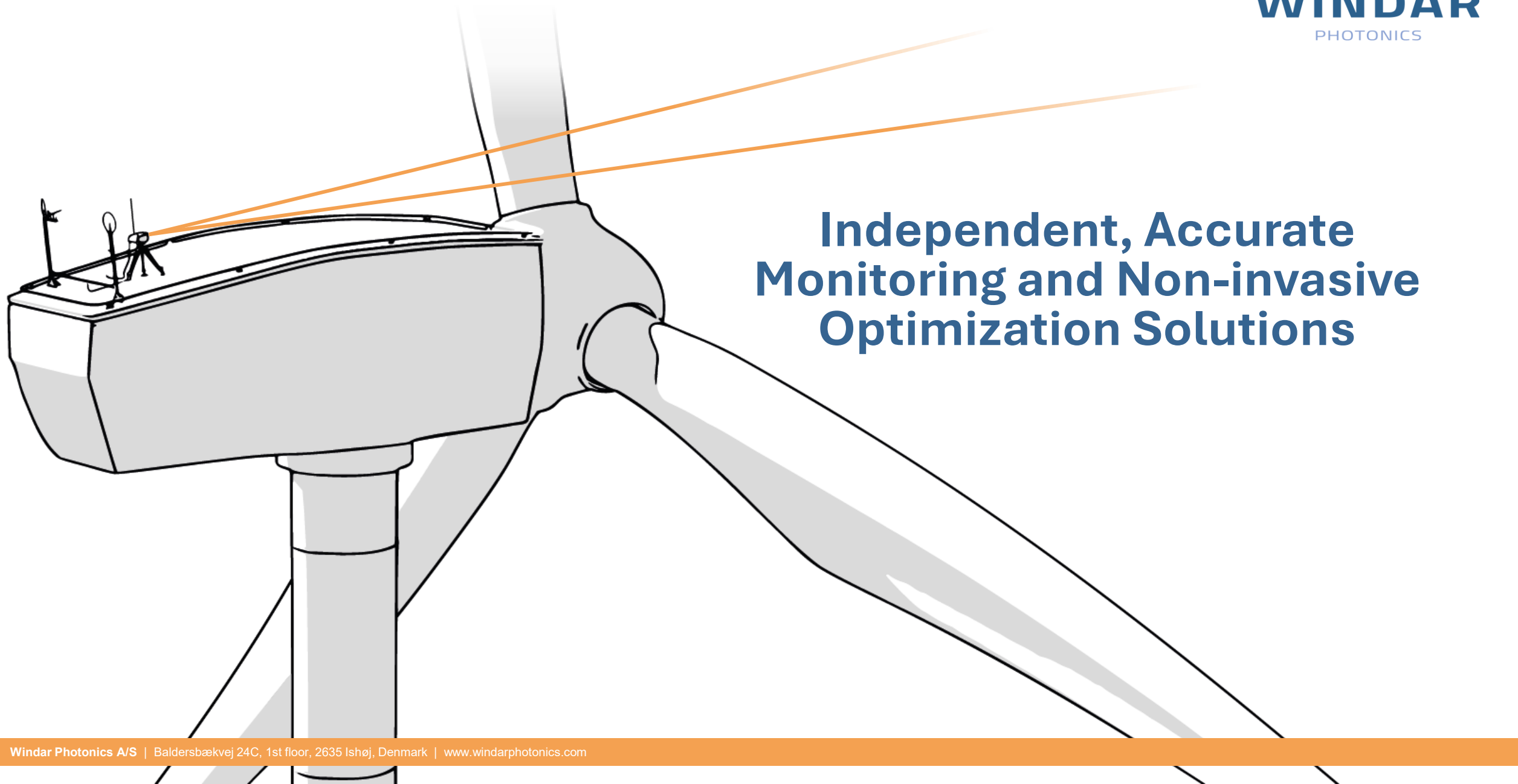
# Turbine wind sensors are inherently inaccurate




## Turbine sensors are severely disturbed by the rotor wake

- The rotor wake induces large fluctuations in the nacelle wind measurement, causing inherent bias and inaccuracy
- Ad-hoc calibrations of turbine wind sensors are used to correct for the inadequate measurement
- The wind measure changes depending on the turbine mode

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# Independent, Accurate Monitoring and Non-invasive Optimization Solutions

# WINDEYE™ Looks ahead

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## Unbiased Wind Data because it is measured in front of the rotor in clean air with laser accuracy

- Wind speed
- Wind direction
- True turbulence intensity
- Wake effect intensity
- Other derived parameters, such as RPM, air density

# WINDEYE™ Simple and accurate

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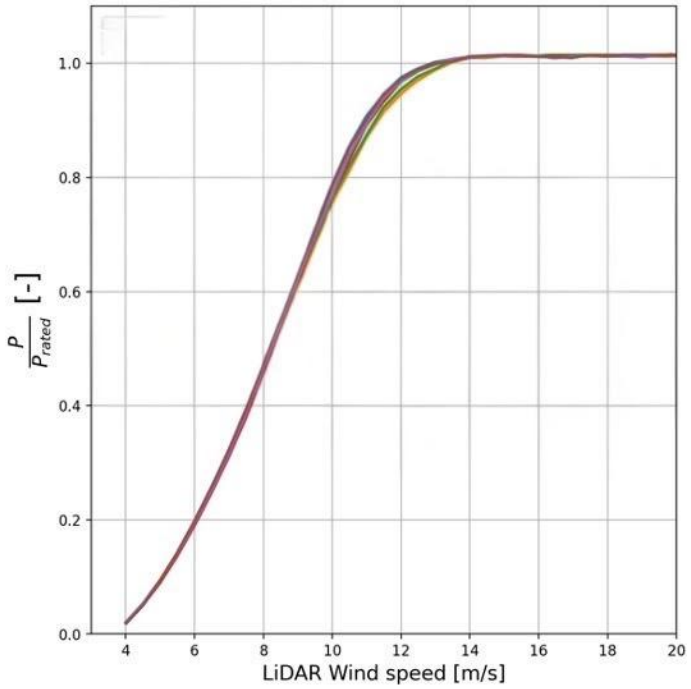

- WindEye provides the unbiased wind information and adds intelligent in-depth wind analysis to your independent data
- Minute differences can be detected
- Boost AEP 1 to 4% by adding Plug'n'Play WindTimizer integration technology, for improved turbine control (No need for modifications)
- More than 1,600 wind turbines installed with the WindEye Optimisation Solution

## A unique solution powering accuracy that matters

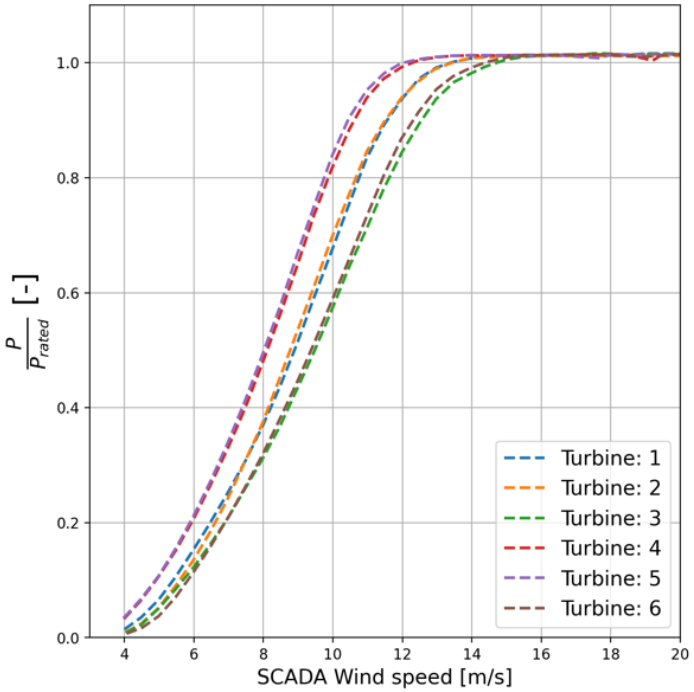
# If you do not know the true windspeed…

## …how can you identify performance changes ?

WindEye power curves collapse, independent, accurate and consistent over time




Turbine power curves do not collapse, and calibration change over time, so accuracy is limited



# Turbine wind speed measurement (SCADA)…

## …can even lead to erroneous conclusions:

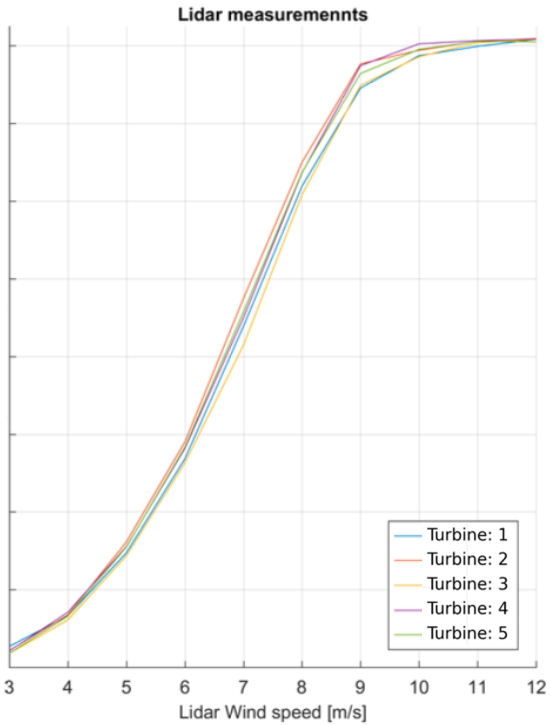
Turbine 3 (yellow) underperforms

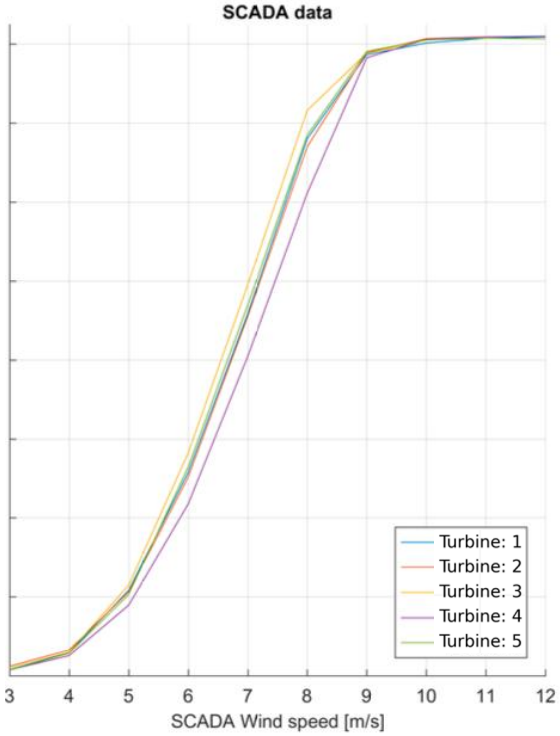
Turbine 4 (purple) performs

?

Turbine 3 (yellow) overperforms

Turbine 4 (purple) underperforms



# NEXUS TPM

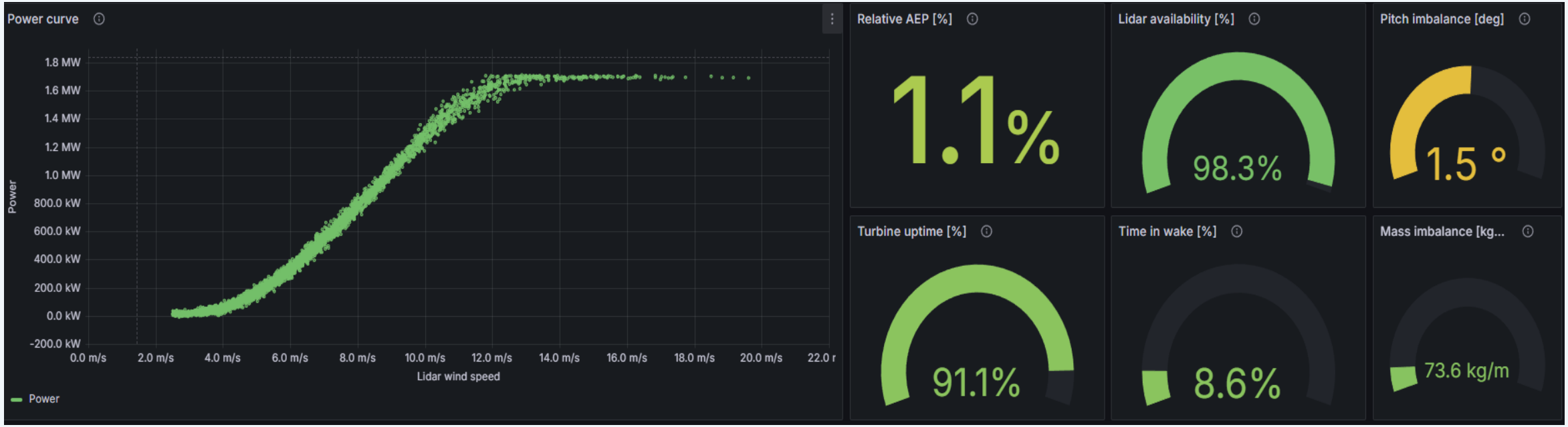
NEXUS TPM software platform monitors performance

***Data is independent from SCADA and OEM***
*(but can fuse with SCADA data)*

# NEXUS TPM Fleet Dashboard – Overview

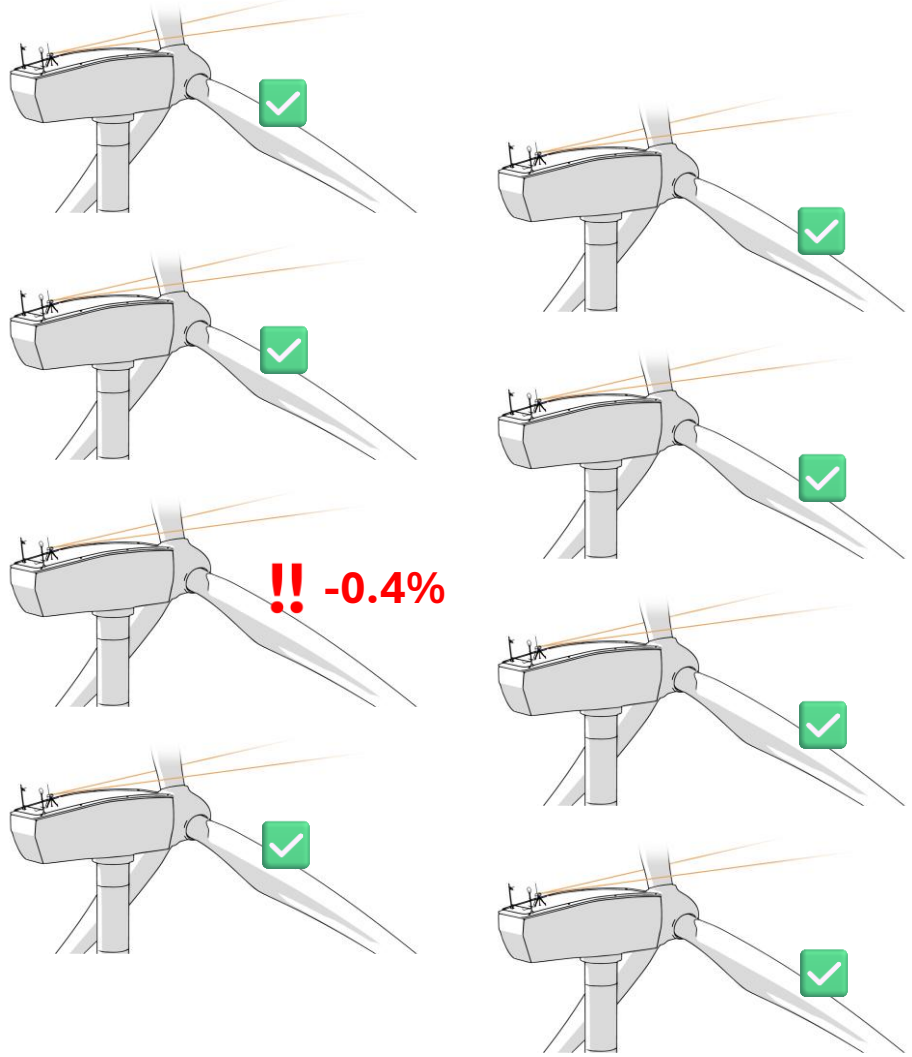
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- Windar NexusTPM monitoring platform applies intelligent wind information to turbine performance monitoring.
- Smart wake detection and other intelligent wind data enables accurate evaluation



# The power of monitoring all assets accurately

- With accurate wind speed measured at each wind turbine, each turbine can be monitored simultaneously far beyond today's best practice
- If turbine is equipped with a WindEye, you can assess each turbine continuously, adding firm performance knowledge for each asset, even within the warranty period of new turbines
- Similarly, by adding WindEye to all turbines, complete assessment is available across the farm. There is no need to wait for tedious side-by-side test or 6 months long IEC compliant power curve measurement, when you already know which turbine needs to be addressed



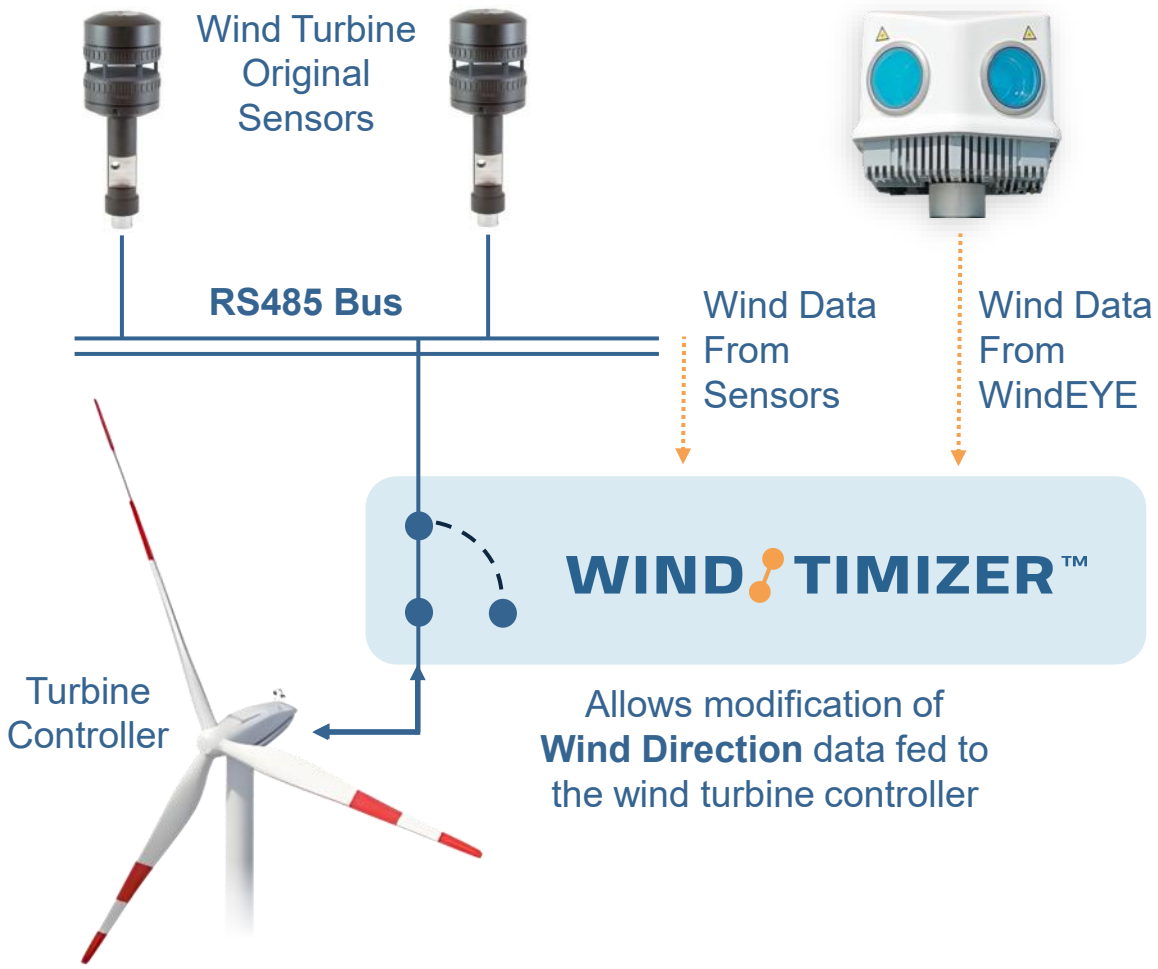
# WINDTIMIZER™

## Take control and increase AEP and Reliability

Customized control strategy, independent of turbine controller

# WINDTIMIZER™

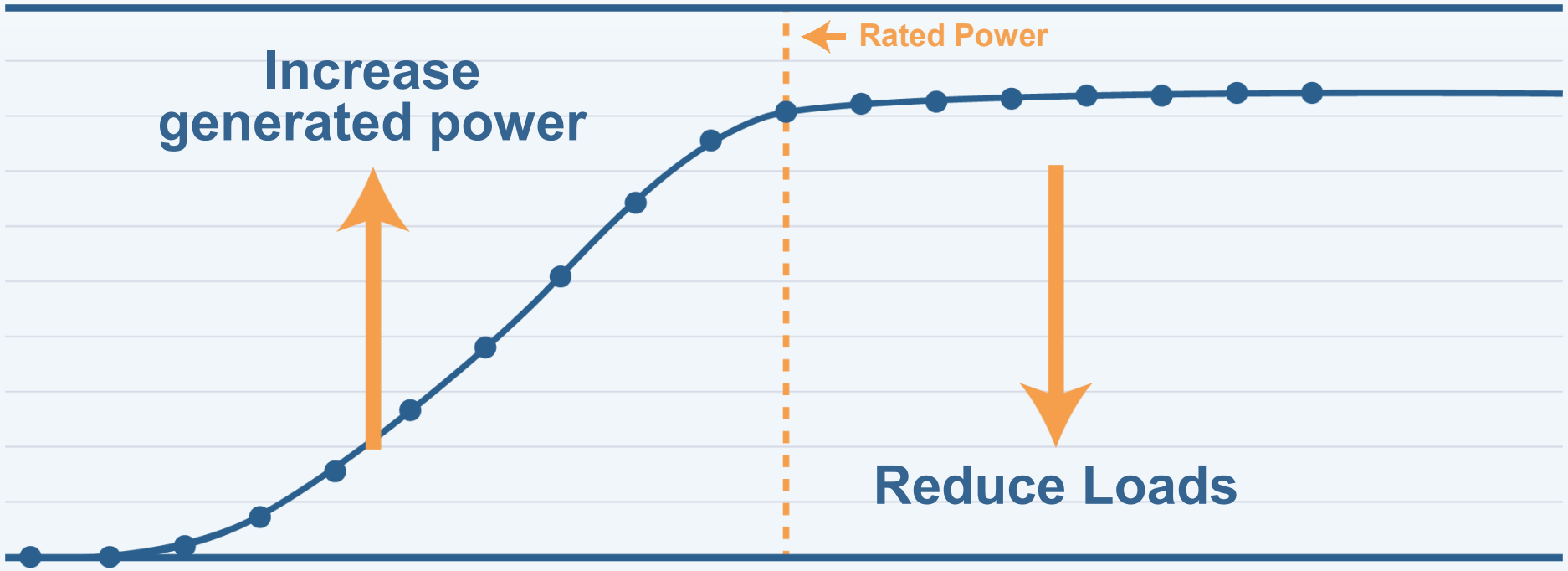
WINDAR PHOTONICS




## Unique wind turbine yaw optimization

- Realign any given wind turbine to the incoming wind direction and increase power production
- Misalign wind turbines above rated wind speed to alleviate critical loads
- Does not require modification of the turbine controller
- The WindTimizer automatically interfaces with most turbine sensors on the market

# WindEye Optimisation Solutions




## Below rated power

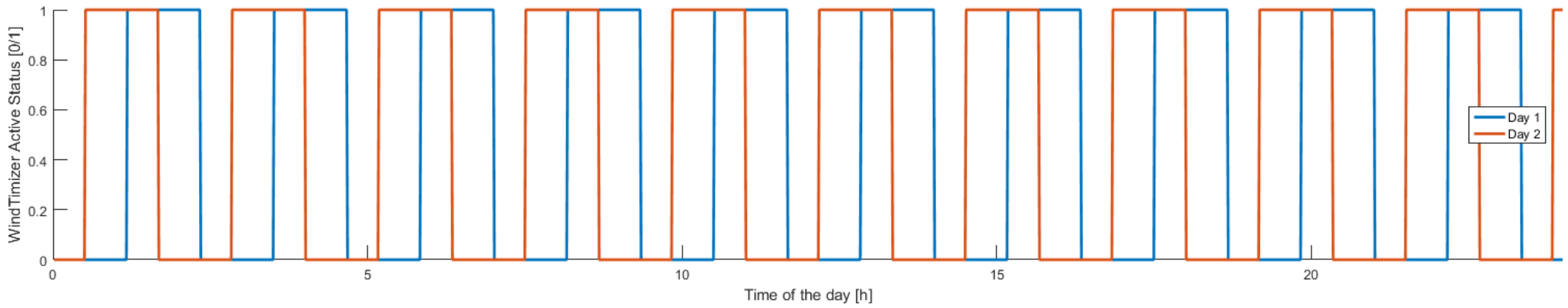
Aligning the wind turbine to incoming wind flow direction in order to increase power production

## Above rated power

With precise wind measurements, custom tailored controls signals can reduce wind turbine loads without sacrificing power production

# Toggling Verification

- Toggling campaign enables tracking of power gain from WindTimizer activation
- Automatically toggles WindTimizer from ON to OFF every 70 minutes, in order to have 1:1 comparison
- After 3 months test campaign, power gains can be derived accurately



# +1600 Installations worldwide

## Shall we add some more in in the UK?



**Birol Yosul, VP Sales Europe**
byo@windarphotonics.com
+49 15563 735170

Accurate, independent, and reliable wind data yields better results

