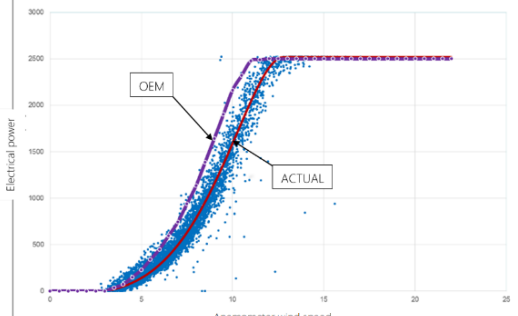
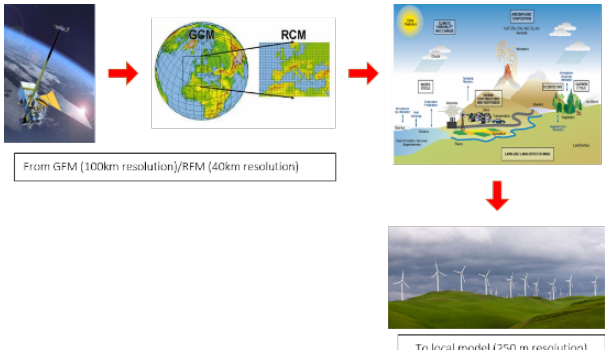
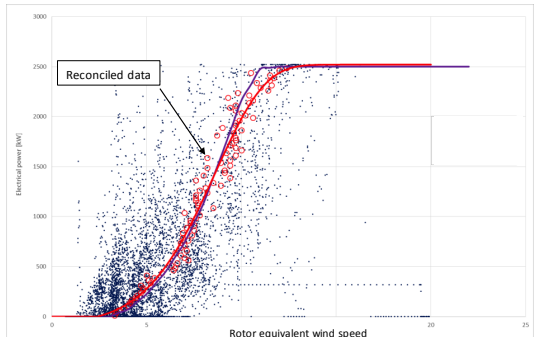


Project	Wind farm performance assessment through hybrid modelling
Industry / Asset	Wind Turbine
Country	France
Year	2017

The Context	Pictures / Graphs
<p>The wind farm owner wanted to optimize his production. An assessment of the power curve is required to identify the possible improvements, but in most cases this cannot be achieved by using the SCADA data only as there is often an incorrect calibration or a wrongly referenced wind direction.</p>	 <p>Identification of a potential underperformance of a turbine compared to the OEM specifications</p>
<p>Our Solution</p>	<p>1. <u>Detection of anomaly</u> P4A introduced its hybrid method using weather data coming from the meteorological model to compensate the inconsistency in the SCADA data and thereby increase the accuracy of anomaly detection</p>
<p>2. <u>Diagnosis</u> Identification of the root cause of the underperformance through cross-analysis of multiple performance metrics. Our hybrid model diagnosed an absolute error of nacelle alignment of $\sim 10^\circ$</p>	 <p>From GCM (100km resolution)/RCM (40km resolution)</p> <p>To local model (250 m resolution)</p>
<p>3. <u>Prognosis</u> Potential production increase of $\sim 5\%$/year</p>	<p>Detection of an over/underestimation of the nacelle anemometer</p>
<p>4. <u>Intelligence: Production Optimization</u> Short term action: Assessment and correction of underperforming turbines</p>	 <p>Power curve measurement using ERAI-based local meteorological data as reconstructed by MAESTRO Wind and in correlation with the SCADA data</p>
<p>The Benefits</p>	<p>Average possible increase of revenue thanks to production gain: € 21K/year*</p> <p><small>*Result depending of electricity price & wind conditions</small></p>
<ul style="list-style-type: none"> - A more robust model giving a more absolute view - Cheaper and quicker than LIDAR - Easy monitoring of result and evolution 	
<p>The ROI</p>	