

## **DecomBlades consortium awarded funding for a large, cross-sector wind turbine blade recycling project**

*A consortium consisting of ten project partners has received funding from Innovation Fund Denmark for the three-year 'DecomBlades' project which seeks to provide basis for commercialization of sustainable techniques for recycling wind turbine blades.*

Ten Danish project partners have been awarded funding from Innovation Fund Denmark's Grand Solutions program to co-fund the research and development project 'DecomBlades': a three-year project which seeks to provide basis for commercialization of recycling of wind turbine blades using sustainable solutions. The project partners are rooted in Denmark, but many operate all over the world and have the capability to implement solutions on a global scale.

The cross-sector consortium behind DecomBlades consists of Ørsted, LM Wind Power – a GE Renewable Energy business, Vestas Wind Systems A/S, Siemens Gamesa Renewable Energy, FLSmidth, MAKEEN Power, HJHansen Recycling, Energy Cluster Denmark (ECD), University of Southern Denmark (SDU) and Technical University of Denmark (DTU). Together, these partners represent the value chain required to establish a recycling industry for composite materials – from supply, to processing, to implementation.

Today 85 to 95% of a wind turbine can be recycled, but cost-efficient recycling of composite materials remains a challenge. On a global scale, an estimated 2.5 million tons of composite materials are currently in use in wind turbines.

The wind power industry produces far less composite waste compared to other industries – such as the construction, electronic, transport and shipping industries – nonetheless it is an important objective for the wind power industry to ensure sustainable recycling solutions exist for all materials used in a wind turbine. As the wind power industry grows, that responsibility becomes even bigger.

John Korsgaard, LM Wind Power Senior Director of Engineering Excellence and Chair of the DecomBlades Steering Committee, stated: "The wind power industry is committed to finding a sustainable way to dispose of these decommissioned wind turbine blades with respect to the environment, health and safety of workers, energy consumption and cost, and we simply don't yet have solutions that meet all those criteria. To create viable, sustainable, cost-efficient solutions for recycling wind turbine blades, it is essential that composite materials from blades can be incorporated into similar resource streams and processed in the same facilities."

In DecomBlades, the ten project partners will investigate and develop solutions to recycle the composite material in wind turbine blades. The project focuses on three specific processes: shredding of wind turbine blades such that the material can be reused in different products and processes; use of shredded blade material in cement production; and, finally, a method to separate the composite material under high temperatures, also known as pyrolysis.

John Korsgaard stated: "In pursuit of a carbon neutral society, recycling end-of-life materials and switching to alternative materials in cement production can play a significant role in

reducing CO<sub>2</sub> emissions. The DecomBlades project focuses on recycling technologies which can be upscaled to recycle the expected volumes of decommissioned wind turbine blades in the coming decades. The investment and commitment from this cross-sector consortium represents the next step to further the growth of these recycling industries.”

Sustainable, widely-available and cost-effective recycling solutions for composite materials will support the wind power industry – and other composite manufacturing industries – in the transition to a circular economy. The DecomBlades consortium aims to make Denmark a frontrunner in establishing the value chains for recycling solutions within a circular economy, creating jobs both in Denmark and globally within sustainable technologies.

The ten project partners are:

**Ørsted** is the world’s largest owner and developer of offshore wind farms with more than 6.000 employees globally. For Ørsted it is important that there exist sustainable recycling solutions for all parts of our wind farms. Therefore, Ørsted will take the role as project lead in DecomBlades.

**University of Southern Denmark, SDU**, will conduct environmental and economic performance assessments of the different supply chains and apply a cutting edge hybrid assessment frame based on value chain analysis, life cycle assessment, material flow analysis and multi-criteria decision support. This includes research into further development of the economic and environmental sustainability assessment frameworks that are relevant for the Danish wind turbine industry and other areas in terms of optimum recycling of composites materials.

**Technical University of Denmark, DTU**, will contribute within the fields of material characterization, engineering, assessment of material properties of reused glass fibers, surface properties and investigate the possibilities of increasing the quality and value of fibers obtained from pyrolysis.

**MAKEEN Power** will lead the work on the pyrolysis technology and will design and build a pilot pyrolysis facility dedicated to treatment of blade materials. The pilot facility will be developed and based upon existing MAKEEN Power technologies. Furthermore, MAKEEN Power will seek commercialization of pyrolysis facilities for recycling of composite materials as well as a market for recovered solids to replace new materials.

**HJHansen Recycling** will lead the work regarding the common prerequisite for all three technologies: preprocessing, i.e., cutting of blades to ensure it is possible to transport blades to recycling facilities in an economically-viable way. Furthermore, HJHansen will work with solutions on shredding of the blade materials and explore the market for use of shredded blade materials in new products.

**FLSmidth** will investigate the possibilities of using shredded blade material and products from the pyrolysis process in the cement production process. Use of blade materials in cement production can decrease the environmental impact from cement production. As a

knowledge and technology provider to the cement industry, FLSmidth's main objective within the DecomBlades project is to evaluate possible solutions for incorporating blade materials in cement production on a global scale.

**Vestas Wind Systems A/S** As the world's largest wind energy OEM, Vestas brings an extensive level of expertise around the composition and manufacture of turbine blades. In early 2020, Vestas introduced ambitious targets to increase the recyclability rate of its rotors, as well as an increased focus on addressing the decommissioning of existing blades. Vestas committed to producing zero-waste turbines by 2040. In support of the DecomBlades project, Vestas offers to provide blade samples for testing purposes. Vestas contributes a broad spectrum of knowledge on the expected lifetime of a blade, its production volume, and on assessing the potential for recyclability.

**Siemens Gamesa Renewable Energy** is a leading supplier of wind power solutions all over the world and a key player and innovative pioneer in the renewable energy sector. With installed products and technology in more than 75 countries and a total capacity base of over 105 GW, Siemens Gamesa Renewable Energy is thriving to be the global leader in the renewable energy industry while driving the transition towards a sustainable world. The company will contribute its extensive knowledge on blade structure and design, market expectations to commercialization of recycling of composites as well as promoting circularity in the wind sector to the project.

**LM Wind Power – a GE Renewable Energy business** is a world leading designer and manufacturer of wind turbine blades, with more than 228,000 blades produced since 1978 corresponding to 113 GW installed capacity. LM Wind Power will lead the work to establish product disposal specifications for wind turbine blades, utilizing its expertise on blade construction and material composition. In order to support efficient waste management of decommissioned blades and new business models for recycling methods, LM Wind Power will work with project partners Siemens Gamesa Renewable Energy and Vestas Wind Systems A/S to contribute knowledge on expected blade lifetime and to assess the value of recycled materials.

**Energy Cluster Denmark, ECD**, is the national Danish innovation network and cluster organization for the entire energy sector and gathers Danish companies to be part of these new supply chains. Furthermore, Energy Cluster Denmark will develop new research and development projects based on the opportunities emerging from the technical solutions being developed and matured during the DecomBlades project.

**Contact Information****Ørsted**

Tom Christiansen  
tomlc@orsted.dk  
+45 9955 6017

**University of Southern Denmark**

Erik Skov Madsen  
esm@iti.sdu.dk  
+45 5164 4015

**DTU Wind Energy**

Simon Rubin  
siru@dtu.dk  
+45 9351 0826

**MAKEEN Power**

Anders Bjørn  
abj@makeenenergy.com  
+45 8740 3092

**HJHansen Recycling**

Sophus Borch  
sbo@hjhanzen.dk  
+45 2449 5541

**FLSmidth**

Rasmus Windfeld  
rasmus.windfeld@flsmidth.com  
+45 4044 6060

**Vestas Wind Systems A/S**

Kristian Holmelund Jakobsen  
krhja@vestas.com  
+45 5221 1467

**Siemens Gamesa Renewable Energy**

Lisa-Marie Von Raepke  
LISA.VONRAEPKE@siemensgamesa.com  
+49 1520 2691609

**LM Wind Power**

Katelyn Huber  
Katelyn.huber@lmwindpower.com  
+45 5012 0459

**Energy Cluster Denmark**

Sune Falther

[sfa@energycluster.dk](mailto:sfa@energycluster.dk)

+45 6160 0180