

# OptiFarm – A Management Tool for Efficient Operations of Wind Farms

- Optimised and efficient technical management
- Joint management of several wind farms
- Manufacturer-independent interface
- Development based on operational management practice
- Uniform alarm management
- Power production checking
- Production loss calculation
- Operating parameter monitoring
- Integration of condition monitoring
- Integration of shadow cast switch-off and video

## Operational management and OptiFarm

Today it's vital for any wind farm project to optimise the economic performance of the overall system. The key to a maximum power production is permanent efficient and optimal technical management. A rapid, reliable response to alarms is just as important as monitoring operating parameters, precautionary measures such as condition monitoring and documentation and reporting as an interface to commercial management.

Our wind farm management tool **OptiFarm** supports technical management in all these four areas, with modules geared specifically to the operator's requirements. **OptiFarm** offers joint management of several wind farms, independently of the specific turbine type, via a uniform user interface. This user interface is web-based, so the wind farm manager does not require any special software. It also means you can use **OptiFarm** in the field via mobile devices.

## Data management and visualisation

There are two options for transferring the data from each wind farm: with a computer on site linked to the farm system, or via a central server at the operator's using remote log-in to the farm's operating software. The great advantage of the first solution is that it sends a faster and more reliable alarm signal to the operator, because the operating data is available to **OptiFarm** online. On the other hand, the solution

with a central server costs less to implement and makes monitoring available centrally. For joint management of several wind farms, a combination of **OptiFarm** wind farm PCs and a central server is ideal.

**OptiFarm** saves and manages the operating data collected in an SQL database. Access and visualisation are via a web-based interface, so the **OptiFarm** user can access the data using any web browser.

## Alarm response

Vital for the high availability of a wind farm is a rapid reaction to turbine stoppages. In practice, this often represents a huge optimisation potential (see reverse). **OptiFarm** offers a manufacturer-independent alarm system that guarantees rapid and reliable notification of the operator. The type of alarm is determined by a calendar, so that e.g. during the daytime, notification is by email or fax, while at night and at weekends, alarms go to a mobile phone. To ensure alarms are dealt with reliably, **OptiFarm** includes an alarm acknowledgement and reminder function. There is also an alarm logbook for documentation of the steps taken. A note is made here of whether an error that occurred affects the availability of the farm, or whether it is a subsequent error. A link-up to the alarm systems of Condition Monitoring Systems (CMS) is a further way of facilitating the work of operational management (see below).

## Your contacts:

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OptiFarm hierarchy from wind farm overview to alarm of the CMS sensor.

## Power production checking

To optimise power production, effective checking of the energy yields is essential for the wind farm operator. For this purpose, **OptiFarm** offers monitoring of the power curve that detects and reports changes in the curve and measured data outside normal operating conditions. In case of turbine stoppage, **OptiFarm** automatically estimates the lost production to facilitate negotiations with the insurer or the turbine manufacturer. This feature uses an online simulation of the wind farm behaviour to produce a damage estimate as realistic as possible.

## Operating parameters

An important element of operational management is monitoring operating parameters, also independently of acute turbine stoppages. **OptiFarm** provides a simple, clear-cut representa-

### Example of production increase

Examples of production increase through optimised operational management: increased availability, e.g. with foresighted maintenance and repairs, and rapid reaction to alarms and stoppages. (Farm with 10 turbines, 2 MW each, 20 % full load hours).

#### 1% availability increase

Increase per year by	
mean	32,000 EUR
at full load	158,000 EUR

#### Faster reaction to stoppages

1000 alarms per year	
15 minutes faster reaction	
Increase per year by	
mean	9,000 EUR
at full load	45,000 EUR

tion of the various operating data such as performance, wind speed, temperatures etc. The operator can configure the parameters to be shown using the web interface. What's more, the operating data can be downloaded as Excel files for in-depth analysis.

## Reporting

As an interface to commercial management, **OptiFarm** provides automatic compilation of reports. Included here is documentation of the yields achieved and the availabilities as well as comparisons with the forecast power yield according to the wind indices. The report is also presented as an attractive Word document for presentation to shareholders.

## Condition monitoring (CMS)

In response to demands from insurers, new wind farms in future will as a rule be equipped with permanent monitoring of transmission gears and bearings (Condition Monitoring System, CMS). To ensure a uniform user interface and alarm function, we have created an interface to the CM systems that integrates the condition monitoring functions into **OptiFarm**. This provides a monitoring system that can, in cooperation with insurers, lead to a modification of inspection conditions.

## Extra modules

The option of added video remote monitoring supplements the usual operating data checks with component checks (rotor blades, machine parts) as well as with damage monitoring (leaks). This also offers an excellent opportunity for PR and communication with shareholders.

A shadow cast switch-off module can be integrated in **OptiFarm** to reduce the nuisance to nearby residents from shadows cast by turbines (depending on requirements, with or without shadow cast sensor). Switching off of the individual turbines is optimised according to an online simulation, depending on the actual duration of



Overview of the energy produced by the various turbines in the wind farm

sunshine, which minimises the production lost from switching off.

To ensure regular maintenance, maintenance dates and intervals are managed in a maintenance calendar so that the operator is informed in time of maintenance work due (or maintenance work not carried out).

To simplify day-to-day work, **OptiFarm** features an address database which can be used to enter contact information on manufacturers, insurers and shareholders.

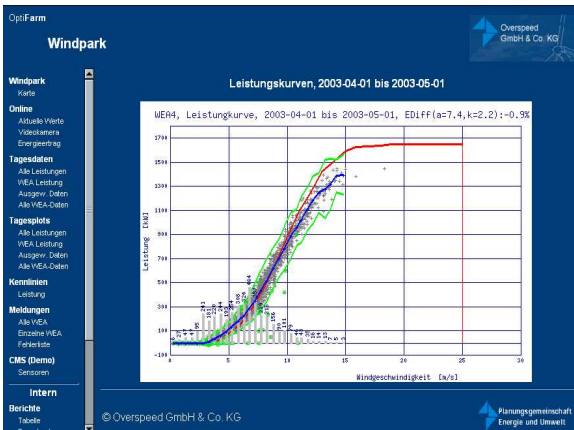
## OptiFarm

The goal of **OptiFarm** is to make running wind farms as efficient as possible and simultaneously to optimise the farm's power production and availability. The special feature of **OptiFarm** is that it has been developed and tested jointly by wind energy and system specialists, working on the basis of their operating management experience.

## Links

[www.overspeed.de](http://www.overspeed.de)

[www.optifarm.de](http://www.optifarm.de)



OptiFarm power curve monitoring. Significant deviation between anticipated and actually measured curve of a wind energy turbine

