

# Using Operational Data to Optimise Assets

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## Abstract

While performance is often measured by just looking at budgeted outputs, availability and occasionally power curves, a more in depth analysis of the SCADA data can reveal trends and opportunities for optimisation that might otherwise be passed by.

By delving more deeply into the available SCADA data, conclusions can be drawn to highlight where best to focus efforts to improve performance. For example, following the data analysis:

- Endemic problems such as pitch or electrical failures can be detected and hence pursued with the OEM
- Targeted forestry felling can be justified
- Controller and hardware improvements can be applied
- Unnecessary curtailments or operational modes can be removed
- And uprating or life extension considered, but only where appropriate

Over 1 GW of capacity has already benefited from these techniques. The lessons learnt and experiences gained are shared here to benefit the wider community.

## Key Findings

Results from a number of studies indicate

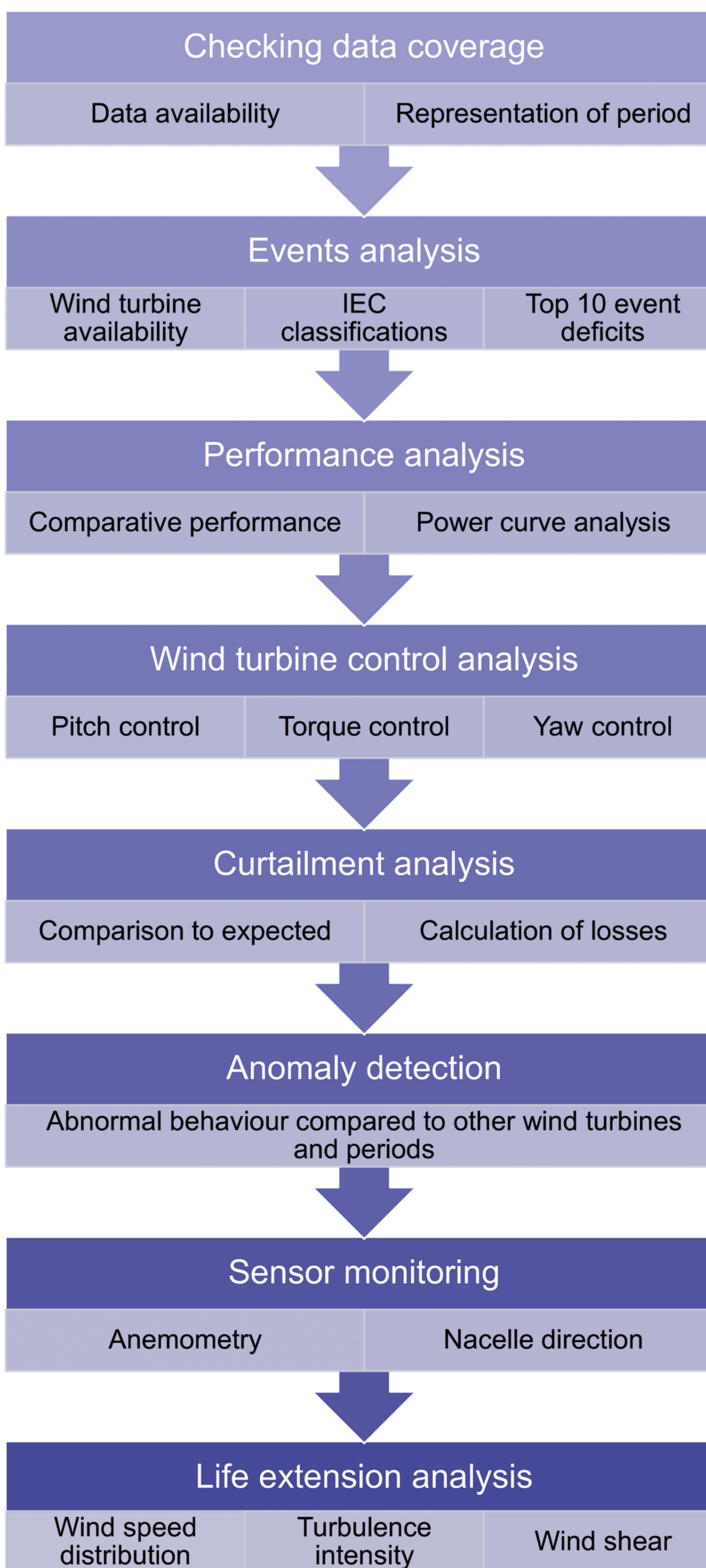
- Almost all wind farms can be improved, even those being carefully monitored and that are performing well compared to their budget. AEP gains of 2-6% are typically achievable on the average wind farm or portfolio
- There is a prevalence of anemometry issues that make performance as measured using power curves unreliable. Indeed many wind turbines appear to over perform (even beyond the Betz limit!) when just looking at power curves. A basic analysis can therefore be misleading
- Many sites have wind conditions that would permit life extension to take place. Few sites however have been properly analysed to determine the financial benefits of life extension, which is important to consider early on and can benefit refinancing or M&A's
- Icing is often reducing wind turbine output and not being captured in the events. Such losses need better estimation, as they impact the financial assessment for ice mitigation solutions, including hardware and software options
- Wind turbine nacelle direction and wind direction measurements are often poorly calibrated, and these impact on any wind sector management plans
- Some sites have unnecessarily strict curtailment strategies in place. These could be relaxed through better wind farm control and can often substantially increase output

## Our Experience

Different sites can have markedly different issues affecting performance. For some sites where we were asked to investigate a specific issue, through the analysis we found they were suffering from other, sometimes more significant problems, as well. It is therefore important when conducting the analysis to take a holistic approach, and in particular consider optimisation directly, rather than just whether the wind farm is performing satisfactorily.

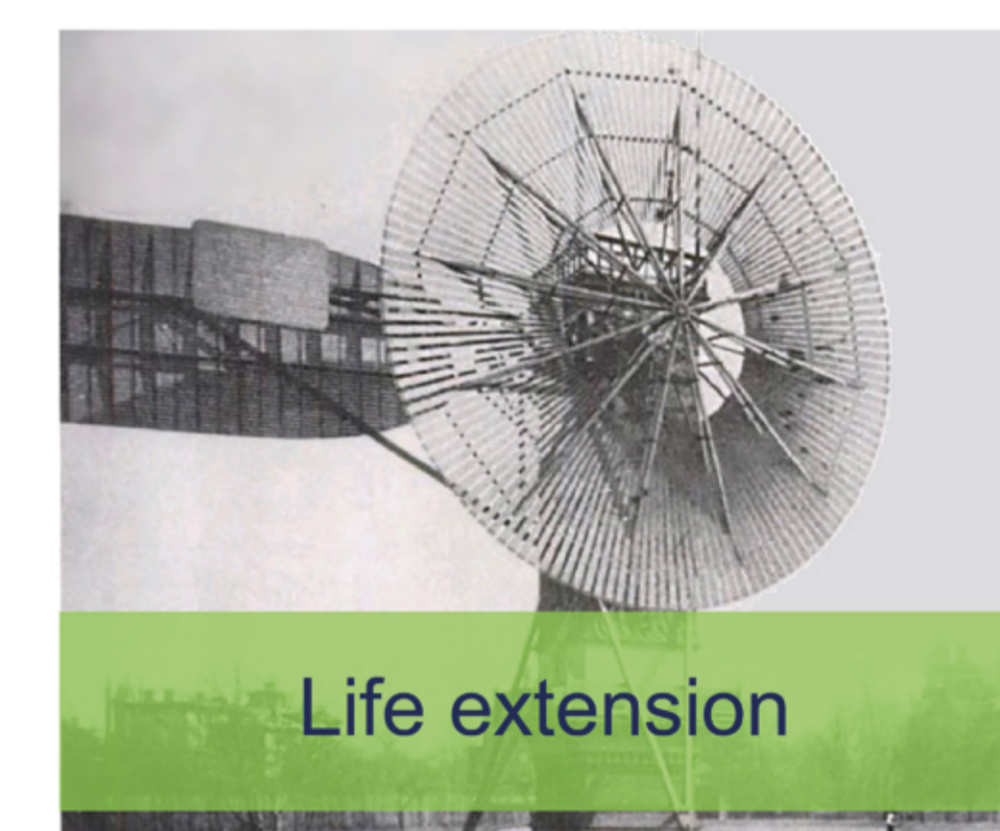
## Using Operational Data

The optimisation studies involve a technical analysis of all available data in order to determine the most cost effective solutions for optimisation. This is achieved following a rigorous process and utilising custom-made software. The use of operational SCADA data is beneficial for all of the following.



## Optimising Assets

Following the data analysis it is possible to identify areas of improvement and quantify the value of such changes. The identification of these potential improvements and their evaluation requires experience and expertise. A sample of recommendations made are shown below.



## Conclusions

Analysing operational data is essential in determining optimisation potential of wind assets. This ensures that the best value for money option is chosen.

Findings also suggest that all wind farms can benefit from optimisation, even those meeting their budget and that are being closely monitored. Improvements of between 2 and 6% are typical, but can be significantly greater. It should also be noted that there is not a one size fits all problem or solution.

The commercial gain associated with wind farm optimisation is significant for project owners and can also be used as a tool to support Merger and Acquisition (M&A) activity or refinancing.

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and check out PO.026 for a more holistic overview of optimisation

