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## NEWSLETTER

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Winter 2018/19

### In This Issue:

*Condition monitoring*

*Crowdfunding opportunity*

*Business rates*

*X Series gearbox update*

A yellow tag with a hole at the top left, attached to a string, is positioned diagonally over a dirt road. The tag contains the text 'February Open Days Page 11'.

February Open  
Days  
Page 11



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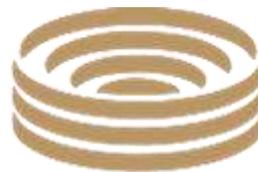
*“Selling your wind turbine to Arena Capital Partners releases tied up capital that can be used to buy machinery or fund projects on the farm such as building holiday lets...”*

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## **Want to release capital tied up in your wind turbine?**

Following the purchase of Earthmill Maintenance & its fleet of turbines, Arena Capital Partners Ltd have successfully raised further funds to grow their fleet to 100 turbines by early 2019. If you are interested in selling your turbine get in touch today.



**ARENA CAPITAL PARTNERS LTD.**

**Call today:**

**01937 581011**

Arena Capital Partners Ltd is the parent company of Earthmill Maintenance Ltd.

## Foreword...

Welcome to the winter 2018 edition of the Earthmill Maintenance Ltd newsletter. After a very calm summer I'm sure you are all enjoying the windier weather.

We have moved into our new office, warehouse and workshop on the outskirts of Harrogate this autumn and there is an exciting buzz about what we have in the pipeline for 2019.

The team have been very busy behind the scenes working on a number of projects to improve the reliability of the fleet and to help our clients get the most from their turbines.

In the meantime, on behalf of myself and the Earthmill Maintenance team I'd like to send you the warmest wishes for the festive period and I look forward to working with you in 2019.



Steve Milner, Managing Director



Earthmill's first ever rental turbine near Harrogate

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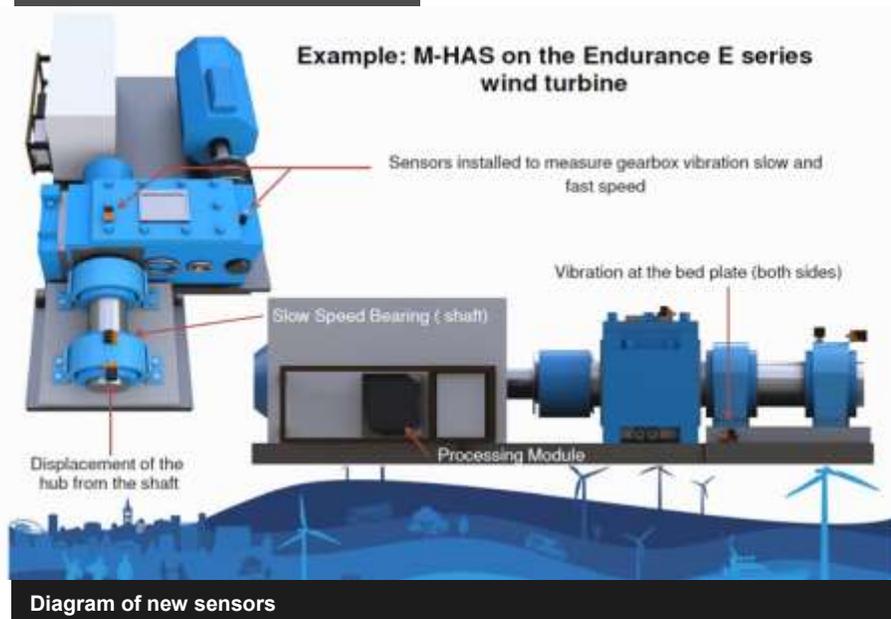
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## Blade refurbishment facility proving valuable

Earthmill Maintenance's blade refurbishment facility in South Yorkshire is proving a success in reducing downtime for clients.

EMM purchased the stock of 80 turbine blades following the demise of Endurance and to date have turned over 15 blade swaps.

Operations manager David Broadbank commented "without the facility, clients would have to wait weeks for blades to be refurbished if they had an issue. Now we can swap them out straight away reducing downtime massively and reducing the cost of repair."

The refurbished blades are just one of 4 'off the shelf' options for E-Series owners with blade related issues. With solutions to suit all budgets and E-3120 variants, EMM will have your turbine back to generating with minimal downtime.

1. Used blade straight swap
2. Fully warranted, refurbished flat route blade set swap out
3. Brand new circular route blade set
4. Refurbished spring tube swap out (newer turbines only)

## Condition monitoring on the horizon

In a drive to improve reliability, Earthmill Maintenance is currently exploring how condition monitoring could be beneficial for turbine owners.

The systems, often used in 'big wind' installations, comprise of a number of sensors placed inside the turbine nacelle which measure vibrations, noise and alignment as well as monitor oil for quality and contamination.

Programmed algorithms identify and provide early warning of irregularities that if not addressed, could lead to issues such as spring tube failure, hub slip, bedplate cracks and gearbox or drive coupling failure.

By identifying the symptoms of technical issues before breakdown or failures occur, repairs costs and loss of generation are significantly reduced.

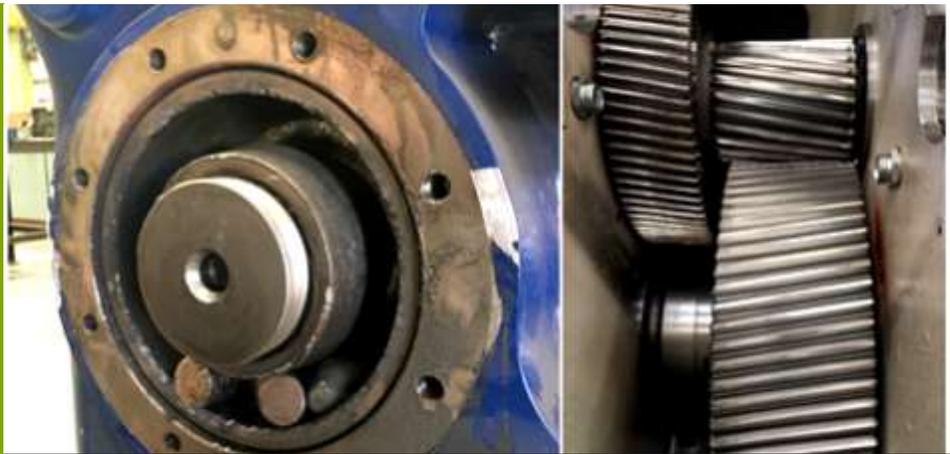
Earthmill Maintenance have been working together with Natural Generation to research options from a number of developers and to identify the best suited system for Endurance wind installations in terms of value and quality of data feedback.

Earthmill Maintenance Managing Director Steve Milner commented "we are currently testing a customised system in 5 of our own turbines and are going to expand the trial by a further 25 turbines. From the data we are receiving we can preempt issues and rectify them before they occur, significantly reducing downtime and repair costs."

The system has been integrated into a traffic light system on the WindSync dashboard with a live data feed so that turbine owners and the Earthmill Maintenance operations team are able to monitor the health of the machine and be alerted of irregularities ahead of major any problems.

Milner added, "The developers charge a low cost monthly subscription however we anticipate the system will reduce repair costs and loss of generation by preventing major breakdowns.

Condition monitoring is expected to be rolled out to Earthmill Maintenance clients from spring 2019 but turbine owners can get a sneak preview at one of EMM's open days in February (see page 11 for more details).



Damaged bearing and gearing in an X35 gearbox

## X35 Gearbox Issues

Over recent months there have been several gearbox failures in X35 turbines. Early investigatory work suggests failure of the intermediate shaft bearing is the root cause of the issue.

Earthmill Maintenance Project Manager Dave Smith said “unfortunately the original manufacturer of the X35 gearbox is no longer trading. We are therefore working with a number of gearbox manufacturers in both the UK and Germany to develop a solution for all X-Series owners and will provide clients with an update in due course.

“In total 4 gearboxes have been stripped for analysis and full rebuild. We have recently purchased a full X-Series turbine in component form in order to have spare major components on the shelves to speed up future repairs.”

## E-Series upgrades proving popular

Huddersfield based Turbine Engineering Developments (TED) has reported a better than expected uptake in its provision of new bedplates & shafts for Endurance E-3120 turbines.

After careful consideration, this summer saw EMM announce that TED is to be its recommended supplier for new bedplate and shaft designs following a number of failures in E3120s. The new design is manufactured in conjunction with Lyndhurst Engineering who have experience in nuclear and aerospace engineering projects and is built to have much higher tolerances than the original design.

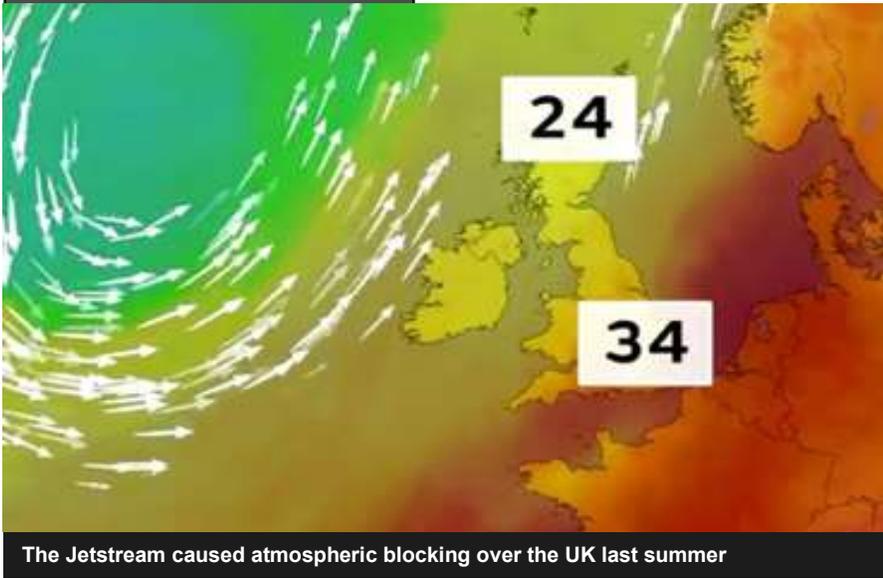
Since launching this summer, TED have already replaced 9 turbine bedplates & shafts with several more currently in the process of being restored.

To date only 1 turbine in the Earthmill Maintenance fleet has required a new bedplate but engineers are closely monitoring the condition of shafts and bedplates as part of an enhanced service schedule.

A specialist welding repair has been used multiple times for instances of less extreme bedplate cracking to prevent further damage. The low cost repair has so far had zero repeat failures which EMM are continuing to monitor.



Top: E-Series turbine in action  
Bottom: TED bedplate & shaft



## Minimizing Downtime

Earthmill Maintenance have taken steps to ensure that downtime is kept to a minimum when maintenance work is required and proudly boasts the highest fleet availability in the industry, at over 98%.

This has been achieved by investing heavily to keep spare parts, including major components on the shelves and upgrading monitoring systems to provide more in-depth data into the health and performance of a turbine.

## Summer heatwave leads to low 2018 production figures

As the UK enjoyed the hottest summer on record this year, wind turbine owners have been left wondering what happened to the wind in 2018.

Warmer ocean temperatures pushed the jet stream further north resulting in high pressure sitting over the UK for months on end. The Met Office said the high pressure that caused much of the country to bask under sunny skies had suppressed windy conditions leading to many wind turbines being sat idle for days.

Earthmill Maintenance Project Manager Matthew Dowley commented “while wind speeds this summer were disappointing there is no cause for alarm as we are seeing above average wind speeds for the latter part of the year.”

“A recent study showed that the average wind speed in 2017 closely matched the ten year average so as a calendar year this would be a better indicator of what a turbine is likely to produce as opposed to using data from 2018.”

Dowley added, “Unfortunately there is nothing we can do to control the weather and while we are all hoping for a windier winter, the key to maximising returns from your turbine is maintaining a high availability for generation.”

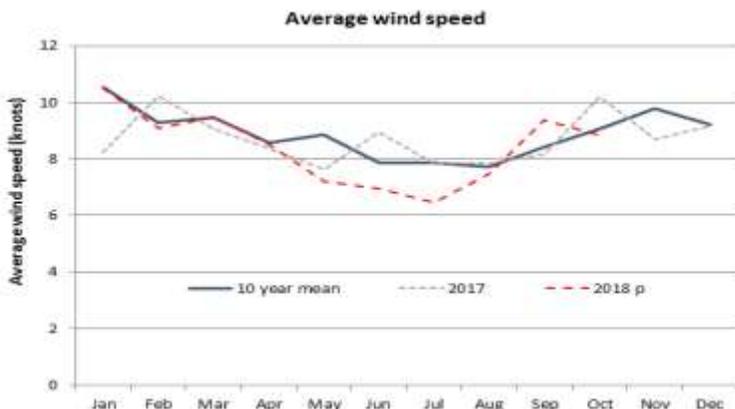
### FAST FACTS

98%

Average availability for generation or Earthmill fleet

10,400kWh

How much extra annual energy production that could mean to you (above the manufacturer target).



(Left)

Average wind speeds for 2017, 2018 and the 10 year average

## Typical business rates...



### E-Series

£500-£1000



### X-Series

£2000 -£3000

The above figures are only typical rates and can vary depending on circumstances.



The VOA are responsible for setting business rates in England & Wales

## Are you challenging business rates?

The days of business rate exemptions for renewable energy generators are unfortunately behind us and councils are getting to grips with invoicing turbine owners. But are you getting a fair deal on your business rates?

Earthmill Maintenance Project Manager Matthew Dowley has been looking into the grey area of business rates for the turbines owned by EMM and found the rates being charged varied substantially.

Business rates are set by the Valuation Office Agency (VOA) in England & Wales, the Scottish Assessors Association (SAA) in Scotland and Land and Property Service (LPS) in Northern Ireland. These bodies then advise the local authority what to charge a business. Typically turbine owners can expect to pay around £500 to £1000 for an E-Series and £2000 to £3000 for an X-Series, however rates do vary.

Dowley commented "We have been talking to the Valuations Office to understand what assumptions they make when setting business rates. We are also doing the same for Scotland and Northern Ireland. In several instances their assumptions of what a turbine generates were inaccurate and we felt the business rates were unfair."

"We have identified anomalies where we feel we are overpaying and challenged them. This is ongoing and we are still developing an understanding of the process and what we can do to ensure a fair price is being paid. Ultimately, we aim to be able to help all our clients get the best deal possible on their business rates but at the moment this is still a learning curve."

Turbine owners should however air on the side of caution before contacting their local authority in the hope of getting a better deal, "by presenting all the facts you run the risk of them actually raising the rates if it is deemed that you are underpaying."

Earthmill Maintenance will keep all clients up to date with progress on getting better business rates in due course.



Export rates peaked at 7.3p per kWh in October

## Weather and politics create volatile climate for export rates

Over recent years export rates agreed in power purchase agreements (PPAs) have fluctuated at a steady rate. Prices paid for exported power is dependent upon demand and over recent years has usually fetched between 4.5 & 6.5 pence per kWh.

However over recent weeks the market has seemingly become more erratic changing by several pence on a day to day basis.

Export rates had slowly climbed throughout 2018 to a peak of around 7.5p per kWh in October but then dropped back to 5p overnight. Since then the market seems to be fluctuating at greater increments. At the time of writing the rate being offered is a healthy 8p per kWh however just 24 hours earlier the rate was 5.5p.

PPAs are traded in a live marketplace much like the stock market and are affected by a matrix of factors. Weather affecting the demand for energy, oil & gas prices, legislation and global politics all can have an impact upon the price of the export rate.

So what is happening at the moment? The looming uncertainty of a Brexit agreement is certainly a factor; the risk of the UK leaving the emissions trading scheme has hit the power curve hard. Trade tensions between China and the US could also play a part, with China now buying Canadian crude oil which is a lot cheaper than US oil at present which as a result means oil is trading lower. Finally, a long hot summer and temperatures still above the seasonal average has driven down demand for energy in the short term.

Project Manager Matthew Dowley said, "Understanding export prices is very complex however the current political climate and hot weather have definitely created a more unstable market. The variation in prices offered in PPAs is rising and dropping at a much faster rate.

"Over a longer term we believe that export rates will increase in-line with greater demand for renewable energy and the current short-term volatility will eventually settle.

"Negotiating PPA renewals is often overlooked as a way to maximize the returns from a wind turbine. Just half a pence difference can amount to a significant amount of money over the course of 12 months so I would advise clients to contact the Earthmill Maintenance office if they would like help to negotiate the best rate for their PPA renewal in this unsettled market."

### Did you know...

You can often renegotiate your power purchase agreement part way through your 12 month contract if you are unhappy with the export price you are receiving .



Hot weather this summer led to a lower demand for energy



*"Customer Service has always been core to our values at Earthmill, that's why 94% of our customers say they would recommend us to a friend or work with us again."*

*Steve Milner, Managing Director*

“An effective rate of 5% IRR over 16 years with regular cash returns and a 2% up-front bonus return”



Crowdfunding platform Abundance aim to raise £2.9m

## Abundance offer crowdfunding investment opportunity.

A new investment opportunity has been launched by green investment platform Abundance which allows anyone to invest in E2 Energy. The E2 portfolio includes eight Earthmill-installed wind turbines at farms in the North of England that were commissioned between 2012 and 2016 and are all receiving feed-in-tariffs (FITs).

E2 Energy is owned by Earthmill Maintenance parent company Arena Capital Partners Ltd, which has built a portfolio of more than 70 turbines in the UK and Italy since its creation in 2014. Arena CEO Ian Greer said that the funds raised will be used to acquire more wind energy assets and to develop renewable energy projects in its pipeline.

The 8 turbines create a diversified portfolio of assets, and there is a security package for the benefit of Abundance customers.

Abundance say investors can expect to receive an effective rate of return of 5% IRR over 16 years, with regular cash returns of capital and interest offering a stable, long term return. Any investment in E2 Energy will also receive a one-off bonus of 2% of the amount invested at the point the project is successfully funded.

Arena plans to raise more funds on Abundance with another portfolio of mid-size wind turbines in the near future.

To learn more about the investment opportunity you can visit:  
[www.abundanceinvestment.com/investments/e2-energy](http://www.abundanceinvestment.com/investments/e2-energy).

As with any investment product there are risks. Part or all of your original invested capital may be at risk and any return on your investment depends on the success of the project invested in.

## COMPANY NEWS



Earthmill Maintenance's new premises

## A new home for Earthmill Maintenance

It took a lot of hard work but we have finally moved into to our new, purpose-built facility on the outskirts of Harrogate.

Just a few miles down the road from our old Wetherby base, the new office boasts extra space for the growing Earthmill Maintenance team. Overlooked by a bank of screens which feed live data of the health and performance of over 300 turbines, our operations team are the first to know if a turbine requires attention.

The adjoining warehouse/workshop has a roll-in, roll-out workshop for nacelle refurbishment and major works and the larger warehouse facilities shelve over £1m of spare parts and consumables meaning our team of engineers can resolve turbine issues faster than ever before.

Whilst our phone number remains the same, make sure to update your records with our new address.

**Unit 14, Follifoot Ridge Business Park, Pannal Road, Harrogate HG3 1DP.**

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*"I rang Earthmill concerned that my turbine had stopped working. They were able to tell me that lightning had struck my turbine during the night and not only had they already dispatched an engineer, but that the engineer was finished, on his way off the property and the turbine was already operational again!"*

*-Peter Beal, Yorkshire Farmer*

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YAMS 2019, Wednesday 6th February

## Visit us at YAMS 2019

Warm up with a tea or coffee by joining us on the Earthmill Maintenance stand at YAMS 2019 on **Wednesday 6th February 2019**. Look out for our famous inflatable wind turbine!



E-Series upgrades, left to right: New bedplate and shaft, upgraded braking system, new hub fastening design

## Earthmill Maintenance to host Open Days in February

On February 12th, 13th & 14th Earthmill Maintenance will be opening its doors to all clients and turbine owners to demonstrate the benefits of condition monitoring, showcase the new E-Series upgrades and provide a tour of our new Harrogate premises.

The days will be a great opportunity to ask any questions you have for the EMM team as well as to meet representatives from EMM's parent company, Arena Capital Partners Ltd.

To register your interest please contact us on the below details stating your preferred date.

**Call 01937 581011 or email [info@earthmill.co.uk](mailto:info@earthmill.co.uk)**



**Join us at  
one of our  
Open Days  
on February ,  
12th, 13th &  
14th**

**To register your  
attendance, please  
call 01937 581011  
or email  
[info@earthmill.co.uk](mailto:info@earthmill.co.uk)**



## Merry Christmas & Happy New Year from the Earthmill Maintenance Team

It's that time of year again, and whilst the work on a farm never stops, we hope you find time to sit around the table with your families to enjoy Christmas dinner.

Here at Earthmill Maintenance we will be open over the Christmas period as normal Monday to Friday, 8.00-17.30 with the exception of bank holidays, and we are available as always through our tech support email address:

[techsupport@earthmill.co.uk](mailto:techsupport@earthmill.co.uk).

From all the team, we'd like to thank you for your loyal support in 2018 and look forward to working together next year. We wish you and your family a merry Christmas and a prosperous new year.



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