

## Project TwoPager | EuroTeQaThon III

**Challenge Collaborator:** Ørsted

**Team name:** BioBlade

**Team slogan:** From Wings to Wonder

**Team members** (full name | study program | university)

Thor Aaberg Hoff-Hansen	Design and Innovation	DTU
Isabella Schibbye Vildenfeldt	Design and Innovation	DTU
Viktor Ryle Tamstorf Oliver	Design and Innovation	DTU
Groth Christensen Otto	Design and Innovation	DTU
Rønnest	Design and Innovation	DTU
Mads Emil Oxholm Iversen	Design and Innovation	DTU
Adam Fink Clemensen	Design and Innovation	DTU

*What is the target problem for your project (in one sentence)?*

Decommissioned wind turbine blades (WTBs) pose an environmental challenge due to their composite materials and the substantial volume generated.

*How do you solve it (in max. three sentences)?*

We propose repurposing decommissioned wind turbine blades to promote biodiversity and sustainability by transforming them into habitats, providing an eco-friendly alternative to current disposal and storage practices. Our goal is to provide a viable alternative to current disposal and storage methods, thereby extending their life by upcycling them into bio-promoting and functional solutions.



Figure 1. The solution

## Potential for impact

Our project holds considerable potential for large-scale environmental, social, and economic impact. From an environmental perspective, repurposing decommissioned WTBs reduces waste and pollution, while simultaneously promoting biodiversity by creating habitats. The societal impact lies in the conservation and enhancement of natural spaces and the potential for communities to engage with these repurposed structures, contributing to a greener urban environment. Economically, our project could stimulate the development of new industries and jobs focused on repurposing and maintaining these structures. Given the global increase of wind turbines, the impact of our project is not confined to one region but has the potential to influence sustainable practices worldwide.

## Innovation

While it's true that wind turbine blades have seen some repurposing, the vast scale of these materials and the unique potentials they hold mean that the solution space is far from saturated. BioBlade stands out with its innovative approach to developing a comprehensive framework, designed to deliver bespoke solutions tailored to the specific needs of various stakeholders, such as architects, entrepreneurs, or city planners. Currently, these groups may find the journey from acquiring a blade to implementing a workable concept too daunting to undertake individually. As such, BioBlade intends to bridge this gap, acting as a facilitator and enabling a more extensive, non-specialized audience to contribute to and benefit from this sustainable initiative. This distinctive approach sets us apart from competitors and ensures that BioBlade has a unique role in promoting and easing the adoption of WTB repurposing.

## Feasibility

Wind turbine blades are currently disposed of in landfills, often at considerable cost to the companies involved. Ørsted, our primary stakeholder, has expressed willingness to donate the blades to us for sustainable and biodiversity-enhancing uses, removing material acquisition as a potential hurdle. Our project would have costs primarily from blade handling and post-processing. The main challenge is to scale blade repurposing in a way that's adaptable to the blades' varied sizes and shapes; and if achieved, this will become our greatest strength as it will ensure substantial blade usage. Our approach involves bespoke solutions - from sound barriers to animal shelters - that fit the needs of different stakeholders. For instance, Køge municipality has expressed keen interest in implementing several of our concepts. The next step is to connect with more stakeholders and refine a framework for marketing, producing, and implementing these repurposed blades.

## Inclusivity

The project was developed in collaboration with Ørsted, a global leader in offshore wind energy. The solutions and concepts from Bioblade were continually developed and evaluated through a series of co-sessions and interviews with Ørsted. Furthermore, the potential of the initial concept ideas was evaluated with other stakeholders, such as Miljøstyrelsen and Køge municipality's city planning department. We included a biologist from Ørsted's global sustainability team to ensure the solutions were technically feasible and biologically sound. In terms of the general project methodology, the solutions were developed based on a socio-technical systems approach to design holistic solutions that exist within a complex and dynamic solutions space.