

SHARED PASSION, SHARED PROGRESS

Profitable partnership

between Vestas and Bachmann



For almost 40 years Vestas Wind Systems A/S, headquartered in Århus in Denmark, has been considered one of the greatest pioneers in the wind power sector. It is the largest wind turbine manufacturer in the world with wind turbines in operation in over 75 countries around the globe. Market share: approximately 20 percent. With a completely new controller system based on the Bachmann M1 controller, Vestas is taking a further step in the future of renewable power supply technology – and thus offering plant operators the key competitive edge.

Around 5,800 GW of power are installed worldwide in electricity power stations. Around 30 percent of it is now covered by renewable energy. At the end of 2015, the worldwide capacity of wind energy was 369 GW and this share is increasing.

Demanding task definition

The growing number of wind turbines, which are also increasing in power at the same time, are having a greater direct influence on the grid. As a result, the regulations for the operation of wind turbines are becoming increasingly more stringent. For example, the requirements for the reaction time of a wind turbine, i.e. the time in which the output or output power of the generator has to be adjusted, were previously uncritical: »In future we not only need very short reaction times but also absolutely reproducible ones,« explains Rasmus Lærke, manager of Plant Control Engineering in the Plant Power Engineering division at Vestas. The new regulatory framework, the so-called grid codes, stipulate considerably more

stringent requirements to be fulfilled, which Vestas intended to cover with a completely new wind farm control architecture. Although an initial solution approach for this was soon found, »the structure conceived was far too complex,« Rasmus Lærke recalls. »Our initial concepts required too many controllers, the entire system was basically too complicated and ultimately too expensive.«

» Vestas and Bachmann –
We speak the same
language. «

Henrik Møller
Lead Engineer, Plant Power Engineering

Bachmann chosen

As a result, Vestas assessed different controller systems available on the market: »We looked for a solution with a powerful controller, which perfectly combines both control

as well as sensor and measurement technology, and thus enables a rapid response for the entire system,« adds Henrik Møller, lead engineer for plant power engineering at Vestas. In Bachmann, we finally found a partner that could meet these requirements: »The M1 automation system has a high performance capability, is very open and provides maximum flexibility in its design,« Rasmus Lærke confirms.



Vestas Wind Systems A/S, headquartered in Århus in Denmark, is one of the largest wind turbine manufacturers in the world. The company achieved a turnover of 8.423 bn euros in 2015 and has around 22,000 employees in 26 countries.

www.vestas.com



» The key factor for our success is really the fact that we discuss things directly on the white board – and can make a decision immediately. «

Mogens Feldthaus Fyhn
Specialist, Plant Power Engineering

Together to a new level

We soon identified our aim: »We wanted to bring the efficiency of the entire wind turbine control system to a new level,« Rasmus Lærke describes in a few words the beginning of the collaboration. The engineers at Vestas and Bachmann then also worked jointly on the solution: »This took us a critical step further,« a delighted Rasmus Lærke said, »since we were able to develop the specifications together, discuss what is possible and what is not. There are naturally also relevant legal frameworks with which we have to comply. However, the best thing is: In this constellation, we didn't require any lengthy exchange of papers between each other and wait for each other's reply.«

Win-win situation

An example of this success story is the integration and further development of the power measurement technology into the overall automation. »It was clear to us that besides the optimization of the actual control solution we naturally had to pay special attention to the sensors,

particularly the power measurement,« Henrik Møller recalls. »When we chose Bachmann to supply the controller we had not yet actually considered their grid monitoring solutions.« Up to this time Vestas had looked at several different solutions available on the market, however, none of them were able to meet requirements in terms of functionality and speed.

»You have to bear in mind that we are essentially operating at the limits of what is physically possible,« says Mogens Feldthaus Fyhn, plant power systems project manager at Vestas. »We set ourselves as target an update rate for measured values in the millisecond range – and this over a distance of 50 km between measuring point and controller.« A significant portion of this time is required just for the signal transmission there and back via the fiber optic cables: »Working against the laws of physics is definitely a challenge – but is clearly impressive if you find the solution,« asserts the delighted specialist at Vestas.

Faster and better – in dialog

Instead of drawing up specifications, commissioning their implementation from the supplier, testing the result, and making improvements – in short: kicking the ball back and forth – the solution arose in stages and in continuous dialog. »There weren't any bureaucratic overheads. We improved the quality and functionality of the end product – and soon achieved our aim,« Rasmus Lærke recalls. Vestas got 'it's' power measurement system, highly integrated, highly functional and very fast. And this col-

▼ Windpark in Macarthur, Australia





◀ From left to right: Henrik Møller, Mogens Feldthaus Fyhn, Rasmus Lærke

laboration will also benefit Bachmann and its customers: Many of the functions arising from the joint development have been incorporated in the standard products of the grid measurement and protection modules of the Bachmann GMP series. Rasmus Lærke: »This is exactly how it should be: A cooperation that benefits all involved – for Vestas as wind turbine vendors and for Bachmann as suppliers of control and grid monitoring systems.«

Teamwork as the recipe for success

Without this close collaboration, in which Bachmann engineers are still working regularly today in the development team on site in Århus, Denmark, the ambitious aims could probably not have been achieved. The trust established between the two companies is also great: »Bachmann looks into our task system and we into theirs. This means that everyone

always has up-to-date information about the status of work, and this is an invaluable benefit,« Rasmus Lærke confirms. He sums up the recipe for success in a few words: »If you want to achieve advances like this, it is only possible if users and vendors work together, as is the case with us. Tasks are solved in the team and we complement each other perfectly with our abilities.«

However, this also requires partners to understand each other's business and speak the same language, as Henrik Møller also notes. The team members nod in agreement: »I wouldn't know what could be improved. Bachmann isn't for us just any ordinary controller manufacturer, and for them we are not just another builder of wind turbine systems. This makes the collaboration really enjoyable,« Rasmus Lærke says in closing. And we are all in agreement about this.



» Commercial issues were naturally important. But that has never impeded our collaboration or driven us apart. We have respected each other's requirements and looked for a solution that suits both of us. «

Rasmus Kold Andersen
Director, Plant Power Engineering



PROGRESS – FOR TWO

A unique form of collaboration

Vestas has invited Bachmann to support them in drawing up specifications for the completely new Power Plant Controller generation. Something that was up to now unique for business at Vestas. We talked about it to Rasmus Lærke, plant control systems manager at Vestas.

Specification supported by the supplier – that's very unusual. How did it come about?

We wanted absolutely the best controller solution. So we said to ourselves, nobody knows the controller system better than Bachmann. It was therefore an obvious choice to get support in the specification process.

And did Bachmann say »Yes, of course, we can meet all the requirements set?«

Naturally we also had requirements that Bachmann could not yet meet. When we discussed the initial details, we had a Bachmann development team at our company. The result was a long list of what was possible and what was not. For example, we had a particular



◀ **Interviewed:** Rasmus Lærke, plant control systems manager at Vestas

idea of how we wanted to measure the grid. Bachmann looked at it and said that it wouldn't perhaps work like that but in another way, so they asked whether we could imagine measuring like that instead of our idea. So we created the algorithm together – and thus for us the best way of measuring power in a very short measuring time.

But is the customer-supplier relationship maintained?

No, it was and still is a collaboration. This naturally requires openness and the ambition from both parties that we want to find a solution and don't simply want to fall back on specifications. Of course it is not always a relationship of »rapturous joy«. We had and still have many lively discussions. This is what collaboration is about, there are also obligations.

However, as Bachmann is definitely part of our development team, we are all in the same boat. And so we simply work out the best possible solution together. In the end, one thing counts for both parties: We have to exist in our particular business and ultimately also make a profit as well. Compromises are therefore needed on both sides.

And when is the solution »good enough«?

A cross-fertilization process takes place with regard to what is actually needed, where the limits are, what still needs to be worked on

and what today is just a »nice to have«. The Bachmann solution, which is very open and is also used in other areas, guarantees us further flexibility. And this also guarantees future security.

What was the key to success?

A key factor is certainly the fact that we meet once a week here at our offices in Århus. The fact that we discuss things directly on the white board and can make a decision immediately, without having to go through a lengthy exchange of emails, makes a big difference. It also allows us to have direct access to the engineering at Bachmann.

And overall?

I wouldn't know what could be improved, it actually functions brilliantly. However, it doesn't necessarily have to be like this. At a different place or in a different combination this way of working may not possibly work. We didn't explicitly set it up like this either. The point where we are today grew out of the collaboration. Promises were kept, we were always able to rely on this. Naturally, we have a legally binding framework document in place as well. However, apart from that we don't need any time for making lengthy agreements on any specific technical details. I think collaboration takes place between people. And the fact that it will succeed cannot simply be taken for granted.

Thanks for talking to us.