

*This is a real-life case study.  
However the customer has chosen  
not to feature their brand name.*

### Effects:

- Seamless access to PROFINET, PROFIBUS and other networks using the same hardware platform.
- Lower development costs and risks = faster time to market.
- Lower operation and maintenance costs.
- Continuous product updates for all supported networks.

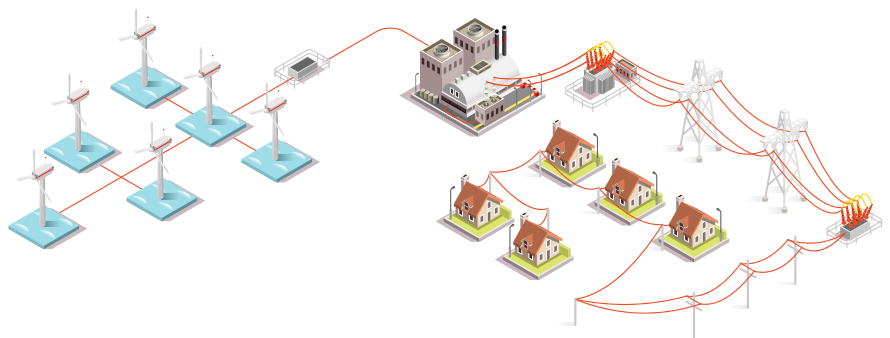
*"Our wind turbines are mostly installed at harsh environments like high mountains far away from the closest city. We need to make sure the systems run smoothly and reliably, because once there is a failure or shutdown, it results in huge losses. The high performance and high stability of Anybus products in harsh environments and the excellent service of the HMS team make us feel safe."*

## Anybus enables wind power converters to communicate with control system

A wind turbine is like a small, automated factory with an advanced control system. The main control system needs to communicate with operational systems in the turbine such as yaw and pitch systems in order to realize the efficient transformation from wind to electric power. One of the most important parts in the turbine is the current converter system which needs to be operating reliably in order to deliver a smooth flow of electricity. Through Anybus embedded and gateway solutions, wind power converters can be seamlessly connected to the main control system.

### How wind power works

The wind turbine uses wind to turn the rotor blades of the windmill converting wind energy into mechanical energy. The mechanical energy is then converted into electricity by a generator in the nacelle\*. The voltage generated by the wind turbine is 690V AC after the converter, which is increased to 35kV by the transformer next to the tower. The combined power from several wind turbines are converged into a collecting wire and sent to the substation through the overhead transmission line. The substation converts the voltage to 110kV or higher and delivers it to the power grid.



\*A nacelle /na'sel/ is the covered housing with the generating components at the top of a wind turbine.



## The role of the wind power converter

Wind power converters are mainly used together with generators. The main function is to reach the same amplitude, frequency and phase of the output voltage on the stator (non-moving) section of the generator as the power grid. The goal is to achieve VSCF (Variable Speed Constant Frequency), get the best power generation efficiency and quality, thus improving energy efficiency.

Therefore, the controller inside the converter needs to communicate with the main controller, and quickly and securely send the data to the main controller of the generator set, so it can set the control command to the converter in time.

## The Problem

"Most of our converters use CAN or CANopen interfaces. If the main controller also uses CAN/CANopen to communicate, it is not a problem, but many main controllers are from Siemens and use PROFIBUS DP or PROFINET to communicate, which raises a problem," the customer mentioned.

"If we were to develop different protocols one by one with dedicated chips or protocol stacks, it would take a long time, and we also need to pay attention to research & development risks, testing and certification issues, not to mention the fact that people are getting used to the stable operation of our products in the field, so we really don't want to make any changes to current hardware and software of the converters."

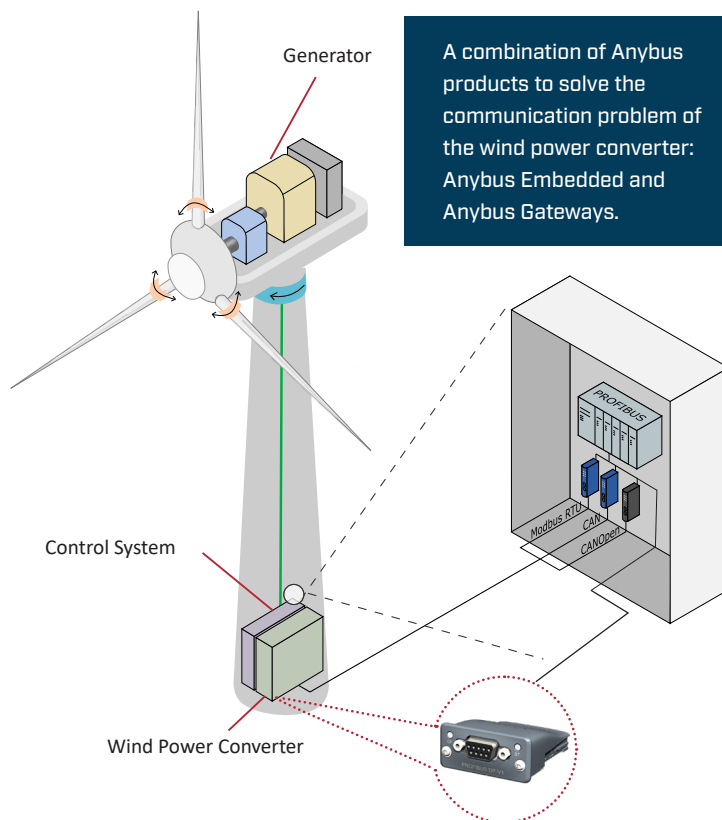
## The Solution

After a comprehensive comparison, the converter manufacturer chose Anybus from HMS Networks. The Anybus offering has both plug-and-play embedded products, as well as stand-alone gateways and provides the customer with flexible choices to achieve seamless communication with the main control PLC system.

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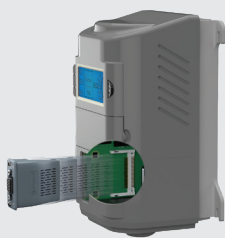
## Embedded and gateway solutions

The customer's wind power converters have used thousands of Anybus embedded modules and Anybus Communicator gateways. They have now also chosen embedded Anybus chips (C40) as the key communication solution in their drives. Currently, the products are already on the market and continue to grow at a high speed.



### Anybus CompactCom M40

The Anybus CompactCom M40 Module is a plug-and-play network interface. It is built on the award-winning Anybus NP40 network processor with multi-protocol support. Through UART, SPI or parallel port, the customer's MCU can quickly integrate the M40 module into the converter by using the C driver provided by HMS, and by changing different modules, the customer can support different protocols. CompactFlash connector and screwing installation makes it solid and easy to change modules.



Anybus slot and 50-pin CompactFlash connector on the PCB of the host device

### Anybus Communicator

The Anybus Communicator is a stand-alone gateway and DIN-rail mounting protocol conversion product. It enables industrial devices to connect to PROFIBUS or PROFINET, and communicate with the main controller. The configuration is easy, with no need to do any changes to existing hardware and software.

