



## Introduction

EWT is the acknowledged world leading wind turbine supplier in distributed energy.

Operational from Latin America through the US, Europe and into Asia, EWT is continually improving the benefits to customers who utilize its turbines for generation of a localized income and/or offsetting the cost of their energy. EWT supplements this with commercial offerings which mean customers can reduce or eliminate the up front cost of installation. EWT is also leading in community energy, currently developing the largest portfolio of distributed solar in the North East of the US together also with wind projects, all of which will feed power to communities for lower cost of energy.

In every case of course, not only do the economics make sense, but the CO2 abatement makes a difference. Happy customers, economic sense, and a better environmental solution provided by a world leader in direct drive technology.

EWT supports these benefits with long term service/asset management which ensure customer peace of mind.

Our unique focus has meant we have built what we consider to be one of the most interesting, loyal and diversified customer bases of any wind turbine company. Our clients vary from customers such as the Ford motor company, the communities of New York State, agricultural operations in Europe, schools, water utilities, electricity co-operatives, mining companies, small and medium industry such as one of Europe's largest wine bottling facilities, Turkish rice processors. To these we look forward to adding operations as diverse as Latin American mining and other C&I, Canadian rural communities, Danish agricultural groups and Italian small business.

Our solutions work both on and off grid, and we have been a pioneer in bringing utility grade turbines into the off grid area, using our technology to allow microgrids to optimize their performance, output and cost of power.

To help bring these experiences of EWT and its customers to life, we have brought together a small selection of those customers in this publication. We thank all of our customers not only for their business but also for their support in providing us with access to their story, and we are proud to be a part of that story now and going forward.

Please enjoy these wonderful stories from some of our customers.

## **INDUSTRIAL**

Ford Bridgend Engine Plant	3-4
Merthyr Renewable Energy Ltd	5-6
Robinson Quarry Master Ltd	7-8
A.G. Barr	9-10
Aggregate Industries	11-12
Yaşar Makina	13-14
Lanchester Wine Cellars	15-16

## **AGRICULTURAL**

Rufford Forrest Farm	17-18
HT Palsson	19-20
Furrowland Ltd	21-22
Pickerton Farm	23-24
Halves Farm	25-26
Acorn Dairy Farm	27-28

## **COMMUNITY**

Wray School District	29-30
Sheers Barton	31-32
Wood Green Animal Charity	33-34
Shafton Two Gates	35-36
Pengelly CE Turbine Ltd	37-38

## **UTILITY**

Fazakerley Waste Water Treatment Works	39-40
Kotzebue Electric Association	41-42
Rural Electric Convenience Cooperative	43-45



# Driving towards lower-carbon vehicle manufacturing in the UK



With factories and dealerships across the globe, Ford is one of the best known vehicle manufacturers worldwide. Manufacturing is by necessity an energy-intensive business and as a result, Ford is committed to reducing their carbon footprint worldwide. To this end, they have been installing on-site renewable energy generation at a number of their plants, as well as purchasing renewable energy indirectly from utilities. The **Ford Bridgend Engine Plant** in Wales is one such example of where Ford have invested in on-site, renewable energy production. Indeed, in 1998 Ford Bridgend became the first car manufacturing plant in Europe to be retrofitted with an integrated, grid-connected solar panel array.

Building on this, in December 2014 the plant had an EWT DW54 wind turbine installed. With an installed capacity of 500kW, and standing at 77 metres to blade tip, the turbine is capable of reliably producing up to 1,700 MWh of electricity per year. On-site generation of a significant amount of clean, renewable energy has made the factory less susceptible to increases in energy costs, as well as reducing the plant's carbon footprint. On top of this, there is a community benefit fund of £2,500 each year provided for use in the plant's local area.



## Key highlights Ford Bridgend project

Ford's Bridgend Engine Plant is a major manufacturing hub, producing more than 800,000 petrol engines for Ford vehicles every year. The plant also serves as the global production hub of the low carbon 1.6 litre EcoBoost engine, which has been used in the Ford Focus ST model. This Welsh factory provides jobs for a workforce of over 2,300, and comprises part of Ford's wider European operations, which produce, service and sell Ford brand vehicles in 50 individual markets.



In 2012, the Bridgend plant used approximately 4,434MWh of electricity. Producing on average up to 1,700 MWh per annum, the EWT DW54 turbine is able to offset more than one quarter of the plant's electricity demands, reducing the factory's energy costs and contributing significantly to Ford's ambition to decrease its carbon footprint.



## Benefits to the company and local community

- ⊗ The EWT turbine produces up to 1,700MWh per annum. This is enough energy to offset more than 25 per cent of the Ford Bridgend factory's yearly energy usage of 4,434MWh p/a.
- ⊗ As well as reducing Ford's carbon footprint by using clean, renewable energy generated on-site, roughly 490 tonnes of CO2 emissions are saved each year.
- ⊗ Children from the local Coety Primary School were invited to celebrate the turbine's launch event in December 2014, where they were able to learn more about renewable energy.
- ⊗ There is a community benefit fund of £2,500 per annum to fund local projects and initiatives in the local community.







## Contributing to Wales' low carbon economy from a brownfield, industrial location

Since November 2013, **Merthyr Renewable Energy Ltd** have been generating renewable electricity at the site of Merthyr Borough's recycling centre. Aside from the significant amount of energy produced by the turbine, its location sends out a strong visual signal of the potential for renewable energy, and improved environmental performance more generally, in Wales.

The turbine model chosen by Merthyr Renewable Energy Ltd was the EWT DW54, 500kW, with a height of 77m to blade tip. Thanks to the good local wind resource and the reliable nature of the turbine, this medium scale turbine is able to generate a significant amount of renewable energy, which is fed directly into the local grid network.

Mr Alan Davies was Merthyr's project manager for the wind turbine. He commented: "EWT were a joy to have as a supplier, they kept us informed throughout the whole project and delivered on time. We have used EWT on more recent projects and will continue to use them on future ones."



## Key highlights Merthyr Tydfil project

Installed at the Pengarnddu Industrial Estate, the location of Merthyr Renewable Energy Ltd's EWT wind turbine is eminently sensible. As well as there being no residential properties within 540 metres of the turbine, by developing on an industrial, brownfield site, no agricultural land has been taken up. In fact, prior to the turbine's installation the land was being used for the storage of scrap metal and cars. The careful siting of the turbine has meant that the operations of the Merthyr Borough recycling centre have also been able to proceed without interruption.

Both the Welsh Assembly and Merthyr's local policy is supportive of wind energy development, especially in relation to small-medium scale development on brownfield land. The significant amount of electricity produced by EWT's turbine – approximately 2,200MWh per annum – makes a valuable contribution to the Welsh Assembly's praiseworthy goal of transitioning to a low carbon economy, as well as their target of being an entirely energy self-sufficient nation through renewable generation within 20 years. The electricity produced is roughly equivalent to the average annual energy needs of 468 homes.



## Benefits to the company and local community

- ⊗ The EWT DW54 turbine provides on average 2,200 MWh per annum for the local grid network.
- ⊗ By producing electricity from a renewable natural resource, 960 tonnes of CO<sub>2</sub> are saved by the turbine per annum.
- ⊗ The power produced is equivalent to the average annual electricity needs of 468 homes – or approximately 7.2 per cent of the homes in the turbine's host ward (Dowlais).
- ⊗ Local construction company, Raymond Brown Cymru, were contracted to install the turbine.
- ⊗ All the construction materials were sourced locally.
- ⊗ Suitable, sustainable location has meant that no public objections were registered with Merthyr Tydfil County Borough Council.



An aerial photograph showing a white wind turbine in the foreground, positioned at the edge of a large, dark, layered quarry. The surrounding landscape is green and hilly under a cloudy sky.

## Digging for a greener future

Robinson Quarry LTD is a hard rock quarry in Glenwherry, east of Ballymena in County Antrim, Northern Ireland. It is operated by **Robinson Quarry Masters Ltd**, a family owned company supplying aggregates and concrete building products to companies in the construction, agriculture, concrete manufacture and civil engineering sectors since 1968.

The driving forces behind the business are brothers Stephen and Alex Robinson. Environmental awareness has been at the heart of their operation and when wind energy became commercially viable, investigating the opportunity for their own wind turbine made perfect sense to the brothers. Today, two wind turbines can be seen spinning at the edge of the quarry.

Director Stephen Robinson said: "As quarry operators we have always been keen on minimising the environmental impacts of our operations. Our annual demand for electricity is considerable, and sourcing it from our own wind turbines has decreased our carbon footprint significantly."

One of the wind turbines feeds into the onsite substation, generating zero-carbon electricity of which 45 per cent is used to power quarry operations. Electricity from the second turbine is exported directly to the local grid network.


Stephen added: "Taking everything into consideration, the two wind turbines have turned out to be a fantastic investment. We save on our electricity bill, sell electricity we don't need to the grid and meanwhile we are doing our bit for the planet and the green economy."

### Key highlights Robinson Quarry project

For the production of aggregates and concrete products, Robinson Quarry Masters need approximately 600,000 kilowatt hours (kWh) of electricity per year. Just under half (45 per cent) of the power generated by the two Robinson Quarry wind turbines is needed to meet that demand, and the rest is fed into the local grid network.

Both wind turbines have an installed capacity of 250kW. They were developed as single wind turbine projects;





the first one was constructed in 2012 and the second one followed in 2016. Their hub height is 50m. Due to differences in turbulence on the site, one turbine has been fitted with a 52m rotor and the other one with a 54m rotor. The Robinson family managed development and construction themselves, getting the wind turbines fully operational over a period of seven months.

An operational quarry can be a challenging environment to build in, but through careful construction management and procedures, both wind turbines were safely delivered without incidents.

Director Stephen Robinson said: "The construction of the wind turbines hasn't hindered our daily activities at all. Our team feel that EWT has been an excellent company to work with. Overall it has been a tremendous success."

### Benefits to the company

- ⊗ The two 250kW wind turbines are fully owned by the Robinson family.
- ⊗ Combined, the wind turbines generate on average approximately 1,200,000 kilowatt hours per year.
- ⊗ 45 per cent of this is used for quarry operations. All excess electricity is sold to the local grid network.
- ⊗ The two wind turbines save Robinson Quarry Masters around £60,000 per year.
- ⊗ Many of the materials required for construction of the wind turbines were sourced from the quarry itself.
- ⊗ It is estimated that the turbines will pay back for themselves in seven years. They have an expected lifetime of twenty years.



## Wind energy powering “Scotland’s other national drink”

**A.G. Barr** is the UK’s leading independent soft drink manufacturer, particularly well known for its popular soft drink, IRN-BRU.

The company was established by Robert Barr in Falkirk in 1875. IRN-BRU was first produced in 1901 and follows a secret recipe of 32 different ingredients, which has never changed.

Today, the company employs around 1,000 people across ten sites in the UK. As well as their best-selling IRN-BRU, also known as ‘Scotland’s other national drink’, they produce a wide range of soft drinks including Rubicon, BARR, KA, Strathmore Water, Snapple and Rockstar energy drink.

As a responsible business, A.G. Barr is always looking for ways to improve its environmental performance. Reducing its carbon footprint is a vital part of this plan and the installation of an EWT 500kW wind turbine at their Cumbernauld site has made a considerable contribution.

The power generated by the turbine provides the drinks factory with up to 8% of its electricity demand every year, replacing between 430 - 1030 tonnes of CO<sub>2</sub> which would have been emitted had the power otherwise been produced by either a gas or coal fired power station.



## Key highlights AG Barr project

In order to realise a wind energy project at their Cumbernauld factory in North Lanarkshire, Scotland, A.G. Barr teamed up with renewable energy company Farm Energy Partnership. The 20-year partnership sees A.G. Barr purchase the generated electricity from Farm Energy, who own the turbine, over its entire life span. Power provided by the turbine will not have to be sourced from the local distribution network and, likewise, any power that it generates when the factory is not in operation will be fed into the local network.



The wind turbine has been operational since November 2015. Standing at 70 metres tall to the tip of the blade, it is the tallest landmark at the Cumbernauld site. There is a significant community benefit fund for local residents in place, which funds a variety of local groups, projects and initiatives.

Andrew Memmott, A.G. Barr's Supply Chain Director, said: "Reducing the environmental impact of our operation is always a key priority and we're committed to reducing our carbon footprint through a number of different activities. The wind turbine is one such activity which also benefits the local community financially."

## Benefits to the company and local community

- The EWT turbine will produce approximately 1,180 MWh per annum during its operational life.
- This power will be used by A.G. Barr, providing up to 8% of the factory's annual electricity demand. That is enough electricity to power around 280 average UK households for a year.
- Each year, the turbine will replace 430 – 1030 tonnes of CO<sub>2</sub> which would have been emitted had the power otherwise been produced by a gas or coal power station respectively.
- A community benefit fund of approximately £120,000 (over twenty years), made available by the turbine's installation, is put to good use in the local community. Causes that have received grants from the fund include the Craighalbert Centre in Cumbernauld, Condorrat City Youth Football Team, High Barrwood Respite in Kilsyth and the Friends of Merkland School in Kirkintilloch.





A scenic landscape featuring rolling green hills under a blue sky with scattered white clouds. In the distance, a white wind turbine stands on a hillside. The foreground is filled with tall grass and small white flowers.

# Powering the way to a more environmental aggregates industry with a DW54-500

Buildings are responsible for more than 50% of all global CO2 emissions and 35% of global energy consumption.

**Aggregate Industries** are providing a leading example to others in the construction business, cutting down their own carbon footprint and investing in the production of low-embodied carbon materials to help others do the same. The company have also made significant changes across their operations to enhance their environmental performance.

Starting in June 2012, Aggregate Industries have been undertaking a truly comprehensive review of energy use across the organisation. Based on the principle that no saving is too small, this progressive energy programme is covering all bases, from converting to equipment which will automatically turn off when not in use, to electrification of whole sites.

Elsewhere, the company have transitioned from smaller scale carbon control to more proactive measures, such as introducing renewable power generation at their quarries and manufacturing operations. Beginning with an EWT 500kW wind turbine at Erith, London, Aggregate Industries are now rolling out their renewables programme across the business; the renewables programme even includes a commitment to buy-back exported electricity. The power generated on Aggregate Industries own sites contributes significantly to the reduction of carbon emissions from the company as a whole.



## Key highlights Aggregate Industries project

The Aggregate Industries' renewables programme is based on an identification of technologies appropriate to each relevant site; this could eventually include solar power, anaerobic digestion and hydro-power.

Their goal is to generate 25% of the electricity used at Aggregate Industries sites from their own, on-site renewable sources, placing their company at the forefront of renewables use in the construction industry by 2020.

Aggregate Industries is a large energy user. They use the electricity produced by their EWT wind turbine to power their factory works, saving on energy costs and reducing their carbon footprint.

Aggregate Industries have trail-blazed the introduction of sustainable working practices in their industry. As a major building materials producer, they are conscious not just of the social and environmental impacts of their work, but the good that they can do as a corporate citizen operating in communities across the UK and Northern Europe.



### Benefits to the company

- ⊕ PPA earnings will be re-invested into the business and thereby produces substantial energy cost savings.
- ⊕ The turbine generates an estimated 1314 MWh p/a (Source: Revised Planning Statement submitted to Bexley BC on 12 April 2012).
- ⊕ Energy savings: Average energy consumption at the factory is approximately 713 MWh p/a. This means that there would be an estimated surplus of 601 MWh p/a, which would be sold and fed into the local grid.
- ⊕ CO2 savings: Approximately 565 tonnes p/a (Source: Revised Planning Statement submitted to Bexley BC on 12 April 2012).
- ⊕ In 2009 Aggregate Industries became the first company in their field to achieve the Carbon Trust standard across all of their UK operations.

## Going green where East meets West

**Yaşar Makina** is a machine manufacturer for the agricultural industry, based in Ipsala, a town to the north west of Istanbul in Turkey. The company is part of the Yaşar Group, a large corporation with interests spanning from food & beverage to fertilizer, paint and tissue paper. Yaşar Makina's machinery feature a variety of tools designed to increase efficiency and productivity, such as rice processors, grain dryers, hazelnut cleaners and stone separators. They are exported to agricultural businesses in over thirty countries worldwide.

The Ipsala factory also comprises a rice processing plant where the company's products are tested and continually improved. Alongside its main purpose of testing agricultural machinery, the plant processes 150 tons of rice per day, consuming a large amount of electricity. Until recently all electricity was sourced from the local grid network. Acting on their ambition to be less reliant on power supplied by the grid, Yaşar Makina

started looking for a suitable alternative. The solution presented itself in the shape of a EWT DirectWind54-900kW wind turbine. After a seamless construction stage, the company's EWT wind turbine was successfully commissioned in June 2016. It is connected to the factory's substation, reducing the company's reliance on fossil fuels and grid-connected electricity as well as decreasing their energy costs.

Yaşar Makina CEO Mustafa Polatcan said: "Our innovative machine building business is a perfect fit to EWT's distributed power strategy. We are very happy with the support we received from EWT, from start to finish. By offering an affordable alternative to the use of fossil fuels, renewable energy is making an important contribution to the Turkish economy".





## Key highlights Yaşar Makina project


Installed in June 2016, Yaşar Makina's EWT 900kW wind turbine is now providing a significant amount of the electricity that is needed to power their 150-tons-a-day rice processor. With that, the wind turbine constitutes a prime example of how harnessing local renewable energy sources can make a tremendous contribution to local businesses. A private cable connects the wind turbine to the substation, overriding grid power use when the wind is strong enough to allow the wind turbine to generate electricity. This solution is known as distributed generation; electricity generated on-site, at the point of consumption.

Distributed generation reduces local businesses' reliance on large power plants which serve a large number of consumers through the national grid network. Decentralising power production eliminates the cost, complexity, interdependencies and inefficiencies associated with the transmission and distribution of electricity from large power plants. At Yaşar Makina, the wind turbine provides a reliable, alternative source of energy and therefore much needed security of supply. It is EWT's first operational wind turbine in Turkey, with many more to follow.

### Benefits to the company and wider community

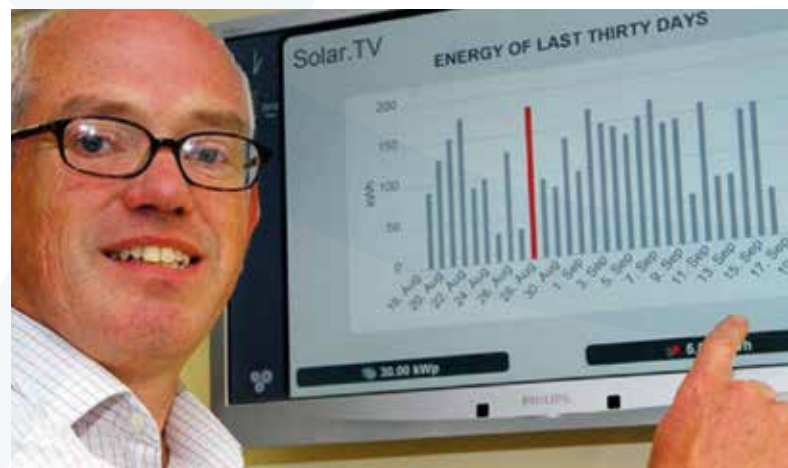
- ⊗ The EWT DirectWind54-900kW wind turbine provides renewable electricity to power Yaşar Makina's rice processing plant, which processes 150 tons of rice per day.
- ⊗ As a distributed or decentralised power source, there are no transmission losses: all on-site generated power feeds right into Yaşar Makina's factory substation.
- ⊗ Wind power is 100% renewable and by reducing grid-connected electricity use - which is largely built up of electricity generated by large, fossil fuel-fired power stations - Yaşar Makina reduces its carbon footprint by approximately 1,000 tonnes of CO<sub>2</sub> every year (source: RenewableUK).
- ⊗ The EWT wind turbine provides continuity and security of supply by generating zero-carbon power right there where it is needed.
- ⊗ The wind turbine is expected to have an operational life of 20-25 years.
- ⊗ Yaşar Makina and EWT have agreed a long-term maintenance and service contract. Service and maintenance works are carried out by EWT's local service team, whilst 24/7 monitoring takes place remotely from EWT's control room in The Netherlands.



An aerial photograph showing two large white wind turbines on a grassy hill. In the background, there are rolling green hills, a small town, and a large industrial building with a red roof. A road and a small pond are visible in the foreground.

# Lanchester Group will become the world's first carbon-negative drinks business

Between 2011 and 2014, the **Lanchester Group** erected three EWT wind turbines with tip heights of 76m; together these provide at least 5.5million KWh each year. The Group uses roughly 50% of this to power their 440,000 square foot site, and this will play a major role in enabling them to realise their vision of becoming a 'carbon negative' business. They are already rightfully proud to be the world's first 'carbon minus' wine business, and wish to take this even further. Growing in a sustainable way is important to the company. Using cutting edge low-carbon technology will have the twofold effect of ensuring the Group grows in a sustainable way and future-proofing the business against rising energy costs.





## Key highlights Lanchester Wine Cellars project

Every bottle produced by the Group is stamped with their 'Carbon Minus' logo. The bottles that bear this logo have had their transport costs offset, and were filled on the Lanchester Group's state of the art bottling lines - which are powered by renewable wind energy.

Lanchester Group began their green drive in 2005. Being sustainable and environmentally friendly is a major concern to their customers as the knowledge and tastes of consumers change. As a group they are powered almost entirely by renewable wind and solar energy.

They offset their transport fleets' carbon footprint and any excess power produced by their own green energy projects is fed into the National Grid. Lanchester Energy, which specialises in renewable wind and solar energy, was founded in 2013. Lanchester Group's offices are all powered by solar panels covering the roof, which during winter months are supplemented by their wind turbines.

The turbines installed between 2011 and 2014 are part of a £4.5m project for Lanchester Energy, which complements substantial investments already made, including: a heat pump to modulate office temperatures; solar panels; the installation of electric vehicle charging points; and the use of a low-emission Volvo fleet of vehicles. The company also operates a high-efficiency Tetra Pak wine-filling line, which is the only high-speed Tetra line in the UK.

Lanchester Wine Cellars plan to continue producing carbon-minus wine. In the future they will combine this innovative mode of production with an innovative mode of delivery, fitting 33,000 Tetra Paks to each delivery truck rather than the old method of transporting 22,000 bottles.

## Benefits to the company

- ⊕ Energy savings from the turbines are reinvested in the bottling plant. The plant has been developed as part of their ambitious 'Carbon Minus' project.
- ⊕ The three turbines generates in excess of 5,500 MWh each year.
- ⊕ The Lancaster Group uses roughly 50% of the electricity produced by the turbines to power their 440,000 square foot site. The surplus electricity is fed into the local grid network.
- ⊕ In addition to the significant amount of electricity generated, the turbines also replace 2,322 tonnes of CO<sub>2</sub> savings every year.







## Providing a better alternative in supplying green power to a Midlands arable farm

**Rufford Forest Farm** is an agricultural business near Newark in Nottinghamshire. It is owned by the King family, who started farming there in 1969. Today it is run by Tom and Kathy King, who took over from Tom's father a number of years ago. Among other things, the Kings use their 650-acre land to grow rye for Ryvita Crispbread.

The farm has an annual electricity usage in excess of 220MWh and it needs approximately 48,000 litres of diesel to generate electricity for farm machinery. The Kings invest in wind energy because they are keen for their farm to operate more sustainably, partly by becoming less reliant on fossil fuels. They are taking steps to offset the farm's carbon footprint of approximately 250 tonnes CO<sub>2</sub> per annum, which is based on energy consumption and fertiliser usage, with a view to becoming carbon neutral in the future.

Wind energy is not new to the Kings. A different brand of wind turbine was developed previously on their land but unfortunately disappointed in power output due to availability issues. It was then decided to replace the failing machine by a state-of-the-art EWT DW54-500kW measuring 78m to the tip of the blade. Since being fully commissioned in September 2014 it has reliably provided the farm with renewable energy to power their farming operations.



## Key highlights Ruffort Forrest Farm project

Since 1969 the King family have been expanding the business at Rufford Forest Farm. The EWT wind turbine supports the next stage of their business development plan, diversifying their income to allow future investment, as well as to become more sustainable.

The wind turbine is fully owned by the King family through their own energy business - King Renewables. Each year that it is operational – expected to be 25 years – the turbine will generate approximately 1,630MWh of green electricity, which is supplied to the farm as well as to the local distribution network. About 20 per cent of turbine output is used for farming operations, the rest goes into the local grid. The wind turbine generates enough power to replace approximately 885 tonnes of CO<sub>2</sub> every year – offsetting the farm's carbon footprint of 250 tonnes per year more than three times over.

## Benefits to the farm

- ⊗ With a power output of approximately 1,630MWh each year, the EWT wind turbine generates more than 7 times the amount of electricity needed by Rufford Forest Farm, which has an annual electricity demand of 220MWh. Therefore, the turbine has a grid connection to ensure that the surplus power can be fed to the local network.
- ⊗ Since the turbine started operations in September 2014, the Kings have saved about £10,000 on their farm's electricity bill compared to the same period before.
- ⊗ The wind turbine offsets Rufford Forest Farm's carbon footprint by 100%.
- ⊗ This allows the farm to market low-carbon produce and puts it in a position to tender effectively for future contracts.



# Harnessing Sweden's wind resource



The first two EWT wind turbines in Sweden were installed in the parish of Tarstad, just west of Svalöv in the southern County of Skåne. They are owned by three agricultural entrepreneurs; farmer and local politician Christer Laurell and brothers Håkan and Thomas Pålsson.

Håkan and Thomas founded their farming business **HT Pålsson** in 1979, taking over their parents' farm in Tarstad. At first the brothers stuck to arable farming, but gradually they expanded the business into selling petrol and diesel generators, followed by selling and installing a variety of biomass boilers and burners.

The company employs five people.

Not only is Christer a farmer and a partner in Erikstorp Agricultural Products HB, he is also an elected Member for the Centre Party. The party strongly supports the deployment of renewable energy in Sweden and signed up to a target of 100 per cent renewable electricity generation by 2040.

In 2001 the three farmers teamed up with the aim to develop a two-turbine wind energy project on their adjoining land. Twelve years later, they finally succeeded: these days, two state-of-the-art EWT wind turbines are quietly turning their blades above the rural countryside of Tarstad, generating green electricity for Swedish homes and businesses.

## Key highlights HT Pålsson project

The wind turbine model installed in Tarstad is the EWT DirectWind54 with a hub height of 75m and an installed capacity of 900kW. The overall height to the tip of the blade - when it is in a vertical position - is 102m. The turbine is a direct drive machine, which means that it operates without a gearbox. Due to having fewer moving parts than the conventional, gearbox-fitted model, the direct drive technology is widely acclaimed to be the quietest available.

This proved a key feature in meeting strict planning regulations on noise, which the turbines achieved with a good margin.

The project spent a total of twelve years in the planning process, standing up to thorough scrutiny time after time and proving robust without fail. Eventually, to the farmers' great relief, planning permission was granted.

Project partner Håkan Palsson said: "This turbine is the quietest and best on the market. With EWT, we have found a solution that gives us the best operational performance and is sympathetic to our neighbours at the same time."

The wind turbines were constructed and commissioned in 2013. During the formal opening, local Member of Parliament, Helena Lindahl, said: "This is a triumph for rural entrepreneurship, for the environment and for local people seizing new opportunities and realising their dreams. It proves how we can all do our bit in the fight against climate change."

"We must have a robust electricity system with high security of supply and low environmental impact, and offer electricity at competitive prices. This creates a long-term perspective and helps to generate new jobs and investment in Sweden."



### Benefits to the company and wider community

- ⊗ For each year of their operational life, which is expected to last for 25 years, the two EWT turbines will be generating sufficient renewable electricity to meet the demand of approximately 1,000 average households.
- ⊗ Combined, the turbines will replace between 1,500 and – 3,700 tonnes of CO2 each year, had the electricity otherwise been produced by either a gas or a coal fired power station respectively.
- ⊗ The wind turbines help diversify the farming business and provide a stable and secure income throughout their 25v-year operational life.
- ⊗ The EWT DirectWind54 direct drive turbine model provides higher efficiency, lower noise levels, less downtime and requires less maintenance than conventional gearbox technology.





# Reliable, renewable energy for a more sustainable family business



**Furrowland Ltd**, located to the east of Newton on Trent, is a family run agricultural business that has been farming in Lincolnshire for generations, as both mixed arable farmers and poultry producers. Roughly 30 years ago the owners of Furrowland – the Ardens – decided that in response to changing demand from the public and supermarkets, large scale vegetable cold storage facilities would be built to diversify the business. These storage facilities, which cover 100,000 square feet, require a constant and sizeable supply of energy – as do the farm’s poultry sheds.

To provide the electricity these operations need, improve security of energy supply as well as to significantly reduce Furrowland’s energy costs, in 2014 the Ardens decided to install an EWT DW54 wind turbine. The 77 metre tall turbine – EWT’s 100th 500kW turbine in the UK – is directly connected to Furrowland’s private electrical network.



## Benefits to the company and local community

- ⦿ The EWT turbine provides approximately 1,615 MWh of renewable, clean electricity per annum. This is equivalent to more than 80 per cent of the electricity the business needs for its most energy intensive operations – the cold storage facilities and the poultry sheds.
- ⦿ This has significantly reduced energy bills, lowered reliance on fossil fuels and minimised the business' carbon footprint.
- ⦿ In excess of 847 tonnes of CO<sub>2</sub> are saved for every year the turbine is operational. This amounts to approximately 21,200 tonnes over its predicted 25 year lifetime.
- ⦿ The turbine has enhanced the job security of five full time Furrowland employees, as well as securing the future of possible contractor work in the local community.



## Key highlights Furrowland Ltd project

As well as their other agricultural activities, Furrowland Ltd operates large scale cold storage facilities (providing 100,000sq ft of storage) and free-range chicken sheds that cater for 50,000 organic, free range chickens. The cold storage facility, maintained at a temperature of 1 degree Celsius, creates a stable environment for the short and long term storage of tens of thousands of tonnes of quality vegetable produce such as potatoes, onions and cabbages.

Furrowland Ltd uses approximately 1,800 MWh per annum to power their storage facilities, chicken farm, offices and workshops. The EWT turbine generates on average up to 1,615 MWh each year, and so can provide a significant portion of the electricity needed to operate the most energy intensive aspects of the business, which are the cold storage and the chicken sheds. By generating much of the electricity they need on-site, the Ardens have been able to future-proof their business against predicted increases in energy prices, increase the security of their energy supply, lower reliance on fossil fuels, reduce their energy bills and reduce their carbon footprint. All these benefits have the combined effect of securing the five full time jobs that Furrowland provides, as well as ensuring work is available for a number of contractors in the local area.



# Increasing farm revenue with a consistent supplementary income stream

The Fairlie family have been farming in Angus, Scotland for five generations, spanning over 150 years of farming tradition. In the experience of Mr David Fairlie - the current owner of **Pickerton Farm** - agricultural incomes can vary from year to year based on unreliable weather conditions, crop quality and yield, market prices, exchange rates and operational costs for fertiliser, fuel and other supplies. On top of that, concerns have been raised about increasing price pressures being exerted by supermarkets on farmers, and ultimately about the sustainability of the farming business due to the ending of the EU's agricultural subsidy – the Single Payment Scheme – in 2013. For all these reasons, Mr Fairlie sought a reliable, alternative source of income. This was found in the shape of an EWT wind turbine.

The turbine has an installed generating capacity of 500kW, with a rotor diameter of 54m and measures 77m to the tip of the blade. It has been operational since November 2013. By investing in the wind turbine, Mr Fairlie looked to increase farming revenue, support existing employment, create new employment, diversify land use and spread risks into a non-agricultural sector, allowing for the continuation of his current farming operations.



## Key highlights Pickerton Farm project

Not only does the wind turbine support for Pickerton Farm directly, it has also contributed to the wider economy. The wind turbine represents an investment of approximately £1.5m, of which it is estimated that around 30% was spent in Scotland. During the construction phase local companies were prioritised; the civils and ground works were done by local businesses and also the sourcing of aggregates, fencing and similar supplies was done locally. The wind turbine's construction created 5 jobs for 1 year.

Pickerton Farm employs 8 full time workers, as well as 4 seasonal part time workers. The turbine's revenue is intrinsic in keeping the farm going, and consequently in safeguarding those local livelihoods. All generated power is fed into the local distribution network.

### Benefits to the farm

- ⊗ The wind turbine generates between 1,500 and 2,000MWh of green electricity per year of operation, a period expected to last for up to 25 years.
- ⊗ This is the equivalent of the annual electricity demand of between 350 and 470 average UK households (source: RenewableUK).
- ⊗ The wind turbine's electricity production is sufficient to replace between 800 and 1,100 tonnes of CO<sub>2</sub> per year, had the power otherwise been generated by power stations running on fossil fuels (source: RenewableUK).
- ⊗ The wind turbine provides an alternative income stream for Pickerton Farm and in doing so, supports the livelihoods of 12 members of staff.
- ⊗ Approximately 30% of the £1.5m investment in the wind turbine was spent within the Scottish economy.





## Securing the future of a three-generation farming business

The Allen family – currently headed by the brothers Cameron and Alistair Allen – have been farming for three generations. Most recently, they have based their farming activities at **Halves Farm**. The farm is located near the historic town of Somersham, which lies just on the edge of the Cambridgeshire Fens, and approximately five miles from St Ives and ten miles from Huntingdon.

Against a backdrop of increasingly difficult circumstances for farmers across the UK, such as reduced government funding and increasing energy costs, the Allens decided that to secure their future as farmers, they needed to diversify beyond purely agricultural operations – hence the decision to install two EWT DW54-500kW wind turbines at Halves Farm.



## Benefits to the farm

- ⊗ With a total installed capacity of 1MW, the two turbines are able to provide a reliable, renewable, and significant supply of electricity for the Allens' farming operations. Not only does this improve environmental performance, it also safeguards the business against future adverse circumstances, such as unpredictable energy prices and varying agricultural incomes.
- ⊗ All generated electricity is sold to the local distribution network, supplementing the farming business with a reliable, alternative source of income.
- ⊗ For each year the turbines are operational, on average between 1,130 and 2,685 tonnes of CO2 are saved.
- ⊗ Including the two turbines at Halves Farm, EWT have installed in excess of 100 500kW wind turbines at various sites across the UK, meaning that a major contribution has been made to meeting the UK's 15 per cent renewables target by 2020.

## Key highlights Halves Farm project

The Allens have a range of arable farming activities at Halves Farm, including recently the growth, harvesting and sale of oil seed rape.

However, the income from solely agricultural activities can vary immensely from year to year. As a result, the decision was made to introduce two small-medium scale turbines at the farm.

Installed in September 2015, the turbines represent a vital form of farm diversification, making best use of available land to harvest a free, readily available natural resource – the wind – in order to produce renewable energy. With a total installed capacity of 1MW, the turbines are capable of producing enough electricity to power in excess of 700 average UK homes.

The Allens' two EWT wind turbines help to offset Halves Farm's carbon footprint as well as providing a stable source of alternative income via the sale of the electricity to the local grid network, supporting their farming operations.

As a result of the turbines' installation, Halves Farm is now able to operate in a more environmentally and financially sustainable manner, and the Allens can carry on their family's farming tradition, safe in the knowledge that their business' long term financial viability has been secured.







## Meeting 100% of the energy needs of an organic dairy business



The Tweddle family have been farming at Garthorne Farm since 1979. Their organic business – Acorn Dairy near Darlington – with its 250 strong herd produces almost six million litres of milk each year. This milk is delivered to over 4,000 households across the North-East, as well as to local schools, hotels, restaurants, leisure centres and British businesses such as Morrisons and Waitrose. **Acorn Dairy** is a great example of a successful local, organic farm with a strong commitment to the local community. Employing 34 people, Acorn Dairy perfectly demonstrates how the green economy provides employment in Britain.

The Tweddles wanted to generate their own power and installed a DW54-500kW turbine with a 40 meter hub height on their farm. EWT's wind turbine will produce enough electricity to make their two farms self-sufficient. Their steam generator had been using diesel at an alarming rate, but has now been replaced by an efficient electric one. The purchase of a wind turbine is the largest capital project Acorn Dairy has ever undertaken. The Tweddle's next step will be to start using electric delivery vans powered by their wind turbine.

## Key highlights Acorn Dairy Farm project

Acorn Dairy uses a lot of energy to pasteurise their milk and sterilise their equipment. Because of this, the farm's owners, the Tweddles, are very concerned about the future costs of electricity – as well as their carbon footprint. Being a leading regional business, price competitiveness is also critical, and energy costs are an important component of this.

The rising cost of fossil fuels has had and was expected to continue to have a substantial impact on their business, so the Tweddles have taken the step to start generating their own clean, green energy. This will reduce their business to exposure from future energy price spikes.

The wind turbine is just one of the many initiatives taken by the Tweddle family to ensure their business can grow sustainably. Acorn Dairy is an organic farm, so their impact on the local environment and the welfare of their cattle are of paramount importance.

The Tweddles also operate a 12 mile hedge improvement plan. Following a RSPB survey, they know their farm provides habitat for over 80 unique species of bird.



## Benefits to the farm and the local community

- ⊗ The income from the turbine has had a stabilising effect. Against the ongoing backdrop of increasingly volatile milk prices, this additional income has enabled the farm to budget on a steady export price for their electricity.
- ⊗ The turbine provides all the power needed for the farm's processing and bottling process, saving 1,000 litres of diesel a week, and drastically reducing the farm's carbon footprint.
- ⊗ The turbine generates 1,350 MWh per annum, from which the farm uses approximately 300MWh, reducing its requirement from the grid by over 75%. All surplus power is fed into the local grid network.
- ⊗ In excess of 736 tonnes of CO<sub>2</sub> are saved annually. Depending on whether this power had been produced by gas or coal fired power stations, the amount of CO<sub>2</sub> saved could be as much as 1180 tonnes per year.
- ⊗ Since installing the wind turbine, Acorn Dairy was awarded the Clean British Energy award by Friends of the Earth.
- ⊗ Local schools that buy milk from Acorn Dairy visit the farm to learn about renewable energy and sustainable living.





# Learning and earning with wind power

The **Wray School District** is located in the City of Wray in wind-swept eastern Colorado, a rural area in the United States. The District comprises three schools; Wray Elementary School, Buchanan Middle School and Wray High School. The schools are attended by approximately 700 students in total.

Faced with dwindling student numbers and high electricity bills of approximately \$80,000 per year, the school district's superintendent Ron Howard encouraged staff members to "find new ways to create additional revenue streams for the district, emphasizing projects that would enhance the district's educational experience."

One of the high school instructors proposed the construction of a wind turbine as an adequate way to decrease spending and provide educational opportunities for students. The District's Board of Education agreed and a wind committee was formed. After an initial round of fundraising, which included a \$350,000 Energy Impact Grant as well as individual pledges from local residents, the school district still found itself approximately 14% short. The funding gap was bridged by preselling the project's renewable energy credits (RECs) to renewable energy company Native Energy. They agreed to purchase all RECs to be generated over the 25-year lifetime of the wind turbine and pay for them upfront. With funding arranged, an order was placed for a EWT DW54-900kW wind turbine.

The Wray School District Wind Turbine reached its operational stage in February 2008. Superintendent Howard said: "This project is a self-sustaining model of energy production, income generation, and an innovative educational opportunity for the Wray School District and rural Colorado."



## Key highlights Wray School District

Wray School District's EWT wind turbine has an installed capacity of 900kW, a hub height of 75m and a rotor of 54m. The tip of the blade when in a vertical position reaches 102m. The wind turbine is expected to generate on average over 2,000 megawatt-hour (MWh) of clean electricity per year. This amount is sufficient to meet the annual demand of over 200 homes and replace up to 53,000 metric tons of greenhouse gas pollution, had the electricity otherwise been generated by fossil fuel-fired power stations (source: Climate Neutral Network).

The wind turbine offsets the school district's annual energy costs and provides a renewable energy educational component to the school's curriculum. It was built on land owned by the City of Wray. The school's Board of Education partnered with the City to establish a power purchase agreement. It is a Grid-Tie system, meaning that the renewable energy captured from the wind turbine feeds into the city grid network for consumer use.

The wind turbine is a true community-owned project, achieved as the result of steadfast commitment from all parties involved. It provides environmentally safe power to the community of Wray, financial support to the education of Wray students and enhanced education opportunities for those students interested in renewable energy and it will do so for its 25-year life.

## Benefits to Wray School District and the wider community

- ⊗ Replaces polluting grid-based electricity with renewable electricity.
- ⊗ Creates an important source of income for the Wray School District.
- ⊗ Provides green energy learning opportunities for the school and community.
- ⊗ Helps stabilize the electric grid with distributed, small-scale power generation.
- ⊗ Replaces up to 53,000 metric tons of greenhouse gas pollution.



The **Sheers Barton** Wind Turbine is owned by Sheers Barton Renewables Ltd, a joint venture between community energy co-operative Community Power Cornwall and the landowners, the Perry family. The Perry's have owned and farmed the land for two generations. The current farming business comprises 1,400 acres, with 650 acres of arable cropping and 750 acres of grassland. The farm also has a beef enterprise, supplying 1,000 head of cattle per annum to Cornish beef processor St Merryn Meat.

Jonathan and William Perry manage and work in the farming business together with two full time employees. The business trades with numerous local businesses in Cornwall and their more immediate Launceston area.

Community Power Cornwall is the first community energy co-operative established in Cornwall. It is an Industrial and Provident Society owned by its members and developed to act as an at-risk developer working closely with local communities to design, develop and deliver low carbon initiatives, minimising inherent development risks. As well as the development of specific projects, Community Power Cornwall is also focussed on skills transfer and capacity building.

Through a share offer issued by Community Power Cornwall, expected in summer 2016, up to 25% of Sheers Barton Wind Turbine will be owned by members of the local community. The Perry family own the remaining 75%. All electricity generated by the wind turbine is fed into the local distribution network.



**A “Triple Whammy”  
of benefits to a  
Cornish community**

## Key highlights Sheers Barton project

The operation of a 67-metre tall EWT DW54-500kW wind turbine at Sheers Barton, Lawhitton near Launceston in Cornwall will open up a range of benefits to the local community. Operational from August 2015, the turbine's community benefits package is three-fold, providing:

- ⊗ Community Benefit Fund of £10,000 per year;
- ⊗ £10,000-per-annum Community Services Package; and
- ⊗ 25% community stake in the wind turbine.


The Community Benefits Fund is a donation to the local community for every year that the wind turbine is operational (this period is expected to be 20 years). Its aim is to provide funding for local projects and initiatives. The Community Services Package looks to cover any costs associated with carrying out those Community Benefits projects; for example compensation for the hours a local person spends on undertaking work to realise those projects and initiatives. The third tier comprises the opportunity for local residents to own up to 25% of the wind turbine. Combined, this three-tier package represents exceptional value to the community compared to what is normal practice in the UK onshore wind industry.



## Benefits to the farm and the local and wider community

- ⊗ The wind turbine is part of the Perry family's plans to make their farm more environmentally sustainable while increasing the future financial viability of their business for future generations of the family to carry on farming.
- ⊗ The Community Benefits Fund and the Community Services package represent a £400,000 value to the Community over the turbine's lifetime of 20 years.
- ⊗ The Community Shares in the wind turbine are expected to deliver a Return on Investment of between 5 and 7%.
- ⊗ The wind turbine will on average generate approximately 1,650MWh of electricity per year of operation. All power is fed into the grid network. The amount of power produced is equivalent to the annual electricity demands of up to 390 average homes in the UK (source: RenewableUK).
- ⊗ Every operational year, the wind turbine will replace between 610 and 1,440 tonnes of CO<sub>2</sub>, compared against the power otherwise having been generated by either a gas or a coal fired power station respectively (source: RenewableUK).





## Saving on energy, spending more on animal welfare

**Wood Green The Animals Charity** is one of the largest rehoming centres in Europe.

Set in 52 acres of beautiful countryside in Cambridgeshire, they promote good animal welfare and responsible pet ownership by providing support, guidance and education to members of the public. Not only are Wood Green dedicated to finding secure, loving new homes for thousands of animals in need, they also take care of the environment.

Wood Green started using renewable energy in 1990, when their first wind turbine was erected at their headquarters - the Godmanchester Centre. This 225kW turbine stood 43m high and within five years it had already paid for itself. After 20 years of successful operation and at the end of its working life, Wood Green decided to replace this turbine with a more powerful one that would generate a lot more electricity: the EWT DW54-500 with an installed capacity of 500kW, measuring 102m to the tip of the blade. The turbine is expected to pay for itself within seven years. It generates enough electricity to make Wood Green's Godmanchester Centre almost entirely energy self-sufficient.

## Key highlights Wood Green The Animals Charity project

To support their drive for energy self-sufficiency and environmentally friendly work practices, Wood Green The Animals Charity set up their own Energy Committee, which looks at all aspects of energy saving, as well as participating in future clean energy and ecology projects. The Committee passionately believe in reducing the Charity's impact on the environment through carbon reduction and making every effort to negate climate change.

The electricity generated by the EWT turbine will power the animal shelter at Godmanchester Centre, and the energy savings made will allow the Charity to spend more on caring for the vulnerable animals in its care. Having more money to spend on helping the animals will translate into vital improvements, such as investments in new veterinary surgery and upgraded kennel blocks. With the power output of the EWT DW54-500 turbine, supported by other forms of renewable energy such as solar panels, Wood Green aims to be energy self-sufficient by the end of 2015.



## Benefits to the charity and the local community

- ⦿ Savings on energy costs are being re-invested into the charity, allowing for improved animal care.
- ⦿ Between approximately 560-1340 tonnes CO2 per annum will be replaced by the turbine, compared to either gas or coal fired power stations (source: RenewableUK).
- ⦿ The turbine generates approximately 1800 MW/h per annum. Any surplus power is fed into the local grid network.
- ⦿ Wood Green won Best Business Environmental Project in the Green Heart Community Awards organised by Hunts District Council in 2013 for making a real change to their environment by reducing their environmental footprint.
- ⦿ With over half of all households in the UK owning a pet, animals are everywhere. By educating children in schools about responsible pet ownership, the Charity can help children make a difference to both pets in their homes now and also their pets of the future.



## Disused colliery site rejuvenated by 100% community owned wind venture

Regeneration company Hayworth Estates specialises in the redevelopment of brownfield sites into low-carbon energy projects, transforming disused, wasted land into valued renewable energy ventures. Recent examples of Hayworth Estates' work can be found in South Yorkshire, where at the former **Shafton Two Gates** colliery site in Barnsley, two DW54-500kW turbines have been installed: one located at Duckmanton near Chesterfield, the other between Grimethorpe and Cudworth.

These turbines were developed by the Four Winds Energy Co-operative to bring tangible benefits to their local communities. Four Winds raised money to fund the development through a public share offer. First priority was given to those who live locally, with the offer later being extended more widely. Additional funds were sourced via a loan. The project gave local people an exciting opportunity to invest in – and enjoy the substantial benefits associated with – renewable energy generation. The project's principal appeal was to local residents and investors, who were enthused by the attractive rates of return associated with the progressive, environmentally friendly and community based initiative.



## Benefits to the local community

- ⊗ It is estimated the turbine at Duckmanton alone will offset 589 tonnes of CO2 each year. In addition to this, the Shafton turbine will offset between 420 and 1010 tonnes of CO2 per annum (depending on whether the power had otherwise been generated by gas or coal fired power stations).
- ⊗ The power output from the Duckmanton turbine is approximately 1,380 MWh per annum. The approximate figure for the Shafton turbine is 1,160 MWh per annum.
- ⊗ Local community projects will receive payments from the co-operative to ensure they can proceed in this challenging economic environment.
- ⊗ This community funding could equate to £777,000 in 21 years.
- ⊗ The funding is achieved through a Feed in Tariff for every MWh of electricity generated by the turbines.

## Key highlights Shafton Two Gates project

Energy produced by the EWT turbines at these previously derelict sites will be sold back to the National Grid through the existing connection from the mining site. The turbines, which are now operational, generate sufficient energy to power approximately 1,000 local homes.

The sale of surplus electricity provides an income allows for payments to be made into a community fund. The remaining surplus is distributed among the members of the energy co-operative.

The Shafton Two Gates project demonstrates Hayworth Estates' expertise at regenerating redundant land into valuable renewable energy initiatives in partnership with trusted partners like Four Winds Energy. Over the course of 2015, Hayworth Estates will be bringing forward a number of other low-carbon schemes across their landholdings as part of the company's ongoing commitment to renewable energy.







## Outstanding Community Benefits Fund in Cornwall

As part of a pioneering scheme, Cleaneart Energy Ltd are partnering with communities to develop renewable assets for truly mutual local benefit.

In one of the first projects of its kind, Cleaneart Energy, Community Power Cornwall and Mr and Mrs Hodge (the owners of Pengelly Farm) worked together in a joint wind energy venture to establish a legacy of social, environmental and economic benefits for the local area. The partnership has allowed locals to invest in clean energy, in addition to creating a substantial 20 year community benefit fund to support the local community more broadly.

The partnership – **Pengelly CE Turbine Ltd** – bought an EWT DW54-500kW turbine with 50 m hub height. It was installed in May 2014 and will generate enough electricity to power the equivalent of 360 homes each year.



## Key highlights Pengelly Ltd project

Pengelly CE Turbine Ltd enables its local community to tackle the collective threats of climate change, energy security and unpredictable rises in fossil fuel costs by generating clean, renewable energy locally. This also has the added benefit of reducing the community's carbon footprint. These ventures provide attractive and ethical investment opportunities which meet environmental, social and financial needs. The wider economic benefits can be directed into a community benefit fund.

Pengelly owns and operates the EWT wind turbine, which generates electricity for on-site use and sale into the national grid, to generate capital which can then be re-invested locally in renewable energy and to nurture the spread of community-owned renewable energy generation. The community fund for 2015 benefited 19 regional and local causes, ranging from local scouts, sports, wildlife and social clubs to schools, music and the Cornwall Young Farmers association.



## Benefits to owner and the local community

- ⊗ The power output from the Pengelly turbine is 1.500 MWh per annum.
- ⊗ The electricity generated is enough to power the equivalent of 360 average UK households; or equivalent of 261 Cornish households, as energy consumption is higher in the Duchy.
- ⊗ Between 560-1340 tonnes of CO<sub>2</sub> are saved by the Pengelly turbine per annum, compared against gas or coal fired power stations.
- ⊗ Any surplus electricity is sold to the national grid providing greater benefit to the community group.
- ⊗ The community benefit fund provides £10,000 every year for local groups and causes, and will continue to do so for at least 20 years.
- ⊗ Potentially, the community group (Community Power Cornwall) have the option to take up an ownership share of up to 25%, thereby providing them with even more benefits.

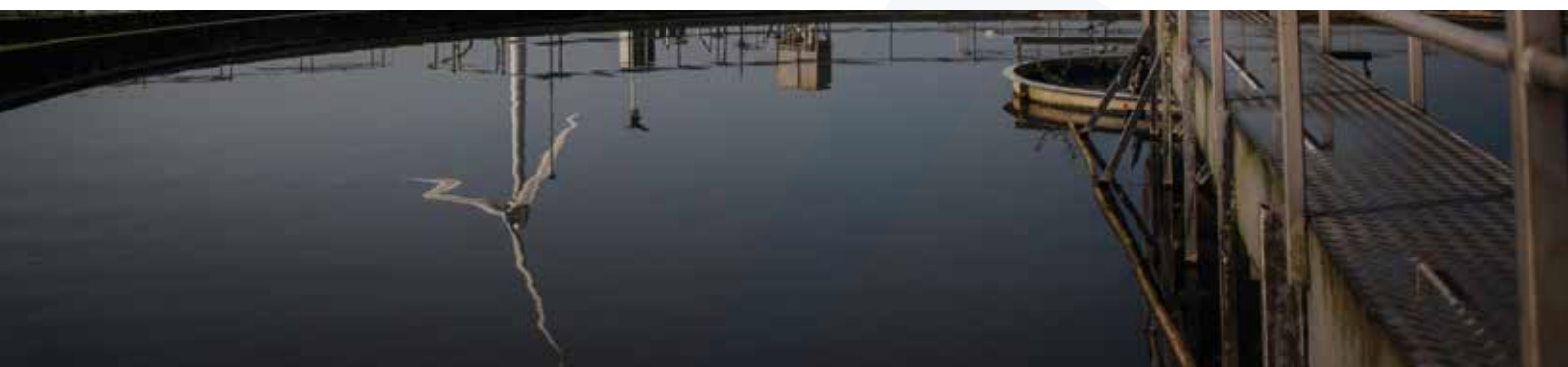


An aerial photograph of a wastewater treatment plant. In the foreground, there are several large, circular aeration tanks with metal walkways around them. A tall, white wind turbine stands prominently in the middle ground. The background shows a mix of green grass, trees, and industrial buildings under a clear sky.

# Clean water for a clean water supply

United Utilities is one of the UK's biggest utilities companies. It operates across the North West of England, supplying three million people and 200,000 businesses in the counties of Cumbria, Cheshire, Greater Manchester, Lancashire and Merseyside with clean, clear water.

In 2007 United Utilities set out its first Carbon Mitigation Action Plan, which aimed to reduce carbon emissions and increase renewable energy production. Since then, United Utilities have produced 100GWh of clean, renewable electricity. As part of this multi-billion pound investment programme, an EWT DW54 wind turbine has been installed at the **Fazakerley Waste Water Treatment Works** in Liverpool. With an installed capacity of 500kW, the turbine will be able to generate a significant amount of clean energy, which will help United Utilities meet its renewables target, lower the company's energy bills, and thereby ensure that customers' water bills are kept low.





## Key highlights Fazakerley project

In order to supply their customers with clean water, United Utilities' water treatment works at Fazakerley are required to operate 24 hours a day, seven days a week. This means that the works require a reliable and substantial supply of electricity – which is where the turbine makes the difference. The EWT turbine produces on average up to 1,250 MWh of electricity per annum, which is roughly equivalent to 15 per cent of the Fazakerley works' annual energy needs.

The turbine will also be connected to the local grid network, but due to the constant, high demand of the water works it is expected that almost all the energy it produces will be used directly by United Utilities.

Not only will the turbine help United Utilities maintain a 24/7 service for their customers, it will also significantly lower energy costs and carbon emissions. More than 500 tonnes of CO<sub>2</sub> will be saved every year the turbine is in use. As such, EWT's turbine will play an important part in realising United Utilities' praiseworthy goal of improving their all-round environmental performance. Ultimately, it is expected that by 2020 the company will be generating 200GWh of renewable energy.



## Benefits to the company and their customers

- The EWT turbine produces up to 1,250 MWh of electricity every year, which will be available for use directly by United Utilities. This amounts to approximately 15 per cent of the Fazakerley waste water treatment works' annual electricity needs.
- The turbine is expected to save UU £105,000 on their yearly electricity bill. By keeping the company's bills low, the turbine will contribute to keeping their customers' bills low as well.
- Up to approximately 537 tonnes of CO<sub>2</sub> saved every year. Over a 25 year period, this would mean 13,425 fewer tonnes of CO<sub>2</sub> being released into the atmosphere.
- The turbine is a visible symbol of United Utilities' commitment to improving environmental performance and protecting the water supply of its customers against the predicted harmful effects of climate change.



# Renewable, reliable and affordable energy for Alaskans



Over 30 miles north of the Arctic Circle in a remote and isolated corner of NW Alaska, the native village of Kotzebue is home to over 3,200 people. The village gets their electricity from **Kotzebue Electric Association (KEA)**. Their primary source of electrical generation is from numerous large diesel generators: 94% of all electricity in rural Alaska comes from diesel generators with 180 micro grids serving well over 100,000 people.

In April of 2012 EWT and KEA commissioned and brought online two DW54-900kW turbines, both with 54m rotors installed on 75m towers designed with high strength steel and special alloys for arctic climates. EWT's cold weather package, black blades, ice detection and heating systems used in Kotzebue's turbines are specifically designed to optimize performance, reliability, and to extend the operating life under arctic



conditions. Despite challenging logistics in getting machinery and equipment to site, unique foundation requirements on frozen tundra, crane limitations and harsh weather, the two turbines were successfully installed and fully integrated into KEA generation and distribution system. The two DW54-900kW are now providing 20% of energy demand, and are saving over 280,000 gallons of diesel fuel per year. As the cost of fuel continues to rise, every kWh generated by wind becomes more and more valuable.

### Key highlights Kotzebue project

Diesel generators are used to generate electricity in every corner of the globe: from remote villages, to islands and isolated communities in the arctic. Although diesel engines can be reliable, effective, and well suited for the application of generating electricity, the costs of energy are relatively high and the diesel engines are also the source of polluting emissions, potential ground and water contamination, and soot. Recently most of these communities, utilities and electric cooperative did not know of the potential benefits of integrating wind energy into their diesel power plant. With the advancement of both wind energy technology as well as grid control system, improved integration and operations, lower cost of ownership, advanced monitoring capabilities and support services, wind energy is now a proven and cost effective solution for integration into diesel power plants.

### Benefits to the utility and its members

- ⊕ Increased profitability through fuel and maintenance savings as well as lower lifetime cost of energy generation from the wind
- ⊕ Increased fuel security and cost stability, lower the vulnerability to rising fuel cost and availability
- ⊕ Reduced need for diesel fuel storage capacity
- ⊕ Lower maintenance and repair costs of diesel generators due to less run-time
- ⊕ Increased power quality through active power compensation and KVAR support
- ⊕ Potential added value from the environmental attributes of generating green energy and the reduction of green house gas emissions and particulate matter
- ⊕ Introducing clean technology into the community





# A unique conversion of a brownfield site into a green energy producing project



The Gob Nob is a 60-foot hill east of Farmersville, Montgomery County in the midwestern state of Illinois in the United States. The hill is what is known as a 'gob pile', consisting of waste material from an abandoned coal mine site. On top of this heap of coal tailings stands an EWT DW54-900kW wind turbine, measuring 310 feet (102 metres) from the base to the tip of the blade when in a vertical position.

It generates zero-carbon electricity where once upon a time, a carbon-rich fossil fuel was dug out of the ground.

The wind turbine is owned by the **Rural Electric Convenience Cooperative (RECC)**, a member-owned not-for-profit business created in 1936 to bring electricity to rural homes and farms. The Co-op has 380 members and serves 5,800 customers in Sangamon, Morgan, Macoupin, Christian and Montgomery counties.



RECC President David Stuva said: “The EWT wind turbine is very popular with our members. It is a direct drive unit, it doesn’t have a gearbox which is one less thing you have to worry about down the road. We needed something around 1 megawatt because that was the average load on the nearby substation, so EWT was a good fit for us.”

The wind turbine started operations in 2009. The Department of Energy awarded RECC Wind Cooperative of the Year 2013 for outstanding leadership in advancing wind power in the United States. Asked about RECC’s experience in working with EWT, David commented: “They’ve done everything they said they would do. They went above and beyond on standing behind their product. We benefit from the maintenance contract we have with them. They monitor the wind turbine from The Netherlands, and we don’t have to worry about anything. I give them an A+ on service.”





## Key highlights Rural Energy Co-op project

RECC's members receive the direct benefit of all renewable electricity generated by the EWT wind turbine at Gob Nob. The turbine is connected to the Farmersville substation about half a mile away. All of the turbine's electricity is fed into the substation, and then distributed to the Co-op members served from that substation in the surrounding area.

Based on its installed capacity and the local wind resource at Gob Nob, the 900kW wind turbine is expected to generate 2,300 megawatt-hours every year. This equates to about 5 per cent of the total demand on the Co-op's system on a hot day. The turbine has an operational life of up to 25 years.

The wind turbine's output reduces the amount of power RECC has to purchase from their wholesale power supplier. Electricity generated by the turbine costs less than the average cost of the coop's wholesale energy supply, as there is no fuel cost involved. While the cost of power on the wholesale market is expected to rise steadily, the energy price from the wind turbine will increase only very slightly,

due to relatively small cost components such as labour prices for turbine maintenance.

The wind turbine project had a total cost of approximately \$1.8 million. To enable the Co-op to realise this green energy venture, grants totaling \$675,000 were received from the United States Department of Agriculture's Rural Development program, the Illinois Department of Commerce and Economic Opportunity and the Illinois Clean Energy Foundation. The remainder was financed with a zero-interest loan through the Clean Renewable Energy Bonds program, and is to be repaid over 15 years.



### Benefits to the utility

- ⊗ All electricity generated by the EWT wind turbine is used by RECC members in the surrounding area.
- ⊗ The annual power output of the 900kW wind turbine is expected to be 2,300 megawatt-hours of electricity. This equates to about 5 per cent of the total demand on the Co-op's system on a hot day.
- ⊗ The wind turbine reduces RECC's need to purchase power from their wholesale power supplier.
- ⊗ Because the wind doesn't cost anything, there is no fuel cost associated with wind energy generation. That is why the electricity from the wind turbine costs less than the average cost of the Co-op's wholesale energy supply.





### **Emergya Wind Technologies B.V.**

T +31 (0) 33 454 05 20  
Lindeboomseweg 51  
3825 AL Amersfoort  
The Netherlands

### **Emergya Wind Technologies UK Ltd.**

T +44 (0) 131 560 1661  
Thistle Court  
1-2 Thistle Street  
Edinburgh, EH2 1DD  
United Kingdom

### **Emergya Wind Technologies Americas Inc.**

T +1 952 886 7271  
Minnesota Center  
7760 France Avenue South  
Suite 1100  
Bloomington, MN55435  
USA

### **EWT Enerji Sanayi ve Ticaret A.Ş.**

T +90 (0) 212 371 8650  
Büyükdere cad.  
Tekfen Tower No:209 Kat:8  
Levent 34393 İstanbul  
Turkey