23 AUGUST 2021

CASE STUDY:

MDA RENEWABLES - HARNESSWIND.COM

mda renewables

DISTRICT 5

Customer Case Study

MDA RENEWABLES

OVERVIEW

MDA Renewables is a business that specialise in generating energy through renewable technologies, in addition to facilitating the planning process of getting energy installations approved.

After installing 1 of only 2 Norwin 750 turbines in the UK, made necessary by site access conditions, they were having many issues getting the turbine to run reliably and to its full potential. Due to the remote location of the site the turbine had the potential to shut down due to a fault and remain offline for a significant period of time, losing the business large amounts of generating revenue.

BRIEF

While MDA Renewables had a lot of experience in deploying and managing turbines, they had no software capabilities in-house. District5 were approached with a brief to alert for 2 main issues:

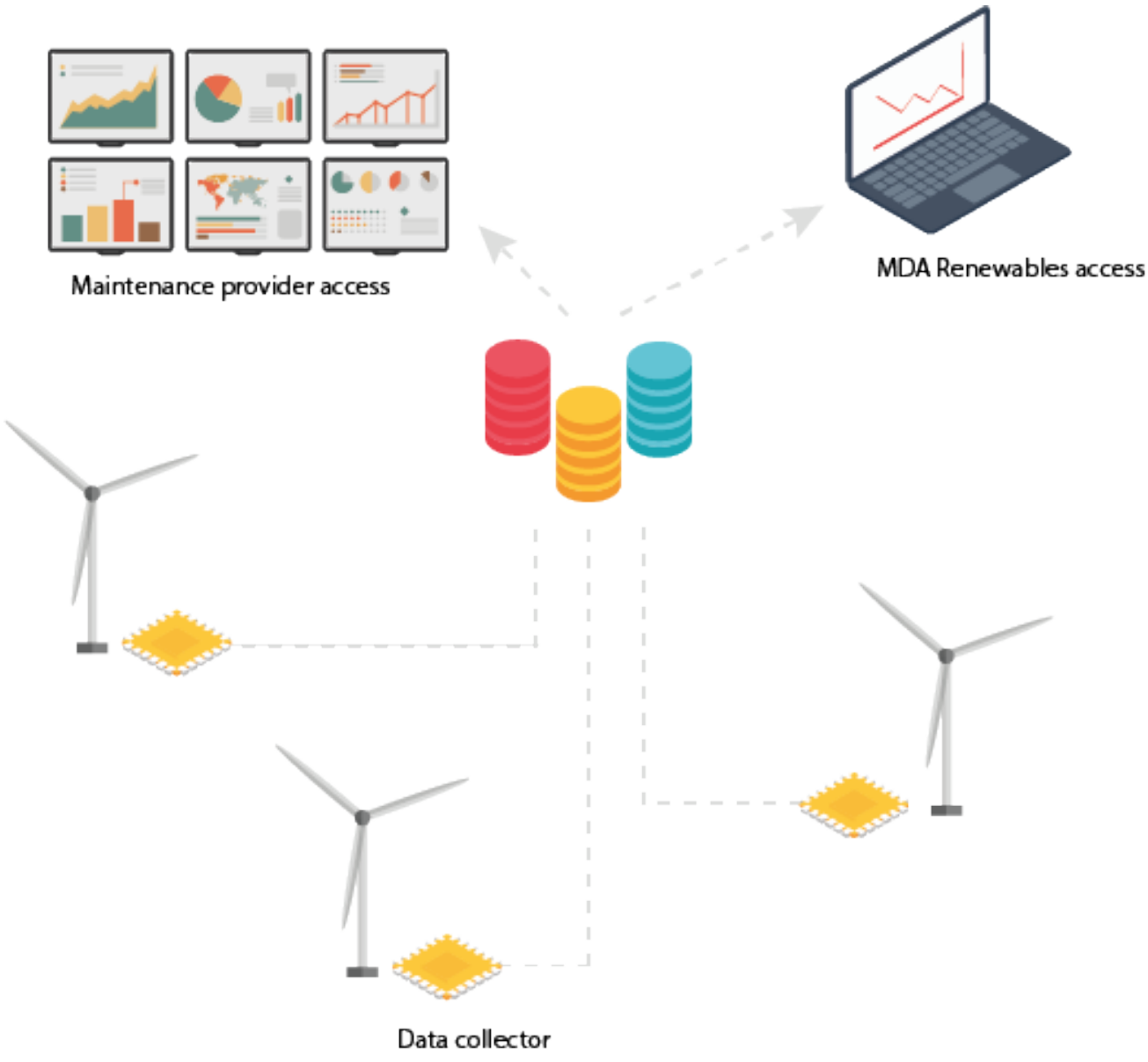
Full turbine shutdown failures: Due to grid instabilities in the region at the time, disconnections and power spikes were quite common. This would often trip the turbine out and it would need to be manually restarted on site. This would be exacerbated in high winds, at the time most crucial for generating energy and therefore revenue.

Turbine online but not generating: Certain conditions appeared to cause the turbine to be online and waiting to start generating, but deciding not to actually generate for some reason. The turbine supplier was unable to ascertain why this was happening as it was intermittent and they needed to inspect sensor data for conditions at the point the fault was occurring.

DESIGN

After liaising with the key stakeholders (MDA Renewables, the maintenance provider and the turbine manufacturer), we designed a system that would require minimal changes from the manufacturer to make basic data available for network querying.

The architecture allowed for an IoT approach with a data collector sat within the turbine, and a centralised system to process the incoming data. This would allow for a 'dead mans switch' approach to a full turbine power failure, whilst also allowing algorithms to analyse data to see if the second failure scenario had presented itself. It would also offer the most flexibility over the coming years, allowing expansion to other turbines within MDA Renewables / the maintenance providers portfolios to be tracked along with big data analysis to be performed.



GOOGLE CLOUD

District5 has worked with Google Cloud for many years and is a Google Cloud Build Partner. With future requirements for possible Big Data analysis and Machine Learning, Google Cloud Platform (GCP), with its suite of APIs for data analytics, gave the most flexibility. A decision to utilise Google App Engine in the short-medium term, with the option to migrate to Kubernetes in the future also made GCP the logical choice of provider.

INITIAL IMPLEMENTATION

The initial goal was to help MDA Renewables address the pain points associated with the specific turbine.

District5 put together a Windows Console application in the short term to run on a device MDA Renewables and the maintenance company had installed within the turbine's internal network, to facilitate remote access. An API and admin portal was created that allowed District5 to be notified when either the hosted service lost communication with the data collector, or algorithms triggered an alert when there was sufficient wind to generate but the turbine did not appear to be generating power.

OUTCOME

MDA Renewables has managed to resolve all of the initial issues they were experiencing with the turbine with the help of the system developed by District5. The manufacturer was able to gain remote access within a few minutes of no generation issues and issued software fixes to address multiple edge cases where the turbine failed to start generating.

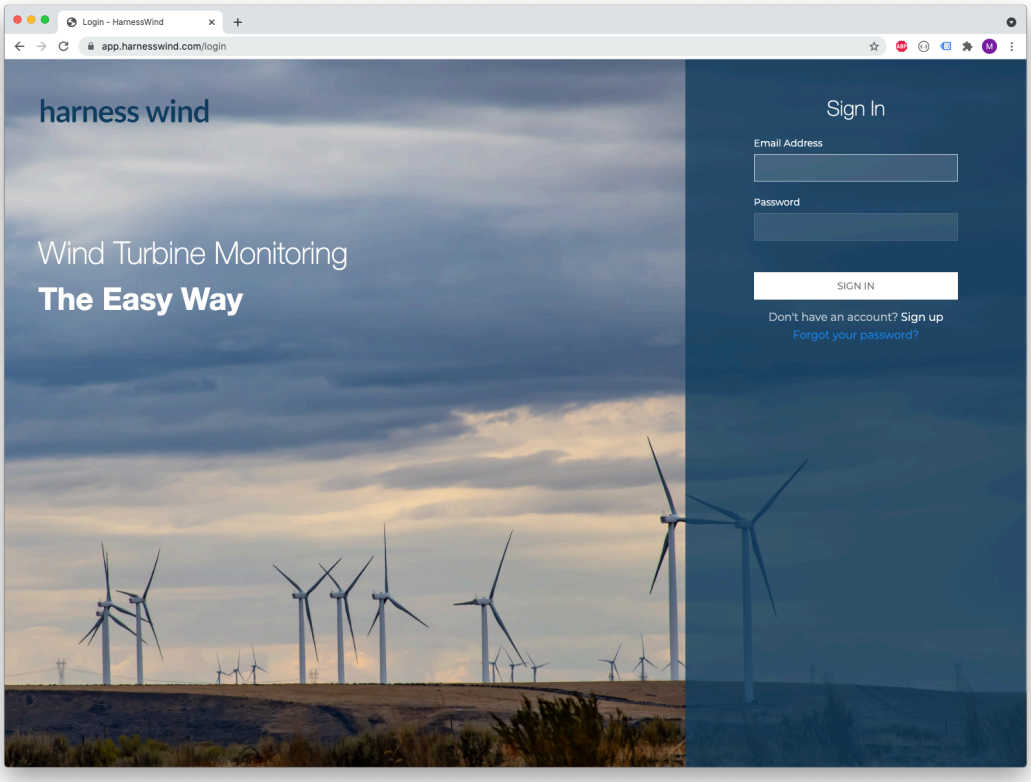
Downtime notifications are a critical part in MDA Renewables strategy for maximising generation time, and use of the system has seen a step increase in this specific turbine's generating revenue by >£100k per annum.

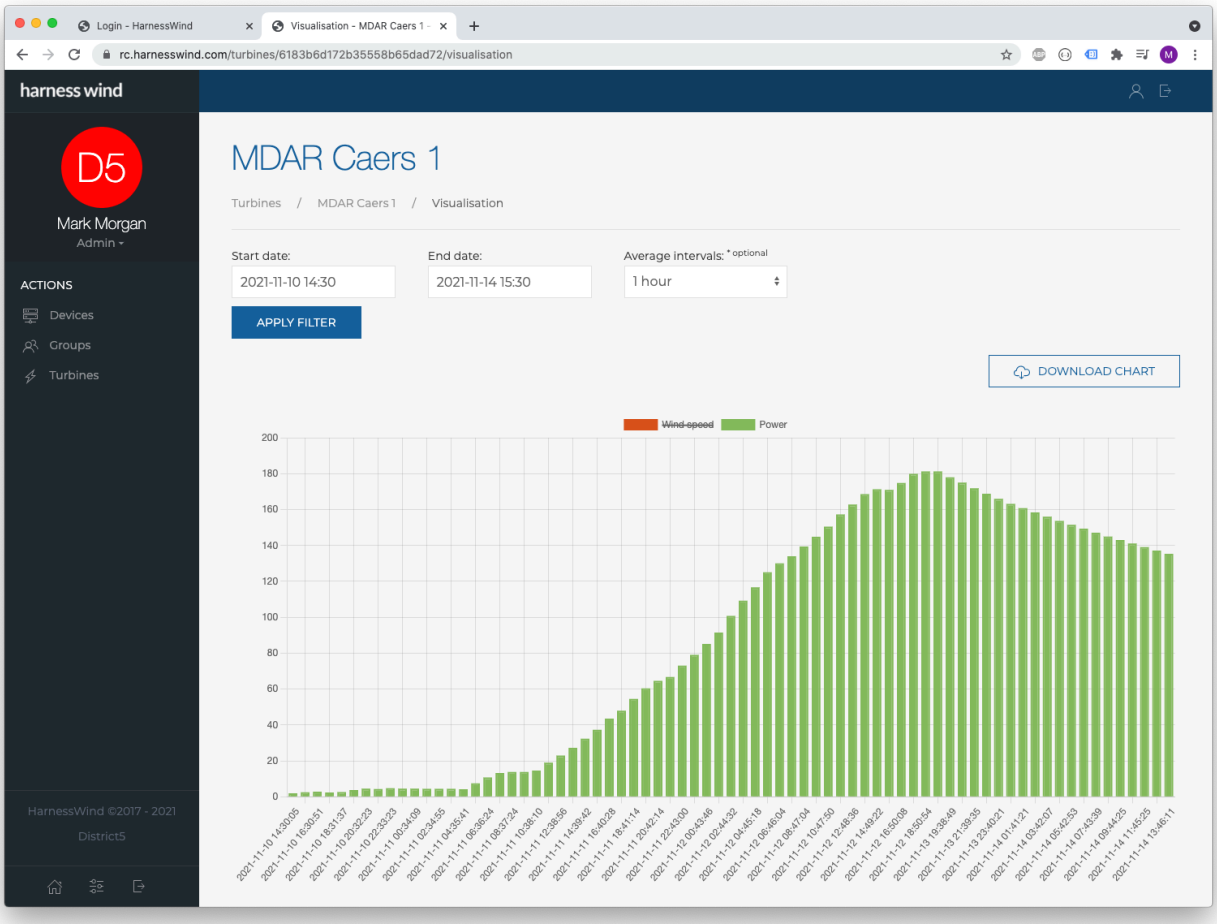
FURTHER DEVELOPMENT

As the initial implementation of the monitoring system proved its value quickly, further work has begun on refining the data collection application, utilising a standalone device based around a low cost Raspberry Pi with the ability for District5 to automatically deploy over-the-air updates as fixes and improvements are made.

The maintenance contractor for the turbine also deals with the maintenance of the other UK based Norwin 750 and has expressed an interest in access to the monitoring solution for that turbine after seeing the drastic improvements in power generation.

The API and Web UI is undergoing upgrades to allow for a new layer of abstraction for owner/operator and maintenance provider access, along with a migration to Kubernetes and modules for improved data analytics. This will facilitate an expansion to gather and analyse any number of attributes from a wind turbine or other facility, and allow District5 to potentially build data collector modules to support other brands of turbine.





district5.co.uk

hello@district5.co.uk

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