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LELY AIRCON

Farm turbines



www.lely.com

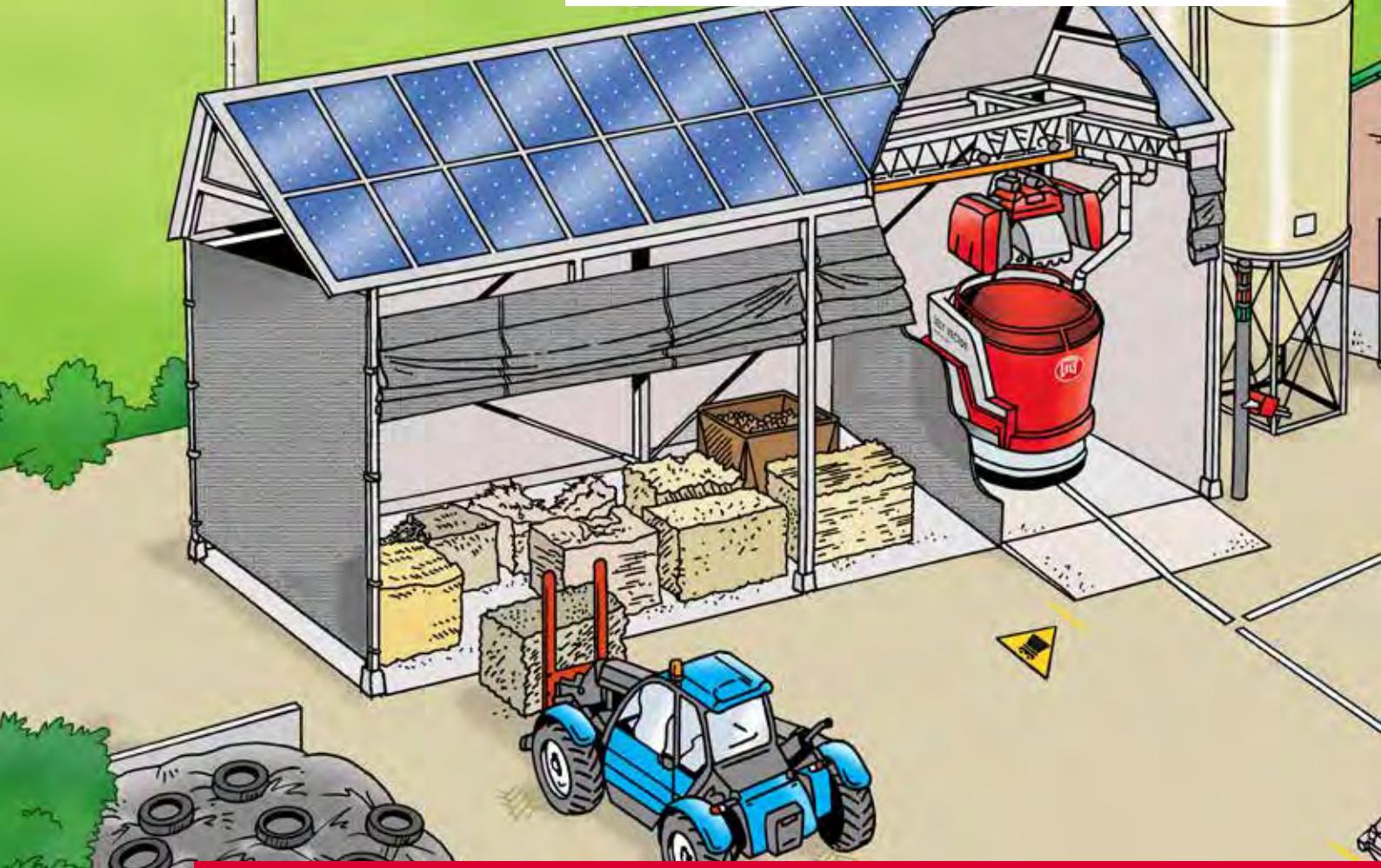
innovators in agriculture

Lely energy solutions

Energy generation and consumption where it is needed



'In the future, farmers will produce more energy than they actually consume. Lely develops products that are technologically superior and capable of improving the social and financial well-being of its customers without the need for subsidies. In addition to the development of products with a proven long lifespan and the lowest possible energy consumption, Lely strives for complete business concepts that enable energy-neutral operations in the farming sector.'



The story of Aircon and becoming a part of the family

Since May 2012, the former company Aircon GmbH & Co. KG has been part of our family. It was in the same year that we decided to open up the energy business segment. Aircon in its early infancy started the first development in 1996. Its aim and vision in the past was to counteract rising electricity prices and to be self-sufficient and independent from the grid. In 2003 the company was officially founded and even today, the core team is still working for the newly named Lely Aircon B.V. In total there are 21 employees working in development, management, sales and production. The team is manufacturing high-quality turbines according to all international standards in the segment. The face to the customer is Lely International N.V. and its dedicated sales team.

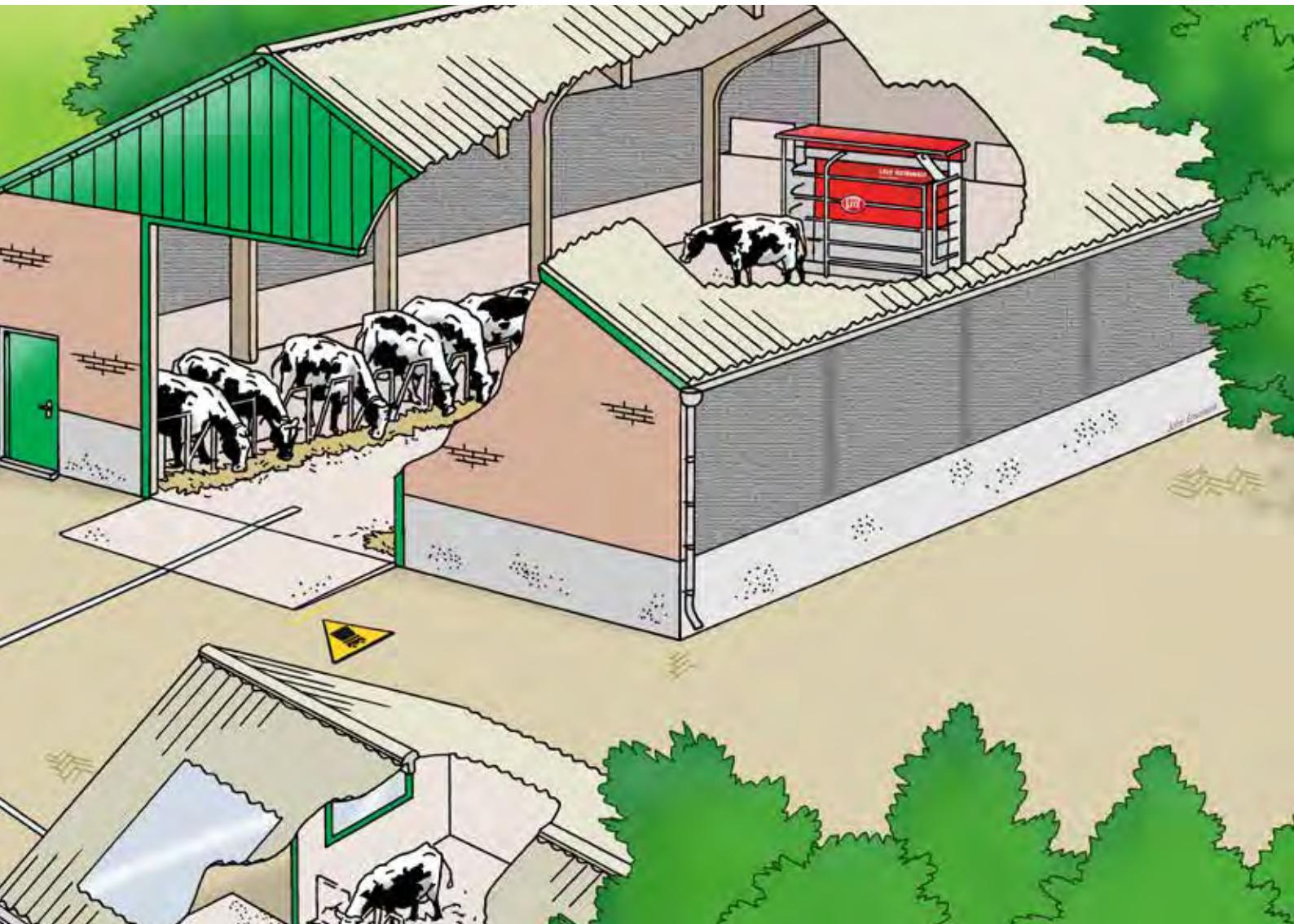
The concept of a sustainable, profitable and self-sufficient farm

Energy generation and its consumption shall take place where it is directly needed: on your farm. Due to automation in the agricultural sector the demand for electricity is increasing constantly. Even by considering

the newest and most energy-efficient technologies in our products, overall demand is increasing. Despite this there is a strong demand for lighting, air pressure, climate systems (heating and cooling) and various other power consumers on your farm.

The dilemma: on average, electricity prices increase by between 2.5% to 5% per year. To help reduce your operating costs we have the solution to hand. The keyword is self-consumption through small wind turbines! By connecting Lely Aircon wind turbines in parallel to the grid, power is fed directly to your farm and also consumed there.

Do you already have renewables like photovoltaics (PV) or biogas on your farm? Perfect! The combination of wind and sun is almost the optimal situation to generate energy for your farm. To get a feeling for how much energy the Lely Aircon turbines can produce, here are some examples: Under good site conditions a Lely Aircon 10 can easily feed one Lely Astronaut A4 robot and further equipment. The Lely Aircon 30, three Astronaut A4 robots and additional barn equipment.



THE RIGHT SIZE

Your farm has different energy needs to those of your neighbour. Therefore we deliver the right size to fulfil your needs and to achieve the highest possible level of self-consumption.

PROVEN SYSTEMS IN ALL MACHINES

Since the original development of the Lely Aircon 10, the major objective has been to ensure the quality and the reliability of the turbine. The first turbine was developed nearly 17 years ago. Design, development and manufacturing are carried out 100% in Leer, Germany.

Our Lely Aircon turbines are sophisticated, leading-edge technology and are comparable to large utility-scale turbines. In terms of control, mechanical and safety features, the engineering is outstanding. The power electronics synchronise and deliver a perfectly controlled wave form to the grid. With its unique design incorporating the minimum of moving parts, the Lely Aircon turbines only require a brief and basic annual inspection and lubrication service.

LONGEVITY AND QUALITY

Minimal moving parts in the turbine mean huge benefits in terms of reliability and durability, as well as keeping service costs to a minimum. This in turn results in low ownership costs during the expected lifetime of over twenty years. Our machines are built with the technology and parts for high durability and a long life.



Designed for maximum safety

The turbine is designed and built with multiple safety systems, such as a remote control via a VPN connection and hydraulic brakes, as well as a safety ladder and a stand ring for use by technicians.



Exceptionally quiet and stable wind tracking, thanks to active azimuth drive

Optimal and stable wind tracking is very important. We use systems that always keep the turbine stable in the wind. Through the interlocking principle we avoid having strokes on bearings and other parts.



Aerodynamic blades and nacelle housing design

The blades and the nacelle were designed to be aesthetic as well as functional, and obtain maximum yield from the wind.



Professional wind tracking systems

Thanks to an active wind-measurement system that processes velocity and direction data, the azimuth drive always rotates the nacelle into the most efficient position.



The farm turbine products – specifications



Ultra-durable gearless permanent synchronous generator

The unique and compact design with minimum moving parts has proven to be ultra-durable in all kinds of environments worldwide.

MACHINE SPECIFICATIONS	LELY AIRCON 10	LELY AIRCON 30
Rated output (kW)	9.80	29.80
Nominal wind speed (m/s)	11	12
Rotor diameter (m)	7.50	13.12
Revolutions per minute (rpm)	50 – 130	35 – 68
Cut-in wind speed (m/s)	2.50	3.50
Cut-off wind speed (m/s)	25	25
Survival wind speed (m/s)	59.50	59.50
Standards included:		
Client touch display	S	S
Remote monitoring via VPN	S	S
Hydraulic disc brake (fail safe)	S	S
Generator dynamic brake	S	S
Active yaw control	S	S
Multiple monitoring and safety sensors	S	S
Certifications	MCS, EN50438	MCS, VDE AR-N4105

APPROVED PRODUCT



OPTIONS TO ORDER

Towers*	Lattice	18 m	x	x
	Lattice	24 m	x	x
	Lattice	30 m	x	x
	Lattice	36 m	-	x
	Lattice	42 m	-	x
Towers*	Tubular	10 m	x	-
	Tubular	12 m	x	-
	Tubular	15 m	x	-
	Tubular	18 m	x	x
	Tubular	24 m	-	x
Towers*	Tilt-up	30 m	-	x
	Tilt-up	12 m	x	-
	Tilt-up	15 m	x	-
	Tilt-up	18 m	x	x
	Electrical controls**	1 ~ phase	x	-
	Electrical controls**	2 ~ phase	x	-
	Electrical controls**	3 ~ phase	x	x

* Depends on location, planning permission and other restrictions

** Depends on country and grid connection regulations

The Lely Aircon 10

The strong and silent one

The Lely Aircon 10 is designed specifically to be extremely silent and a reliable source of renewable energy.

The benefit of your Lely Aircon 10 farm turbine:

To give you an idea, please look at the following example of how much the farm turbine can benefit your business:

Assumptions:

Average mean wind speed = 5 m/s, approximate yield = 19,000 kWh

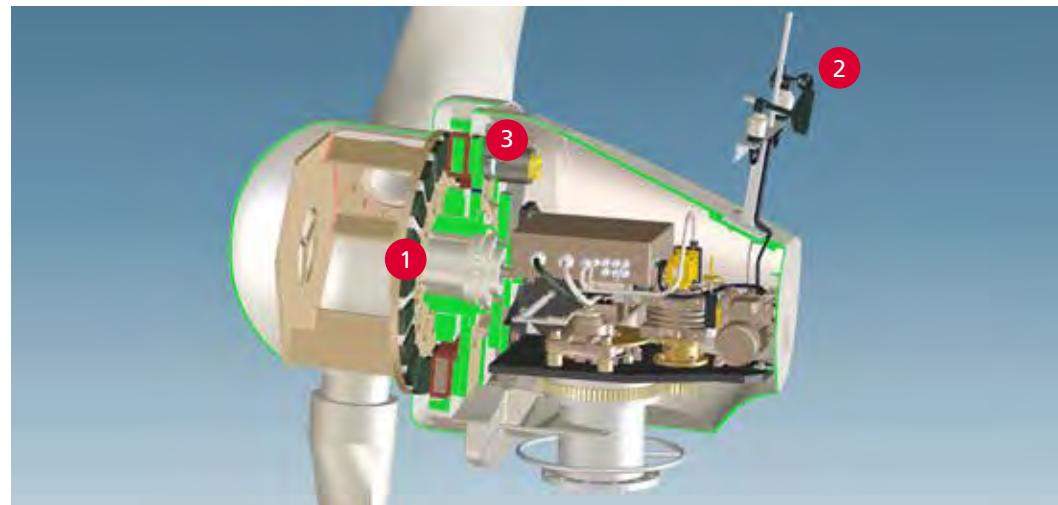
Self-consumption level = 80% – grid feed input = 20%

RESULT = you can easily run one Lely Astronaut A4 milking robot, or one Lely Vector feeding system and further equipment, totally self-sufficiently.



The Lely Aircon 10 – technical data sheet

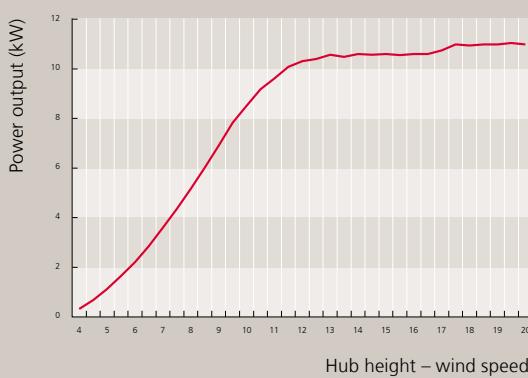
With its unique design incorporating the minimum of moving parts, the Lely Aircon 10 requires only a brief and basic annual inspection and lubrication service. This in turn results in a low cost of ownership during the expected lifetime of over twenty years. The Lely Aircon 10 is manufactured according to the requirements of DIN EN 61400-2 certification.



- 1 The generator is based on direct-drive permanent synchronous technology (gearless). Compared to an asynchronous generator the synchronous generator is 10% more efficient.
- 2 Wind is actively measured at the top of the nacelle with an anemometer for the measurement of wind velocity and a wind vane for tracking wind direction. The obvious advantage is that the nacelle is always rotated by the ACTIVE yaw drive into the ideal position.
- 3 Safety of the complete turbine system is paramount. Therefore the Lely Aircon 10 includes, as standard, multiple safety systems. The turbine includes an active hydraulic brake system and multiple sensors.

POWER CURVE LELY AIRCON 10

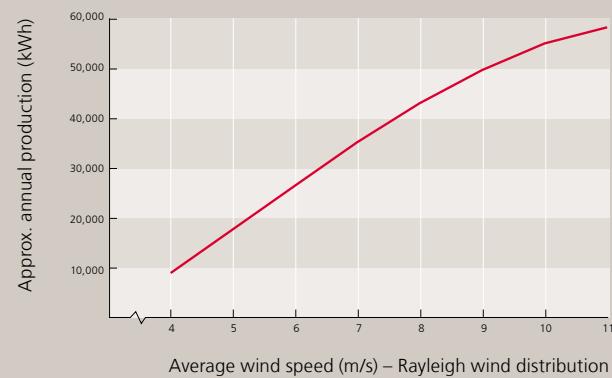
Basis: Rayleigh; air density 1.225 kg/m³
Availability 100%



Power curve independently measured and approved according to IEC 61400-12-1 at the test location.

ESTIMATED YIELD LELY AIRCON 10

Basis: Rayleigh; air density 1.225 kg/m³
Availability 100%



Estimated output, based on certification conditions and the respective Weibull distribution at the test location. The stated output may vary at your location!

Zzzzzz

Sleep well!

The aerodynamic blade shape, the absence of gears and the unique inverter technology for low noise frequency make the Lely Aircon farm turbines the quietest turbines in the marketplace. Even at wind speeds above 10 m/s, the turbine remains exceptionally silent. This means that the turbine can be located relatively close to urban areas.

Aerodynamic blade shape

The blade design and operation ensure the best results in terms of both low noise and maximum yield. The blade was designed according to the aerodynamic stall function, which is one of the safety systems that regulates speed and avoids excessive speed.

Unique inverter technology

Due to direct synchronisation of one inverter to the generator, noise from the electrical system is reduced significantly.

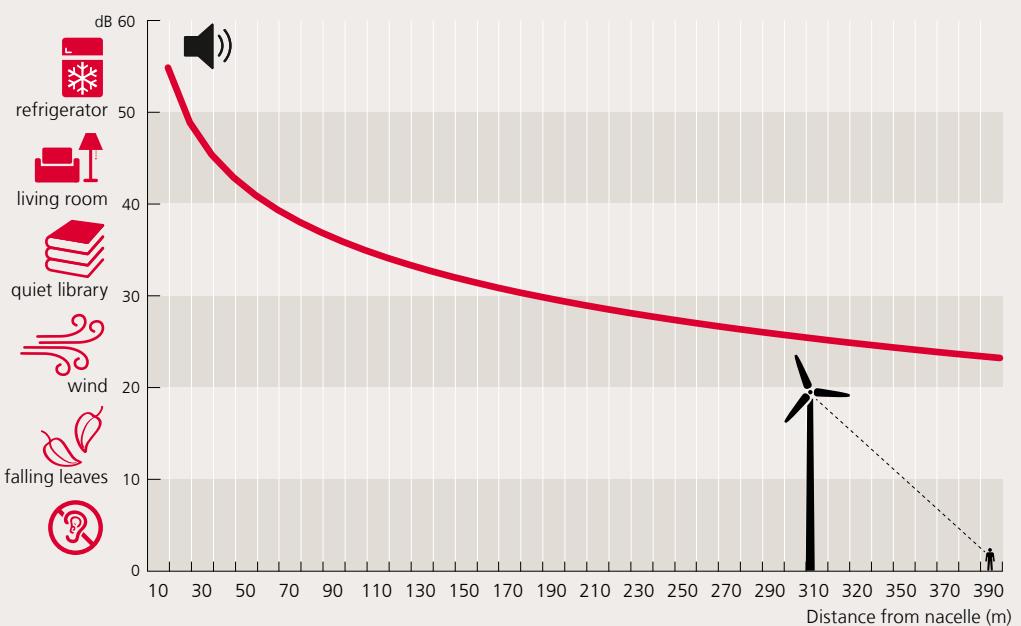
No gears, low noise

The generator is equipped with permanent synchronous technology which makes gears unnecessary and therefore helps limit noise.



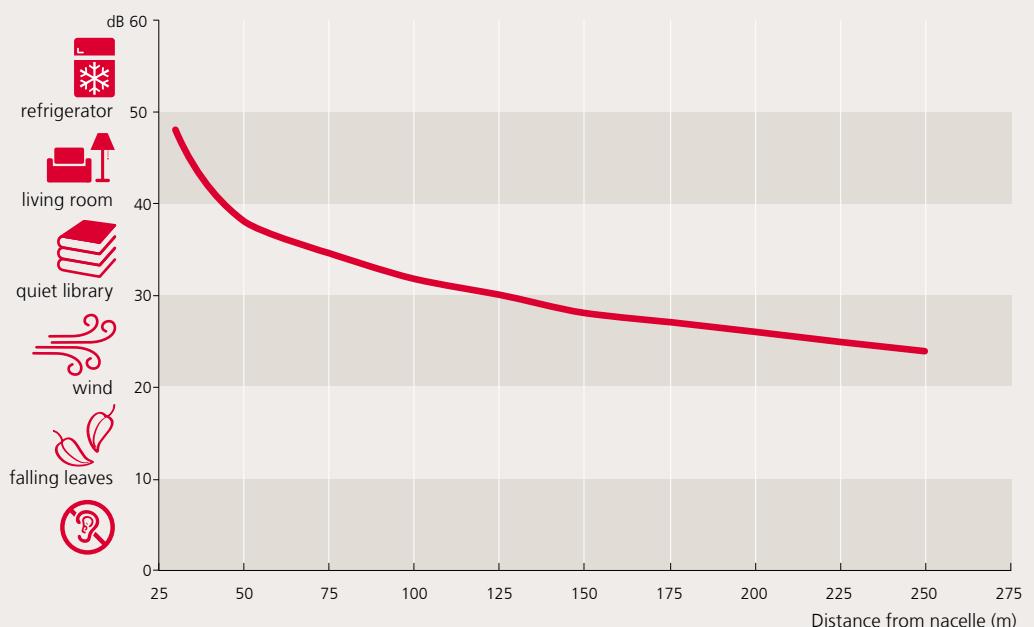


Noise level – Lely Aircon 10



The Lely Aircon 10 is virtually inaudible at a distance of 60 m (slant angle from nacelle).

Noise level – Lely Aircon 30



The Lely Aircon 30 is virtually inaudible at a distance of 35 m (slant angle from nacelle).



The Lely Aircon 30 makes your farm energy neutral

The Lely Aircon 30 has been specially developed to cover the internal consumption of larger consumers.

The benefit of your Lely Aircon 30 farm turbine:

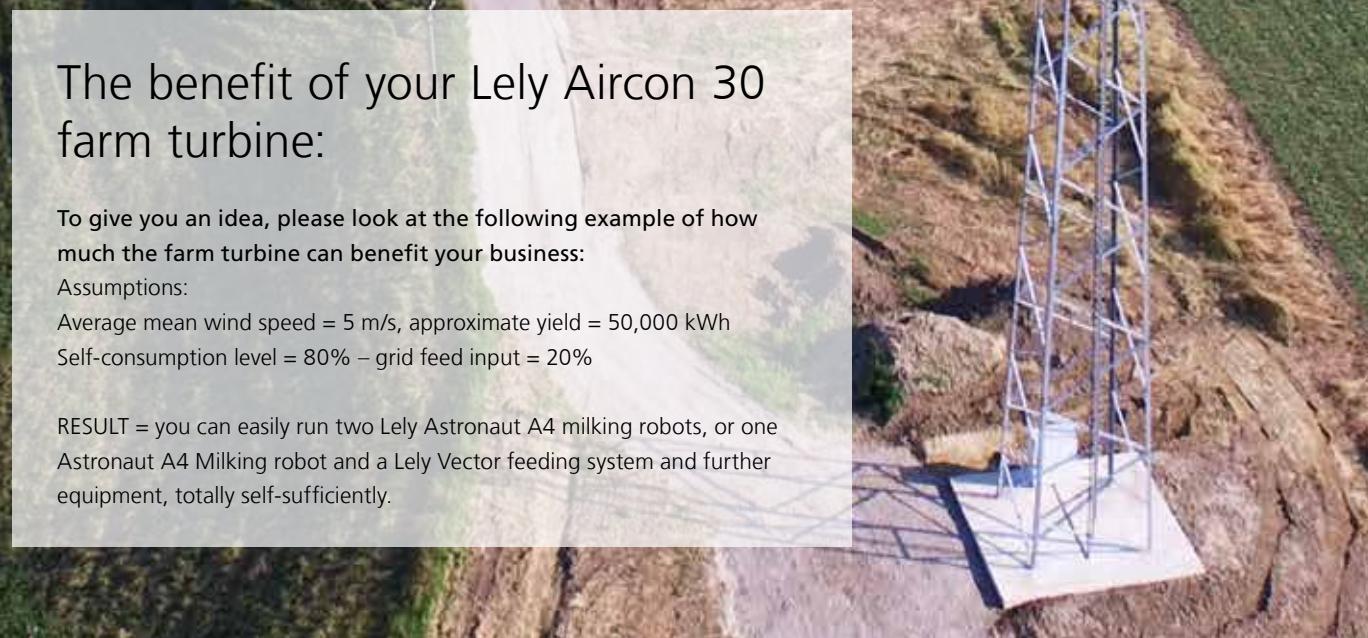
To give you an idea, please look at the following example of how much the farm turbine can benefit your business:

Assumptions:

Average mean wind speed = 5 m/s, approximate yield = 50,000 kWh

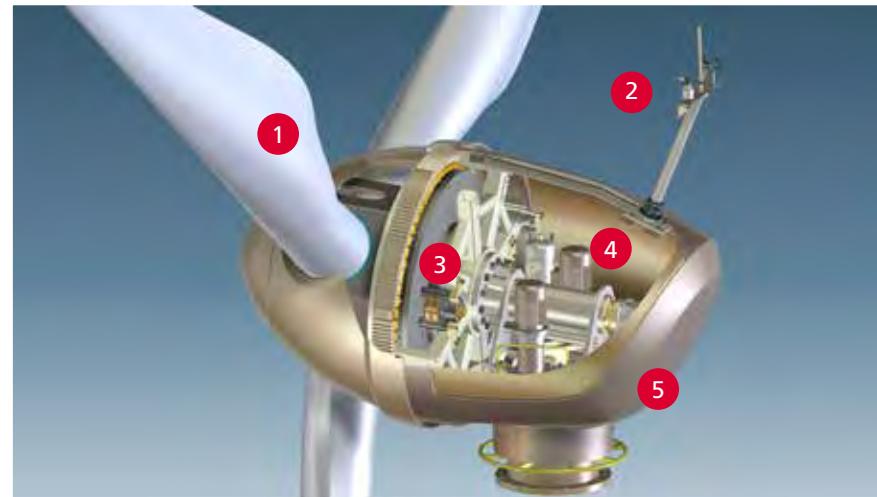
Self-consumption level = 80% – grid feed input = 20%

RESULT = you can easily run two Lely Astronaut A4 milking robots, or one Astronaut A4 Milking robot and a Lely Vector feeding system and further equipment, totally self-sufficiently.



The Lely Aircon 30 – technical data sheet

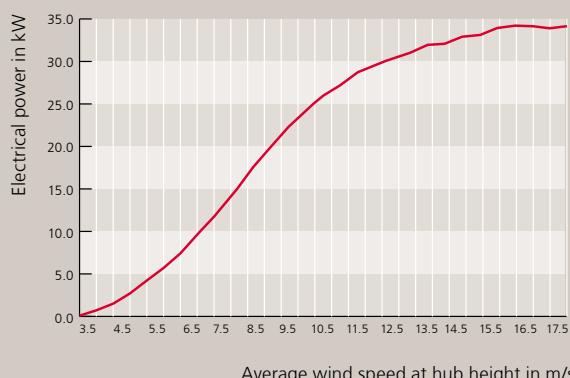
Through its entire development, from production to providing spare parts, our Lely Aircon small wind turbines are designed and manufactured according to the highest standards in the wind industry. As such, we focus on safety and high engineering standards, to provide you with the perfect high-quality product for your needs with minimal total costs of ownership (TCO).



- 1 Blades with tip brake for maximum safety.
- 2 Active measurement of the wind speed and direction for optimum yaw control.
- 3 Gearless direct-drive permanent synchronous generator with high power density and central permanent lubrication (low maintenance).
- 4 Yaw drive adjustment via two interlocking motors for maximum stability in the wind. Storm mode shut-off within 15 s (90 degrees).
- 5 Active cooling system for extreme-high-wind areas.

POWER CURVE LELY AIRCON 30

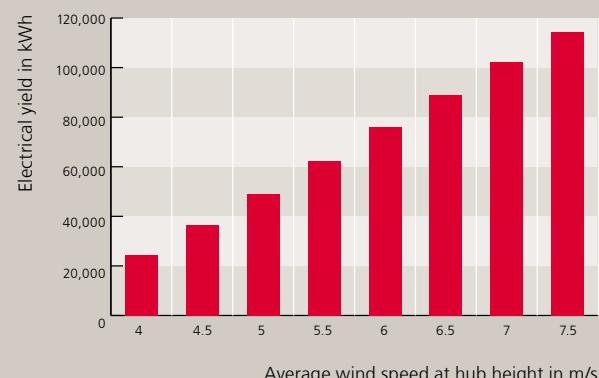
Basis: Rayleigh; air density 1.225 kg/m³
Availability 100%



Power curve independently measured and approved according to IEC 61400-12-1 at the test location.

ESTIMATED YIELD LELY AIRCON 30

Basis: Rayleigh; air density 1.225 kg/m³
Availability 100%



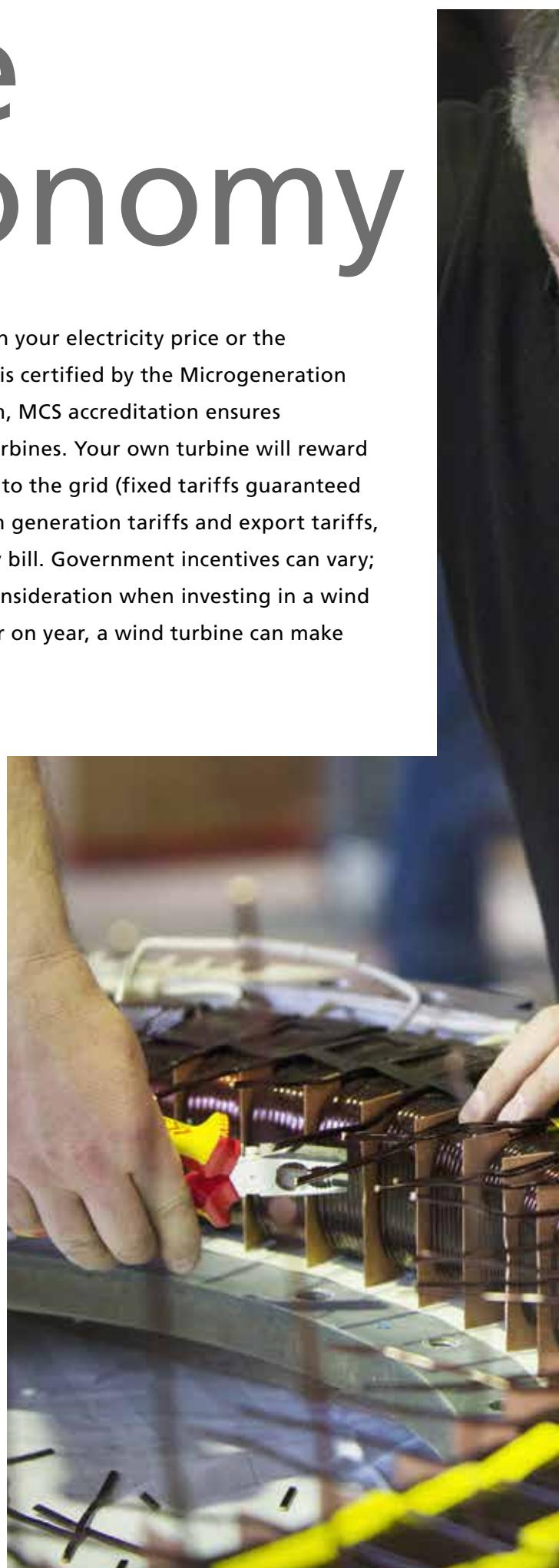
Estimated output, based on certification conditions for a 30 m tower and the respective Weibull distribution at the test location. The stated output may vary at your location!

Turbine economy

'The return on investment is either dependent on your electricity price or the incentives available in your country. The turbine is certified by the Microgeneration Certificate Scheme (MCS). In the United Kingdom, MCS accreditation ensures entitlement to generous tariffs for small wind turbines. Your own turbine will reward you with all the energy generated and exported to the grid (fixed tariffs guaranteed for twenty years). In addition to the income from generation tariffs and export tariffs, you will also benefit from savings to your energy bill. Government incentives can vary; therefore self-consumption should be a major consideration when investing in a wind turbine. As electricity prices look to increase year on year, a wind turbine can make significant savings on your electricity bill.'

Payback and return on investment

As one of Lely's core values is honesty, it would be inappropriate for us to quote a payback calculation based on anything other than your own specific site location criteria. On the one hand, the payback time of a wind turbine is very site-dependent; on the other hand, incentives from FIT (Feed in Tariffs) and current electricity prices must also be configured. Therefore, Lely offers and strongly recommends a detailed site survey, which includes all criteria of the site, wind speed, obstacles such as buildings and trees, together with the immediate geographical data of the area, plus incentives. Based on such a location survey, Lely can then discuss how the payback for your wind turbine will look. In this way Lely is not promising a payback time that is unrealistic. Please ask us if you would like more information or a site survey.

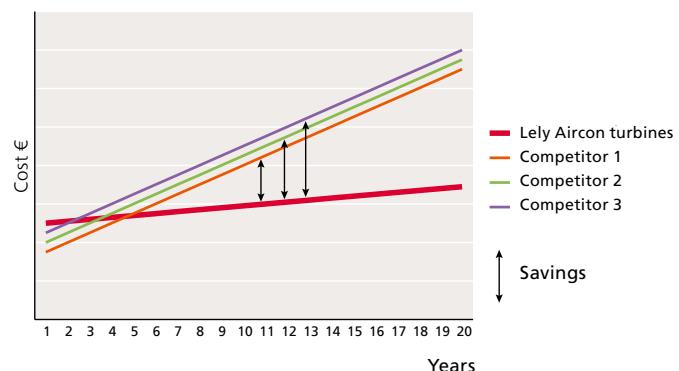




TCO – total cost of ownership

The Lely Aircon farm turbines are designed for a lifetime of twenty years. That means that all machine parts need to be well designed and thought through for longevity. The total cost of ownership, which includes service and maintenance, of the Lely Aircon farm turbines is 40% – 55% cheaper in comparison to other products. Whereas the competition have gearbox-driven machines that need a new gearbox after approximately ten years, the Lely Aircon farm turbines only need their yearly service check.

TCO comparison of Lely Aircon turbines to other small wind turbines



No gears, low costs

Minimal moving parts in the turbine mean huge benefits in terms of reliability and durability, as well as keeping service costs to a minimum. This in turn results in low ownership costs during the expected lifetime of over twenty years.

Safety factors on parts designed

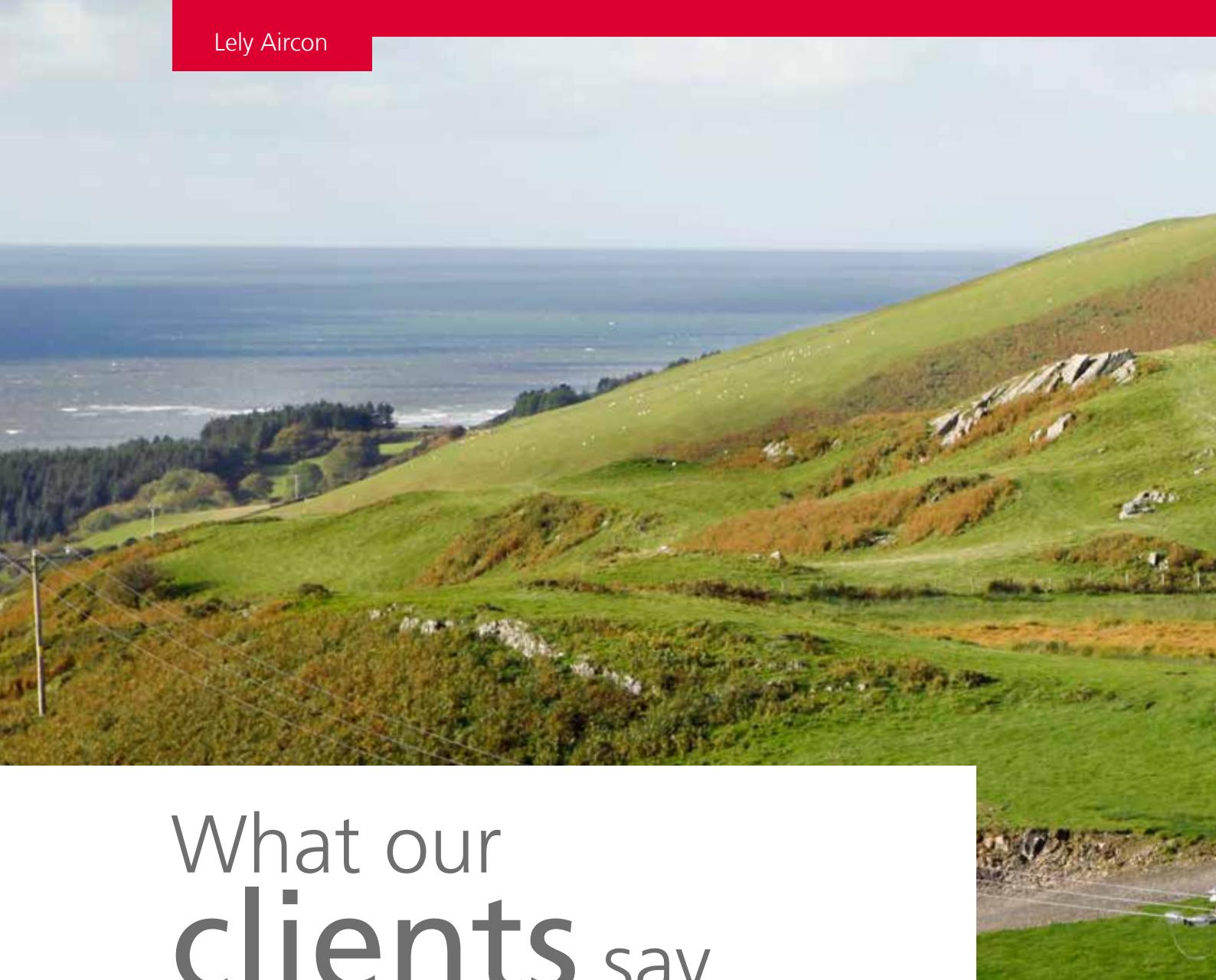
The standard safety margins on all mechanical and functional parts are both met and exceeded. An example of this would be the main rotor shaft bearing, which has been calculated to show a longevity of up to 47 years. (Operation and revolution under nominal power.)

Prepared for the future

All our development efforts are also considered to cover future product add-ons. Think about off-grid systems. The technology in our turbines is already prepared for the future.

Smarter, faster, stronger

Three powerful statements saying exactly why Lely machines stand out from their competitors. Innovative thinking by our engineers often results in surprisingly effective solutions for making larger and larger machines even more efficient. Durability and ease of operation are always key to these efforts. Therefore, we at Lely say quite rightly: 'we are the innovators in agriculture'.



What our clients say

Craig Johnstone

Aberdeenshire, Scotland

'We wanted to utilise the wind resources in the north-east of Scotland, but were restricted by the proximity of our neighbours and concerns over noise. The only turbine in the market that complied with the strict planning conditions was the Lely Aircon 10. Since installation in 2012, we have received no complaints from our neighbours, which is testament to the quality of the blade design.'

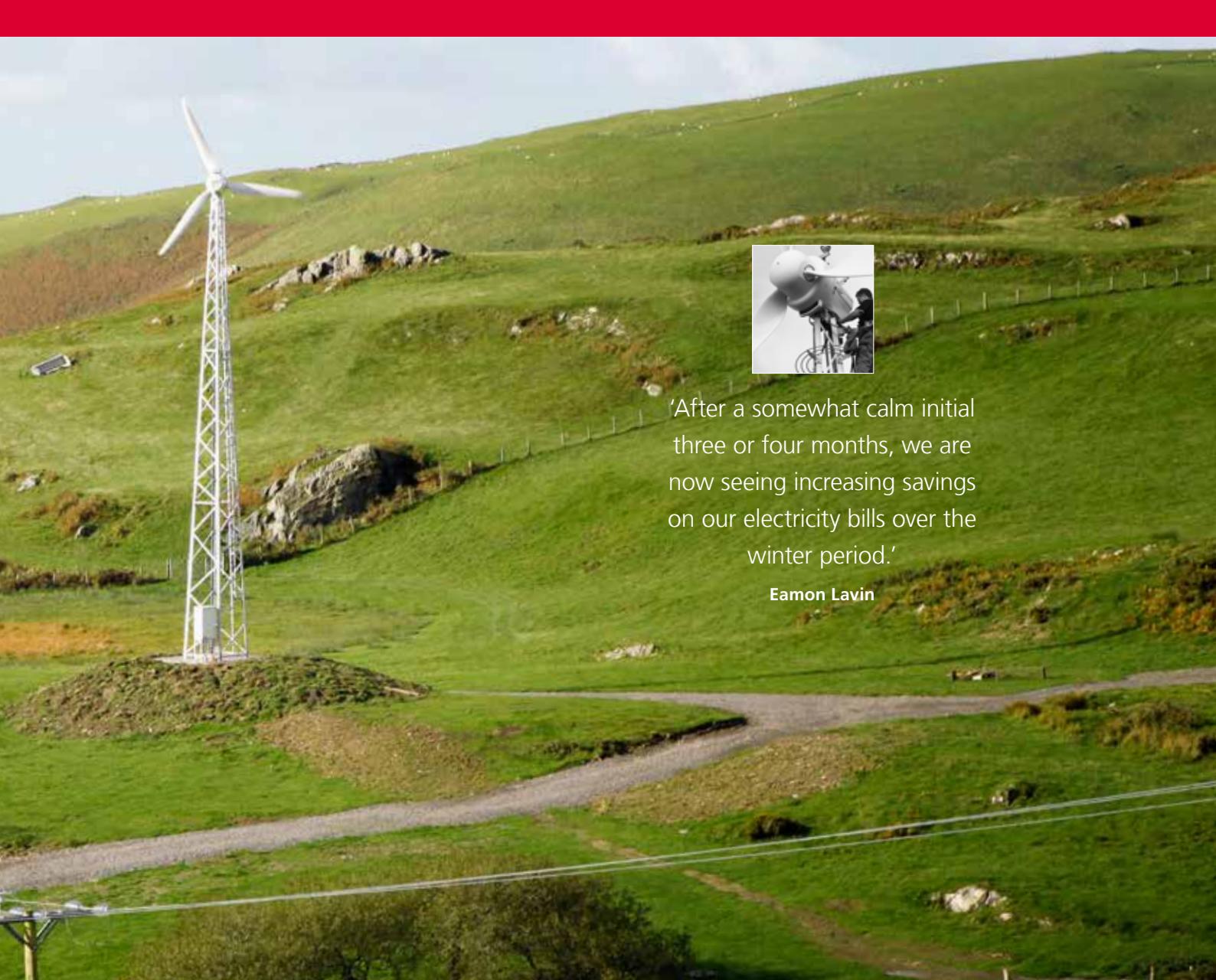
We have found that Lely Aircon can provide very efficient on-site support. The ability to access the turbine via the internet is invaluable, as it enables us to check that it is performing as designed. There has been a lot of scaremongering in the press regarding the negative impact of wind turbines on wildlife. We have found that our horses are unaffected by the proximity of the turbine and happily graze nearby, while our fields and garden still have an abundance of birds!'

Thomas J. Wineman Principal

Clean Energy Design, USA

'As a Lely Aircon 10 dealer in the United States for the past three years, I continue to believe that this turbine offers by far the best available technology in its size range. I have six of these machines installed and operating. I chose this machine after extensive research because its sophistication is comparable to utility-scale machines. The engineering is superior to other machines in its class, as are its control, production and safety features. The machine is both attractive and quiet, making it particularly neighbour-friendly. Over the past three years, I have found the Aircon organisation responsive to work with. They have been willing to go the extra mile to meet a client's particular needs, and they have shown a complete commitment to their product.'

I believe this product has a great future in both the United States and the world market.'



'After a somewhat calm initial three or four months, we are now seeing increasing savings on our electricity bills over the winter period.'

Eamon Lavin

Ian Greaves

FRSA, St Eval Candle Company Wadebridge,
United Kingdom

'The Lely Aircon 10 was installed at our candle manufacturing factory in the village of St Eval in Cornwall in November 2011. It has been very reliable and we have made significant savings on our energy bills over the past year. In fact the turbine is so quiet in operation and visually non-intrusive, we sometimes forget it's even there. After more than a year of ownership, I am confident that the Lely Aircon 10 has proved to be the correct choice of turbine and will continue to serve our needs well into the future.'

Eamon Lavin

Lavin Fruit & Veg Ltd. Castlebar, Ireland

'We installed a Lely Aircon 10 on an exposed site close to our fruit and vegetable processing plant near Castlebar, County Mayo in March 2012. After a somewhat calm initial three or four months, we are now seeing increasing savings on our electricity bills over the winter period. The turbine is operating reliably and proving resilient to the occasional Atlantic storm, which is reassuring. We can therefore confidently recommend the Lely Aircon 10.'

Edmond Murphy

Dunhill, Ireland

'I installed a Lely Aircon wind turbine on my poultry and dairy farm in Dunhill, County Waterford in December 2009. Since installation, the turbine has made me big savings on my electricity bills. It is very quiet in operation and appears to be an extremely strong turbine, operating safely and smoothly and without any incidents in all kinds of wind conditions over the past four years. Despite being located in view of the ocean and just 2 km away, there is no sign of corrosion on the turbine or tower. Overall I am very pleased with my Lely Aircon 10.'



Passionate about farming

Lely has a long and deep history of recognizing the needs of modern farmers. Our products are developed with the cow as starting point. We strive to let her excel and as such, we supply products to farmers and contractors ranging from forage harvesting, to feeding, housing, caring, milking and energy sourcing. In addition we boast specific knowledge and experience in facilitating farmers to get the best out of their equipment. As such our in-depth knowledge of the complete farm cycle – from grass to glass – is unrivalled in the agricultural business.

We are committed to a sustainable, profitable and enjoyable future in farming.

Lely really cares for the environment.

Lely, Astronaut, Astri, Atlantis, Attis, AWS, C4C, Calm, Caltive, Capsule, Commodus, Compedes, Cosmix, Discovery, F4C, Fertiliner, Gravitor, Grazeway, Hibiscus, Hubble, I-flow, InHerd, Juno, L4C, Lely Center, Lelywash, Lotus, Luna, Nautilus, Orbiter, Quares, Qwes, SAE, Shuttle, Splendimo, Storm, T4C, Tigo, Vector, Viseo, Voyager, Walkway and Welger are registered trademarks of the Lely Group. Lely reserves all rights with respect to its trademarks. Any unauthorized use of any Lely-owned trademark or any use of a trademark that is confusingly similar to, or likely to cause confusion with a Lely-owned trademark, would constitute infringement of Lely's exclusive rights. All rights reserved. The information given in this publication is provided for information purposes only and does not constitute an offer for sale. Certain products may not be available in individual countries and products supplied may differ from those illustrated. No part of this publication may be copied or published by means of printing, photocopying, microfilm or any other process whatsoever without prior permission in writing by Lely Holding S.A. r.l. Although the contents of this publication have been compiled with the greatest possible care, Lely cannot accept liability for any damage that might arise from errors or omissions in this publication.

The performance data shown for the Lely Aircon turbine are data at the time of certification. Information, data, test conditions and changes and other factors may change at any time without notice. Comparisons to other manufacturers are data cited from public information available in the Internet. The other manufacturers are not named directly. Lely Aircon does not represent or warrant that any such data are necessarily accurate.