ENERGY TRANSITION SPOTLIGHT

IFM Investors

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Wind turbine, Vestas

Renewing renewables

How repowering windfarms will be a key step in achieving net zero targets

Many of Europe's wind turbines are midway through their planned life. But rather than being a threat to net zero targets, upgrading existing infrastructure is an opportunity to give wind energy a powerful boost.

Europe's first generation of large-scale onshore windfarms are about to have a midlife crisis. About 20% of the continent's wind turbines are at least 15 years old. In countries that were early adopters of the technology the figure is even higher, with about 50% of turbines in Spain, Germany and Denmark aged 15 years or older.[1]

Given the age of Europe's early generation wind turbines and the comparatively lower expected life of these turbines, large swathes of Europe's wind capacity will either be decommissioned or require renewal in the near future. The challenge of ageing wind turbines comes just as Europe is seeking to expand its renewable energy capacity to meet net zero targets and to ensure energy security in an increasingly uncertain geopolitical environment.

[1] The problem with Europe's ageing wind farms (ft.com)

To meet this challenge, energy providers will need to partner with long-term patient capital willing to fund the significant investment required for the energy transition, while also refurbishing ageing capacity. Some energy providers and investors – such as ERG and IFM Investors, through investments in assets supporting the energy transition – have already begun to confront this challenge. ERG is a long-established Italian energy group that over recent years has transitioned into a fully renewable energy business with wind and solar installations across Europe. IFM Investors became a strategic partner to ERG in 2022, seeking to support the firm's growth in line with its wider strategy.[2] Though these and similar commitments, investors can aid the global transition to net zero, potentially capturing value as this transformation occurs.

Growing capacity through renewal

Industry group Wind Europe estimates that Europe must double its wind energy capacity by 2030 "to meet its climate and energy security goals".[3]

In this context, the ageing of Europe's wind turbines looks like a challenging problem. But industry experts argue it represents a major opportunity to repower existing assets and accelerate the growth of wind capacity.

Over the last 20 years wind turbine technology has advanced dramatically. Repowering wind turbines – upgrading the ageing estate with state-of-the-art turbines – will not only keep existing wind farms operational but will deliver huge improvements in generating capacity that will help achieve renewable targets – all without requiring an expansion of a wind farm's geographic footprint.

The potential for repowering to help Europe build energy security and accelerate its journey to net zero is widely recognised. Wind Europe has described repowering as a "unique opportunity" to rapidly increase wind energy production in Europe.

It is a view long shared by the European Commission, and the 2018 Renewable Energy Directive required streamlining for permit approvals for repowering projects.[4] While approvals processes may still not be as rapid as many would like, the European Union has clearly indicated its belief in the importance of repowering. Moreover, the benefits of repowering are well-proven and are also reflected in the work undertaken by ERG in recent years:

- Higher energy capacity, more than 2.5 times higher than existing levels;
- Higher energy production, with peaks more than three times higher than initial generation;
- Fewer wind turbines for a given capacity, cutting turbines numbers by almost half;
- No additional land required.

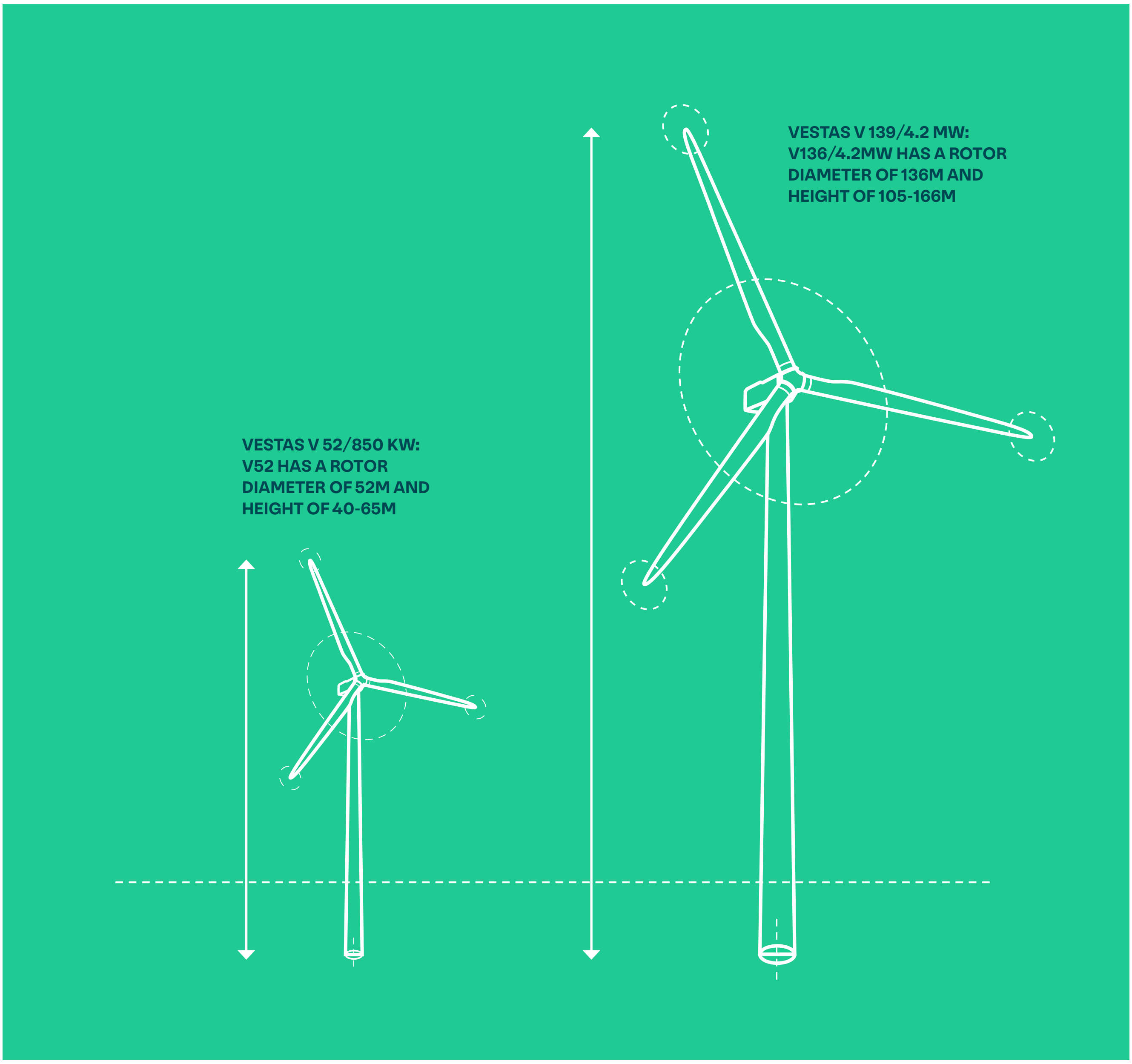
Blade mould in the Nakskov Blade Factory, Vestas

[2] IFM Investors is an indirect shareholder of SQ RENEWABLES S.P.A ("SQR"), which is the company holding a controlling stake in ERG S.P.A.
[3] Repowering wind farms: a major opportunity for Europe | WindEurope
[4] Directive - 2018/2001 - EN - EUR-Lex (europa.eu)

Turbine technology

The potential of repowering stems from technological advances over the last 20 years that have enabled the scale and efficiency of turbines to increase significantly.

An average 20-year-old turbine is about 90 metres in maximum height to the tip of an upright blade and has a generating capacity of 800 kW. In comparison, the latest turbines vastly overshadow these ageing installations, reaching heights of up to 240 metres, with a generating capacity of up to 7,000 kW each.[5]



[5] The problem with Europe's ageing wind farms (ft.com)

One of the new turbines at Partinico-Monreale wind farm

Repowering in Sicily

Repowering existing wind farms in Italy is a central plank of ERG's renewables strategy. The group plans to increase its total renewables capacity both organically and through M&A and repowering will account for a significant share of this expansion plan.

At IFM, this kind of active asset management is vitally important to creating value across our entire portfolio, and repowering is a great example of how there is significant value in the long-term ownership of renewable projects that private capital is able to unlock.

In addition to creating value for investors, our approach to repowering further underlines IFM's commitment to the UN Sustainable Development Goals (SDGs). Within our net zero investments, IFM aims to align with the SDGs when investing, and repowering of wind farms directly contributes to four of these SDGs.

The first of ERG's repowering projects to begin generation was the Partinico-Monreale wind farm in the Palermo province of Sicily, which came online in 2023.

The wind farm at Partinico-Monreale first began operations in 2005, with 19 Vestas V52 turbines each with rotors 52m in diameter. The original site had a generating capacity of 16 MW and energy production of 27 GWh.

ERG's repowering project has replaced these 19 units with just ten state-of-the-art Vestas V136 turbines. No new land was required, and power capacity and power production has been boosted dramatically (see Figure 1). Similar repowering projects at ERG's Camporeale and Mineo-Militello-Vizzini wind farms halved the number of wind turbines, with the 12 newly installed turbines

FIGURE 1

REPOWERING ERG'S WIND FARMS

	PARTINICO-MONREALE		CAMPOREALE		MINEO-MILITELLO-VIZZINI	
	Pre-repowering	**Post-repowering**	**Pre-repowering**	**Post-repowering**	**Pre-repowering**	**Post-repowering**
Turbines:	19 units	10 units	24 units	12 units	59 units	24 units
Capacity:	16 MW	42 MW	20 MW	50 MW	50 MW	101 MW
Production:	27 GWh	94 GWh	31 GWh	86 GWh	77 GWh	234 GWh

Source: IFM Investors

in Camporeale having a generation capacity of 50.4MW, and increasing annual production from approximately 31 GWh to approximately 86 GWh. Mineo-Militello-Vizzini similarly went from 59 to 24 turbines, increasing annual production from 77 GWh to the 234 GWh.

The repowered Partinico-Monreale wind farm now produces sufficient electricity for about 18,000 households and avoids 44,000 tonnes of CO2 emissions that would have been created were the equivalent energy to be produced by fossil fuels.

The successful completion of the Partinico-Monreale and similar repowering projects demonstrates the potential of repowering, aided by patient pension capital, to governments aiming to achieve their emissions reduction policies. IFM believes that the private sector, particularly the energy sector, has a role to play in helping meet global carbon reduction targets, by working with governments to enable the provision of the capital investment required for such goals.

Replacing smaller scale turbines with larger state-of-the-art installations still requires thorough assessment of environmental impacts and sensitivity to local communities. However, because repowering involves upgrading existing assets rather than developing new wind farms on virgin territory, the obstacles should typically be lower.

Recycling

Repowering existing wind farms can also be carried out with the highly efficient use and re-use of materials. There is an active market for the resale of decommissioned wind turbines, either whole or as parts for maintenance, while the masts are suitable for recycling. At Partinico-Monreale, 100% of the existing wind turbines and masts have been recycled or sold for re-use in this way.

The age of Europe's wind power infrastructure is leading to a significant number of assets becoming obsolete and last year 736 MW of wind generating capacity was decommissioned. However, repowering enabled some of these decommissioned assets to be replaced with improved infrastructure and in total repowering added 1.5 GW, accounting for 8% of all wind capacity added in Europe during 2023.[6]

With one in five European turbines due to reach the end of their expected lifespan with a decade, repowering Europe's existing wind energy infrastructure will be a significant opportunity for active investment and will play a vital role in achieving energy security and net zero targets.

[6] Wind energy in Europe: 2023 Statistics and the outlook for 2024-2030 | WindEurope

ALIGNMENT WITH UNITED NATIONS SUSTAINABLE DEVELOPMENT GOALS

The various aspects of repowering demonstrated at Partinico-Monreale and other repowering projects align with a number of the United Nations Sustainable Development Goals (SDGs).

UN SDGs	Our contribution	UN SDGs' targets we support	Alignment
7 AFFORDABLE AND CLEAN ENERGY	As a committed investor in developers and operators of renewable energy, IFM's strategy includes a focus on affordable and clean energy.	**Target 7.2** By 2030, increase substantially the share of renewable energy in the global energy mix.	**1)** Renewable power produced **2)** Installed renewable capacity
8 DECENT WORK AND ECONOMIC GROWTH	IFM is committed to protecting labour rights* and prioritising a safe and secure working environment for all workers in portfolio companies.	**Target 8.5** By 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value. **Target 8.8** Protect labour rights and promote safe and secure working environments for all workers, including migrant workers, in particular women migrants, and those in precarious employment.	**1)** Employment, both full-time and contract, across ERG **2)** Focus on reducing Lost Time Injury frequency rate across both full-time and contract employees at ERG
11 SUSTAINABLE CITIES AND COMMUNITIES	IFM's strategy of investing in the development of renewable power supports the sustainable development of urban centres. Our investments also support the development of local communities by offering new job opportunities in the area and through the provision of community benefit schemes.	**Target 11.6** By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management. **Target 11.8** Support positive economic, social and environmental links between urban, peri-urban and rural areas by strengthening national and regional development planning.	**1)** Recycled waste **2)** Avoided emissions **3)** Percentage of revenues ERG invests in projects with community benefits
13 CLIMATE ACTION	Investments in IFM's portfolio use natural resources (e.g. wind or sun) to generate renewable energy, which is generally considered to mitigate climate change.	**Target 13.2** Integrate climate change measures into national policies, strategies and planning.	**1)** Avoided emissions

* As part of the acquisition due diligence process, IFM seeks to ensure that all targeted investments made by IFM are aligned with labour rights under the UN Global Compact.

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