

Perfectly Tailored Retrofit

WINDS OF CHANGE BRING HIGHER YIELDS



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WINDS OF CHANGE BRING HIGHER YIELDS

The operation of older wind turbines is time-consuming and expensive: Unproductive downtimes accumulate due to failures and maintenance work, and replacement components may no longer be available. In addition, access and parameterization options are limited. And so, yields decrease. With Bachmann's proven retrofit solution, producers remain competitive by increasing productivity and extending the service life of the plant.



More than 130,000 turbine controls installed worldwide is testament enough: Bachmann's automation solutions more than meet the diverse requirements of wind energy plants. This also applies to their modular controller retrofit solutions – already a winner of best technological innovation for wind energy plants at the WEU O&M Excellence Awards.

Each turbine retrofit is designed to increase performance and availability, and reduce plant load – extending service life and improving safety. Bachmann's experts consider individual control strategies for each turbine model, behavior in the event of a fault, and the wind farm's operational strategy.

Higher yields

With a retrofit solution, system speed and pitch can be easily adjusted to current needs via secure, web-based remote access. The yaw system and main shaft brake can also be controlled manually. In the event of balancing requirements from grid operators, the Bachmann solution's

definable power setpoints significantly improve the power curve of wind farms, increasing cumulative energy yield and avoiding an entire plant shutdown (see Factbox). In low wind conditions, the intelligent controller also reduces self-consumption, leading to lower operating costs.

On grid for longer

Automatic self-start routines bring the turbine back online automatically and at record speed after grid disturbances, and a manual plant reset can be carried out remotely.

A turbine retrofit with Bachmann opens up the possibility of condition monitoring for primary components, such as drive trains, gearboxes and rotor blades. Online diagnostics with Weblog, Bachmann's condition monitoring system, supports early-stage damage detection and targeted on-site maintenance scheduling, and extends plant service life. It can also help optimize operational strategies and increase annual energy production. For drivetrain faults, the system's detection rate is a remarkable 99%.

Precisely-tuned retrofit system

Following inventory and performance measurements of the existing system, we analyze data and communication interfaces and identify initial potential for optimization. This is followed by a controller software implementation, including plant documentation, I/O and event lists, as well as load calculations with Bachmann's Wind Turbine Template (WTT) – based on turbine structures as defined in IEC61400-25. After multiple testing processes – software in the loop (SIL), hardware in the loop (HIL), and real-world conditions, the completed system is installed on site and commissioned.

Cost-effective, with rapid replacement

As all hardware retrofits and software adjustments are planned and configured in advance, operations are only interrupted for a few days during implementation.

The retrofit makes the best possible use of existing turbine infrastructure. Existing sensors and actuators remain in use wherever possible. Failure-prone or obsolete components are replaced to ensure many years of continued operations. In addition, new controller modules are subjected to a 48-hour test in advance under the most extreme conditions.

Absolute independence

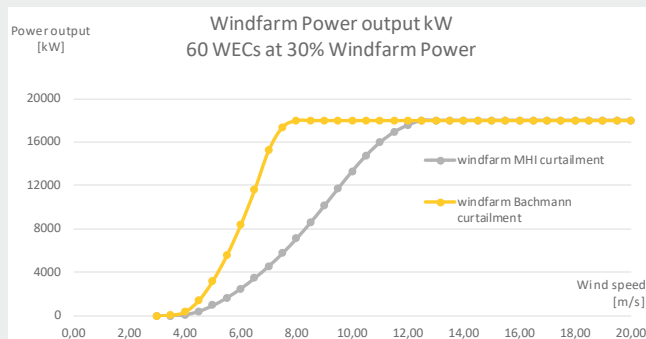
When original parts are no longer available for defective turbine components, controller parameters for any third-party replacements must be reassigned. With existing automation systems from turbine manufacturers, data is not always accessible. With Bachmann's open system, operators have access to all necessary data and are able to make flexible adjustment and optimization decisions.

Full overview with simple engineering

Wind Power SCADA (WPS), Bachmann's web-based SCADA solution, allows any visualization device to be connected to the automation system – from smartphones, to powerful operator terminals.

The software framework is based on WTT and incorporates communication standards such as OPC UA as well as IEC 61400-25. With its ready-made plant components and numerous integrated functions, developers can quickly implement new control strategies and easily create additional visualization tools. Together with the scalable hardware concept, operators remain securely and profitably connected to the grid over the long term.

MITSUBISHI MWT-1000A: BETTER PERFORMANCE FOLLOWING RETROFIT



Higher yields thanks to manageable power: The curve shows the power output from sixty MWT-1000A wind turbines as a function of wind speed at 30% of the grid operator's required park output. With the precise individual turbine control provided by Bachmann's retrofit solution (yellow), output remains constant compared to the complete shutdown of 70% of the turbines (gray), even at very low wind speeds. At 30% required park output, electricity production increased by a remarkable 44% with the Bachmann solution, and by 17% at 70% required power.

Bachmann installed and commissioned a retrofit solution at three MWT-1000A plants in just two days. In addition to updated automation, the operator benefited from addition-

al remote visualization, operation and reporting capabilities with WebMI pro and Wind Power SCADA. Live data is aggregated on individually-configurable dashboards, and can be compared with historical data.

The implemented 'Power Boost' improved the power curve and increased annual power production by one percent. Optimized wind tracking by the Bachmann controller increased production by a further one percent.

A power setpoint that can be remotely defined in the event of grid operator curtailment requirements also increased electricity production by up to 4% per year. Compared with shutting down entire plants to reduce park output, precise individual turbine control via the Smart Power Plant Controller ensures that required output can be supplied constantly, even at very low wind speeds. In addition, the Bachmann controller minimizes self-consumption at low wind speeds. Thanks to gradual turbine shutdown, Mitsubishi plants are less heavily loaded compared to previous abrupt shutdowns – which has a positive effect on service life.

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