

PRESS RELEASE

Issue date: Tuesday 10th November – Embargoed until 00:01 Wednesday 11th November 2020

UK initiative launched to advance technology for sustainable and recyclable wind turbine blades

- Globally, around 14,000 wind turbine blades are reaching the end of their usable life within the next two to three years - that's almost 50,000 tonnes of blades that are currently destined for landfill or incineration.
- SusWIND has been launched to discover and demonstrate viable ways to recycle composite wind turbine blades; to explore the use of sustainable materials and processes in developing composites for blades; and to innovate in design to future-proof the turbine blades of tomorrow.
- Investing now in the future of composites sustainability will unlock the use of recycled and recyclable composites for the next generation of sustainable products in areas such as renewable energy, transportation and infrastructure. This will create a future where recycled composites are a viable, sustainable and low carbon material for use across multiple industries.

The National Composites Centre (NCC) has today launched an initiative to accelerate the development of technology, processes and materials that address the recyclability and future development of composite wind turbine blades.

Delivered in partnership with the Offshore Renewable Energy (ORE) Catapult and supported by The Crown Estate and RenewableUK, [SusWIND](#) is helping to drive the future sustainability of wind turbine technology. It brings together leading stakeholders in the composites industry and energy sector to solve the following sustainability challenges:

- **RECYCLE:** Demonstrating viable technologies for recycling the existing stock of wind turbine blades, many of which are reaching the end of their life, and then using the waste materials to develop secondary applications such as composite parts in electric vehicles, bridges and even in thermal insulation.
- **SUSTAIN:** Driving the use of more sustainable materials, such as bio-derived feedstock or thermoplastics in developing composites for turbine blades, rather than from unsustainable sources or with limited potential for economic recyclability.
- **DESIGN:** Developing innovative new approaches based on design for disassembly, utilising sustainable materials and with end-of-life strategies in mind, therefore future-proofing the next generation of wind turbine blades.

Wind energy is one of the fastest growing sources of renewable energy with predicted global capacity expected to reach approximately 5,000GW (1) for onshore and 1,400GW of offshore capacity by 2050 (2). The UK has the largest offshore wind capacity in the world (3,4) with over 14GW of total capacity. In 2019, 20% of the UK's electricity supply was generated from wind power, which is enough to power more than 18 million homes and saves over 29 million tonnes of CO2 annually.

This continues to grow; the UK is on track to exceed 40GW in the pipeline by 2030 – that's enough to power all homes across the country. This world-leading position for the UK will continue well into the future and drive our commitment to net zero by 2050.

Technology in turbine blade design and manufacture has advanced rapidly over the last 40 years. Today, approximately 2.5 million tonnes of composite materials are in use in the wind sector globally (5), and using composites has made wind turbine blades lighter, stronger, longer lasting and even larger, enabling the current generation of blades to exceed 100m in length. This drives the turbine efficiency up and the costs of energy production down. A typical wind turbine takes just six to nine months of operation to generate as much energy as it consumes in its entire lifecycle. It is also able to pay-back the carbon released in its lifecycle within a similar timeframe (6).

Although most of the existing components and materials used in wind farms are recoverable and recyclable, the blades are a bigger challenge and are one of the missing pieces that would enable the industry to achieve a truly zero waste outcome. Around 14,000 wind turbine blades are reaching the end of their usable life and facing either disposal in landfill or incineration. That's almost 50,000 tonnes of industrial waste where the valuable composite material could be recovered and recycled to be used for many other applications.

Richard Oldfield, Chief Executive of the NCC, said: "Composites are a key enabler for the success of wind energy and the role that it plays in delivering a low carbon global economy. But it is apparent to engineers, economists and environmentalists alike that we need to find a more sustainable way forward. We must commit to transforming the current linear blade product lifecycle into an increasing circular process that forms part of a larger future market for low carbon, recycled composites materials. Investing now in the future of blade sustainability will help unlock the use of recycled composites for the next generation of sustainable transportation and infrastructure. We're excited to work with key partners and the wind industry through this ambitious programme to deliver a more sustainable future."

Dr Stephen Wyatt, Research and Innovation Director at ORE Catapult, said: "As we strive to achieve net zero, offshore wind capacity globally is set to grow rapidly to meet our low carbon energy needs. It's therefore vital that we work to minimise the direct impact on our environment and look for new and innovative ways to recycle the existing fleet of wind turbines and their blades. We must also work at the same time to future-proof technology for the next generation through the use of composites or more environmentally friendly and sustainable materials. We are pleased to be working on SusWIND to solve this major industry technology challenge."

Ambitious leasing rounds are planned for the UK by The Crown Estate which, together with the UK Government and the wind energy sector, has driven the UK's offshore wind capacity from a standing start in 2000 to meeting 10% of the UK's electricity demand by the end of 2020. However, sustainability and technology transcend borders and sectors. The outcomes of SusWIND are designed to support the global challenge for both onshore and offshore wind, reflecting the global footprint of many of the leading organisations in the industry.

Adrian Fox, Head of Offshore Assets at The Crown Estate, said: "As managers of the seabed around England, Wales and Northern Ireland, we're working closely with government, industry and stakeholders to help enable the sustainable, coordinated growth of UK offshore wind. We're delighted to support SusWIND, which offers an opportunity to help translate the important principles of circular economy, already being considered across our real estate portfolio, to further boost the environmental sustainability of wind turbines offshore."

Luke Clark, Director of Strategic Communications at RenewableUK, added: "Sustainability is at the heart of what drives the renewables industry. We regularly see old turbines from the UK being given a second life through re-use in other countries and we're starting to see reprocessing of turbine blades, for example in the manufacture of concrete. SusWIND is a welcome initiative to boost

sustainability, recycling and reprocessing of turbines as the industry gears up to help deliver the UK's net zero emissions target."

SusWIND is being delivered as part of [Sustainable Composites](#), which is looking at the whole lifecycle of composites to future-proof the aeroplanes, cars and turbines of tomorrow. Led by the NCC and CPI – two of the seven [High Value Manufacturing Catapult](#) centres – Sustainable Composites is a partnership between industry, academia and government that will harness the UK's world-leading composites research and technology development capabilities to capitalise on this rapidly growing circa £2bn global market for end-of-life recycling.

The initiative will be delivered in three waves of activities to address the sustainability challenges for wind turbine blades:

- **Wave 1** will stimulate the supply chain for blade recycling and how it leverages the broader supply chain for composites recycling demand with other sectors. Work packages including landscape mapping, exploitation routes for upscaling viable technologies and demonstrating the effective use of recycled materials in value-add products for other applications.
- **Wave 2** will demonstrate options to reduce the environmental footprint of blade manufacture through the use of more sustainable and lower impact material feedstock, and through minimising or recycling waste streams.
- **Wave 3** will develop robust guidelines to improve design for end-of-life, ensuring waste is minimised and that composite components can be disassembled for cost effective repaired, re-used, remanufactured and recycled more efficiently and cost effectively.

The NCC is looking for more companies from the energy industry to get involved in this exciting programme to help to shape the direction of this work. Email suswind@nccuk.com to find out how you can join the consortium. Together we can harness the power of engineering creativity and technology innovation to create a more sustainable future for us all.

-ENDS-

Further information

For all media enquiries, please contact:
Jools Granville, NCC Communications Director
Jools.Granville@nccuk.com

Notes to Editors

1. Watch our [short animation](#) introducing the SusWIND initiative.
2. The following additional quotes from industry are available:

Lisa Ekstrand, Senior Director and Head of Sustainability, at Vestas, said:

"We want to leave the Earth a better place than we found it. That is why our vision is to become a global leader in sustainable energy solutions and why we are to become sustainable in everything we do. We have committed ourselves to four sustainability objectives. One of these four is to produce zero-waste wind turbines by 2040 and addressing the specific challenge on recyclability of composite turbine blades is key to achieving this. We are excited to be a part of the SusWIND programme, and as founding members of the NCC we are confident that this initiative will drive technology forward to help solve this challenge that we all face."

Jim Smith, Managing Director of SSE Renewables, said:

“Harnessing the abundant supplies of wind energy in and around the UK and Ireland is one of the most important contributions SSE Renewables can make in the race to net zero. The sustainable use of the world’s resources and reducing the impact of our activities on the natural environment is just as critical. That’s why SusWIND is so important to us – as well as improving the sustainability of wind turbine blades already in use, this national initiative will help deliver a next generation of blades that can be recycled at the end of their life. In doing so we can build a truly sustainable supply chain for the wind industry in every sense.”

Daniel Kunkel, General Manager, Global Retail Network Engineering at Shell, said:

“We are committed to delivering more and cleaner energy solutions responsibly. As part of this commitment, we are developing sustainable and low carbon design innovations such as using reused and recycled materials in our products, buildings and infrastructure that reduce the carbon intensity of our Retail operations and help drive the transition to a circular economy. Shell is a key partner with the NCC and we are excited to see the benefits that the SusWIND initiative will bring and how recycled materials from decommissioned blades might be reused, for instance to create new customer offers at retail forecourts. This is particularly important as we continue our ambition to supply clean energy for electric vehicle charging.”

Bruce Valpy, Managing Director at BVG Associates, said:

“The wind industry has achieved huge successes over the years in-part due to its great “can do” attitude. The sector is a huge force towards a clean energy future and wind turbines have a really low impact on the climate, compared to other forms of electricity generation. However, finding better ways to use blades at the end of their operational life is now a “must do” for the industry – through collaboration, we can make it happen.”

3. SusWIND is part of Sustainable Composites, a national initiative that is building a supply chain – from raw material suppliers to end-of-life recycling – with the ability to deliver the next generation of sustainable composites by 2040. Led by the National Composites Centre (NCC) and the Centre for Process Innovation (CPI), it brings together industry, academia and government to accelerate the UK’s progress to zero impact carbon through the use of sustainable composite materials. See www.nccuk.com/sustainable-composites/

4. Source references:

- (1) www.irena.org/-/media/Files/IRENA/Agency/Publication/2019/Oct/IRENA_Future_of_wind_2019.pdf
- (2) <https://gwec.net/oreac-1400-gw-of-offshore-wind-is-possible-by-2050-and-will-be-key-for-green-recovery>
- (3) <https://gwec.net/global-figures/global-offshore/>
- (4) www.renewableuk.com/news/405601/RenewableUK-releases-new-global-offshore-wind-market-rankings.htm
- (5) <https://windeurope.org/policy/topics/sustainability/>
- (6) www.newscientist.com/lastword/mg24332461-400-what-is-the-carbon-payback-period-for-a-wind-turbine/

5. The **National Composites Centre** is a world-class research centre, where companies of any size and across industry sectors can access cutting-edge technology and specialist engineers. It focuses on accelerating the adoption of high-value, sustainable engineering solutions in composites, in order to stimulate growth, and enhance capability for the benefit of the UK. The NCC has over 350 composite specialists based at its Bristol facility and offers open access to cutting-edge digital

manufacturing technology for the design, and development of new composite products pulling through technology from the lab to large-scale production. Visit www.nccuk.com

6. The **Offshore Renewable Energy Catapult** was established in 2013 by the UK Government and is part of a network of Catapults set up by Innovate UK in high growth industries. It is the UK's leading innovation centre for offshore renewable energy and helps to reduce the cost of offshore renewable energy supporting the growth of the industry and creating UK benefit. Visit ore.catapult.org.uk

7. **The Crown Estate** is a unique business with a distinct heritage and a portfolio unlike any other, which includes some of central London's best places to work, shop and spend time, retail and leisure destinations across the country, and a substantial rural portfolio. As manager of the seabed and half the foreshore around England, Wales and Northern Ireland, it plays a role in the UK's world-leading offshore wind sector as well as marine aggregates, cables and pipelines. It is also responsible for the Windsor Estate, including the world-renowned Windsor Great Park. Its history can be traced back many hundreds of years. In 1961, the Crown Estate Act established it as an independent commercial business and tasked it with returning all profits to the Treasury. Over the last ten years it has generated £2.9 billion for the benefit of the nation's finances. Visit www.thecrownestate.co.uk.

8. **RenewableUK's** members are building our future energy system, powered by clean electricity. We bring them together to deliver that future faster; a future which is better for industry, billpayers, and the environment. We support over 400 member companies to ensure increasing amounts of renewable electricity are deployed across the UK and to access export markets all over the world. Our members are business leaders, technology innovators, and expert thinkers from right across industry. Visit www.renewableuk.com

9. The **High Value Manufacturing Catapult** is your partner in manufacturing innovation, harnessing the best research to transform the products you sell, the way you make them and the skills of your workforce. Whether you're looking for a better production line or support with a new product, our world-class expertise and equipment can help you to deliver a more productive and competitive operation. Visit hvm.catapult.org.uk

10. **SSE Renewables** is a leading developer, owner and operator of renewable energy across the UK and Ireland, with a portfolio of around 4GW of onshore wind, offshore wind and hydro. Part of the FTSE-listed SSE plc headquartered in Perth, Scotland, its strategy is to drive the transition to a net zero future through the world class development, construction and operation of renewable energy assets.

SSE Renewables owns nearly 2GW of operational onshore wind capacity with over 1GW under development. Its 1,459MW hydro portfolio includes 300MW of pumped storage and 750MW of flexible hydro. Its operational offshore wind portfolio consists of 487MW across two offshore joint venture sites, Beatrice and Greater Gabbard, both of which it operates on behalf of its asset partners.

SSE Renewables has the largest offshore wind development pipeline in the UK and Ireland at over 6GW, of which around 3GW is in construction or consented. It is currently constructing the world's largest offshore wind farm, the 3.6GW Dogger Bank Wind Farm in the North Sea, a joint venture

with Equinor. It also building Scotland's largest offshore wind farm, the 1.1GW Seagreen Offshore Wind Farm in the Firth of Forth, which is a joint venture with Total. [Visit SSE Renewables](#)
