



Avoiding underperformance, maximizing availability

Online performance monitoring of wind turbines and photovoltaic plants

MEASURING AND COMPARING PERFORMANCE

Optimizing the performance of renewable energy sources such as wind turbines and photovoltaic (PV) plants requires permanent monitoring. Normally, manufacturers supply tools to monitor the performance of their specific types of equipment. However, is the manufacturer's monitoring tool sufficiently neutral and reliable? And what if your wind farm or solar field combines various types of technologies and brands? Can you also compare the performance of your site to that of others in your portfolio or even those outside the Group?

UNIVERSAL TOOL COVERING ANY TYPE OF WIND TURBINE OR PV PLANT

Laborelec has developed a monitoring tool that detects a drop in the performance of an entire site or of an individual wind turbine or PV unit, regardless of brand and technology.

> Boosting profitability by tackling underperformance

The monitoring tool calculates the actual performance of a wind turbine or PV plant and then compares it to the performance data supplied by the manufacturer. This evaluation identifies even minor inefficiencies in the system. Using this insight, you can plan the appropriate corrective actions to improve performance.

> Maximizing availability by calculating production loss

Various kinds of interference prevent wind turbines and PV plants from performing optimally. For instance, wind turbines are sometimes limited in power or completely stopped because of ice build-up, stroboscopic effects, or noise levels. In the case of a PV plant, a broken down inverter can prevent the plant from functioning properly. Laborelec's monitoring tool enables you to easily determine the resulting production losses and establish your site's profitability accordingly. You can also use this information to evaluate solutions that maximize your equipment's availability.

PERFORMANCE VALUE CHAIN



Laborelec's performance monitoring services focus on data processing and analysis, as well as on follow-up support and advice.

> Cutting costs through optimal maintenance planning

The monitoring tool rapidly identifies the slightest performance issue. It also pinpoints the specific location of the problem in a string of solar panels, for example. With this information, you can effectively initiate the appropriate maintenance actions at a very early stage. In this way, you can prevent the issue from becoming an irreversible and costly problem.

> Increasing efficiency through benchmarking

How does your site perform compared to similar sites in other parts of the world? Laborelec's monitoring tool allows you to benchmark your specific site against those of your peers. This information sharing can reveal system inefficiencies and lead to the implementation of best practices.

From tuning and implementation to follow-up and advice

Laborelec helps operators configure and install this user-friendly tool. Once installed, the monitoring tool calculates the performance of wind turbines and PV plants based on both equipment characteristics and external factors (wind speed, solar radiation, etc.). Laborelec also offers frequent reporting and advice to improve performance.

FINE-TUNING THE TOOL TO CLIENT SPECIFIC NEEDS

The monitoring tool is easily tuned to match the needs of any specific site. After discussing your specific needs and desires, Laborelec fine-tunes the tool accordingly.

IMPLEMENTING THE TOOL ON SITE

Laborelec integrates the performance monitoring tool into the local data environment. We make sure that the tool fits the local data logging and data management system.

GENERATE YOUR OWN REPORTS

The performance monitoring tool is very easy to use. No additional training is required in order to use the software and generate your own reports to analyze performance.

GAIN ADVICE TO BOOST YOUR SITE'S PERFORMANCE

Laborelec also offers a follow-up service in which our experts regularly generate reports on the performance of your wind farm or PV plant. Based on our extensive expertise and experience with renewable energy generation technologies in the field, we offer advice to optimize the performance of your specific site.

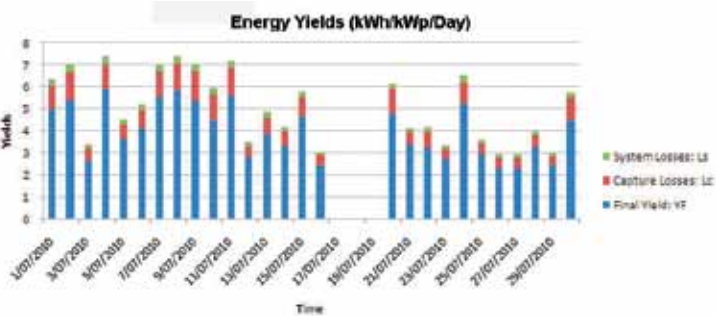
DEVELOPED IN THE FIELD

For three years, Laborelec has been developing this tool for and in collaboration with Electrabel Renewable Generation. This department operates a park of approximately 100 MW of wind energy, which is continuously expanding. It also operates PV plants in the BeLux region, representing a total capacity of 4.5 MW.

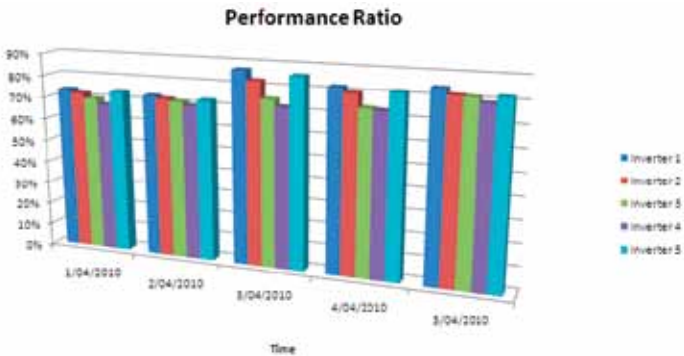
FIVE REASONS FOR YOU TO CHOOSE LABORELEC:

- > One-stop centre for all of your energy-related needs
- > 50 years of experience
- > Increased profitability of your installations
- > Independent and confidential advice
- > Internationally recognized and certified laboratory

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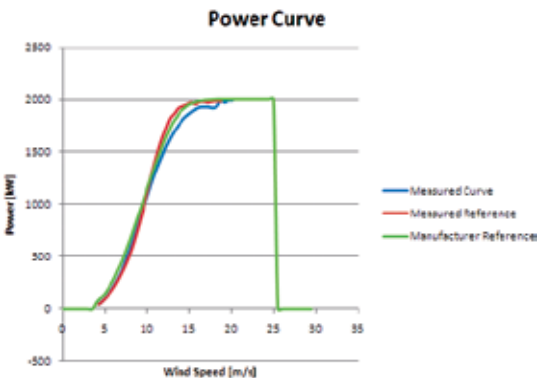
Calculate the actual energy yield of a wind turbine or PV plant, including the system's losses.



Following the performance of each individual inverter enables you to identify a possible cause for the underperformance of your PV plant.



Find out how much energy is lost due to stopping a wind turbine in order to reduce stroboscopic effects.



Does your wind turbine or PV unit achieve the manufacturer's performance figures? The Laborelec performance monitoring tool answers this question.

