Case study

A SMARTER GENERATION OF SMALL WIND TURBINES

Bringing *life* to technology.

XOR
systems

Aeolus Power's wind turbines are located all over Britain. Until Xor Systems got involved, there was no way of remotely monitoring how much energy – or money – each one was making.

The *Challenge*

A £250,000 wind turbine is a huge investment for any private owner, so it's only natural that they want to know how it is performing – each day. However, the technology just wasn't there to do that.

Crossing fields and physically plugging their laptop into the turbine was the only way to gather any kind of information. But even then, the owners struggled to make sense of the unfriendly data.

It was a challenge for Aeolus Power too, as they would have to send engineers all over the country to find out how their fleet was doing – and that cost time and money.
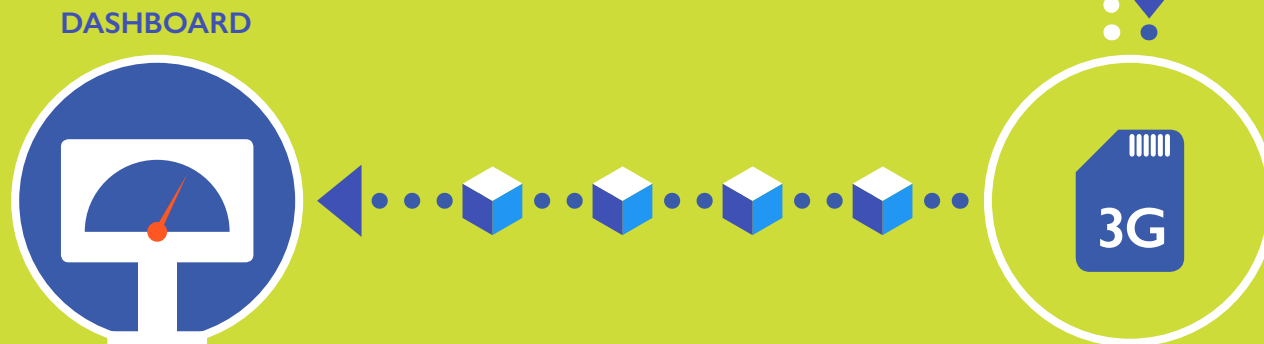
There had to be a simpler way.

Our *Response*

Xor Systems used Sierra Wireless's Fastrack Xtend FXT009 programmable modem to query the turbine. It already had internet connectivity from its 3G SIM, but we added intelligence with an Ethernet module, which connected it to the turbine's controller.

Software on the modem asks the turbine's controller for data – every hour, on the hour. It then parcels it up and sends it as an email via 3G to a web portal where it's loaded into the database. The data is then transformed into easy to understand charts and tables.

Xor Systems also connected the modem up to the generation meter via its existing RS485 interface, so it could take meter readings – and send them back to the web portal, once a day, at noon.

ETHERNET

MODEM

DASHBOARD

3G

"This is a new crop for farmers. I've planted a turbine and now I reap the wind."

Our *Technology*

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The *Result*

Aeolus Power and the turbine owners now simply log into the web portal to see how much electricity and money each turbine has made in the past 24 hours, week, month, year – or over its lifetime – enabling them to make comparisons. It's provided them with peace of mind that their turbines are working and making money.

The data is particularly interesting for Aeolus Power, too, as it can be dissected in many ways. It's now easy to find out everything from the total power output of their fleet on any chosen day, to which county generated the most electricity on a windy weekend. This kind of information was invaluable for Aeolus Power's marketing, as it gave them real-world performance figures.

In terms of reading the generation meter, the whole process is now fully automated (just like a smart meter). And Ofgem pays the owners automatically.
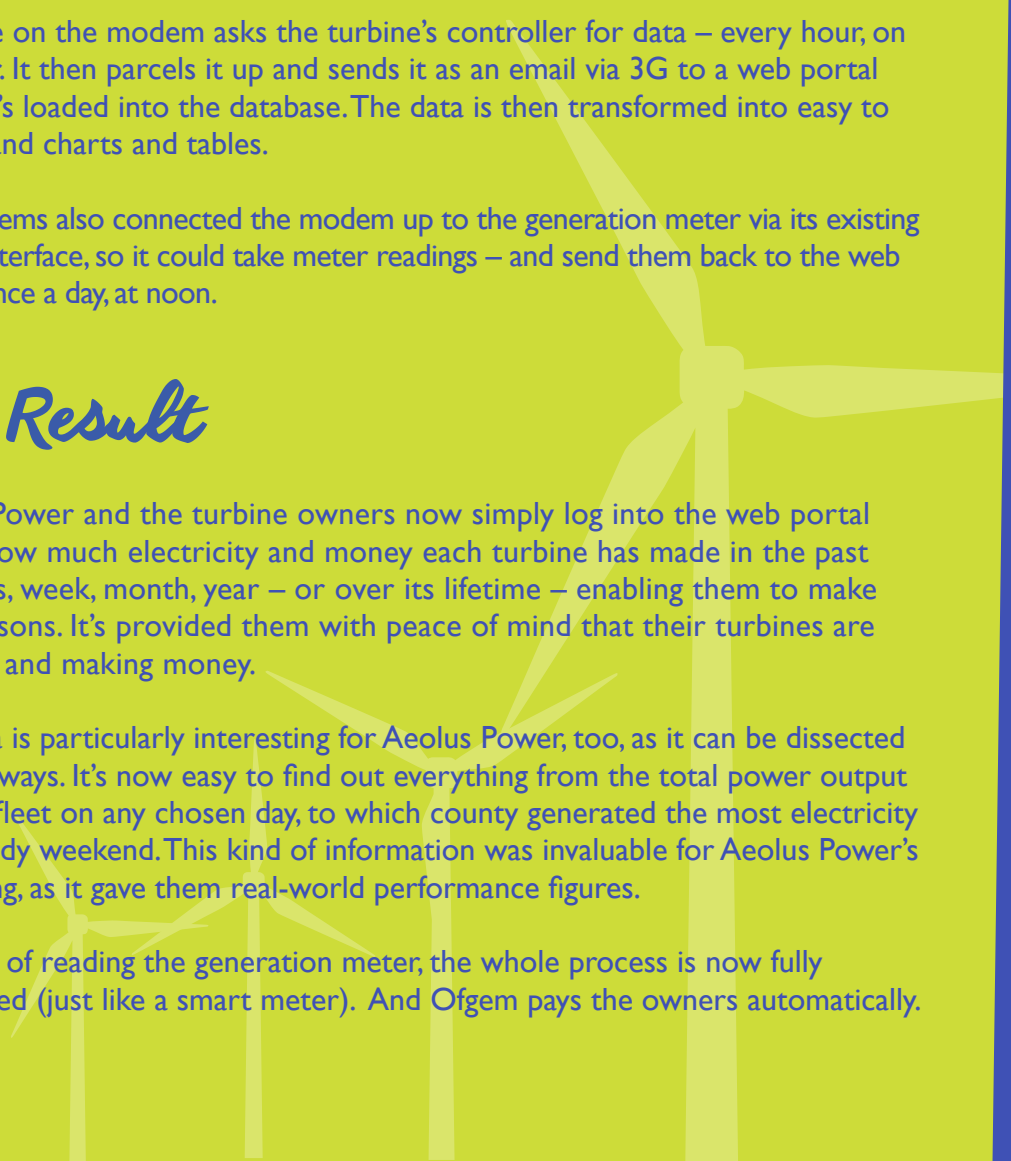
Comment

Data is important. You get immediate insight, such as the status of the device being measured: is it online; is it running; any technical problems? But then you get the performance data, and this gets more interesting as time goes by and the data builds up: how much did we make yesterday? How about last week? How does last month compare to the month before? How does last month compare to the same month a year ago?

This is all such interesting and powerful information, and our solution enabled Aeolus to extract this data from their whole turbine fleet and offer it to each of their customers - the turbine owners.

The data proved even more useful after about three years of operation. The Met Office developed a new product, which allowed them to provide an estimate of the wind speed at any location in the UK, at any height above the ground. The product is aimed at people installing wind turbines so they can estimate the expected output. The Met Office took data from Aeolus' UK-wide fleet of networked turbines - all with months of wind data linked to their precise GPS locations - and they used it to verify the results from their software.

The project demonstrates the capabilities of the Sierra Wireless FXT009 programmable modem (and now the FX30). We can write code to interrogate a device and send data back to a central server.

Jeff Graham, technical director