

DTU Wind

Department of Wind and Energy Systems



PROJECT PREMISE

New research project investigates environmental effects of microplastics released due to the surface erosion of offshore wind turbines

Offshore wind turbines are a vital source of renewable energy. Now, a new research project will work to provide insights into the possible environmental impact of microparticles wearing off wind turbine blades.



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Rain and hail or maintenance work can lead to release of microparticles wearing off or split from wind turbine blades. The new project, PREMISE (PREventing MIcroplastics pollution in SEa water from offshore wind) aims to address this topic. Led by Technical University of Denmark (DTU), Department of Wind and Energy Systems, and supported by the Velux Fonden and the energy companies Vattenfall and Statkraft, this project will investigate the following:

- Extend of potential microplastic release: How much material is shed from the blades?
- Potential Environmental risks: Do these particles pose a threat to the marine life?
- Marine strategies: Can measures be taken to reduce potential harm?

The project started 1. April 2024 and is a three year collaboration between DTU Wind, Aalborg University and Roskilde University. The project will involve:

- quantifying particle volume, size distribution, and blade erosion rate.
- modelling the impact of weather on coatings and erosion.
- studying microplastic degradation and potential toxicological effects on marine organisms and ecosystems.

Roles and responsibilities:

The project PREMISE is coordinated by DTU, Dr. Leon Mishnaevsky Jr. DTU will evaluate the volume of degraded and removed particles falling into the sea, their size distribution, develop a computational model of the blade erosion and study the effect of weather/rain conditions and coating types.

Professor Jes Vollertsen and his team at Aalborg University will study the microplastic degradation under chemical, physical and biological loading in various water depths and sediments. Professor Jes Vollertsen was also a coordinator of Marine Plastics project, VELUX Center, the Danish center for research into marine plastic pollution.

Associate Professor Kristian Syberg from Roskilde University and his colleagues will investigate the impact of virgin and aged plastics on benthic organisms (among others, lugworm) and top layer of sediment as well as the effect of plastics on benthic invertebrate biomass in Danish coastal waters. Associate Professor Kristian Syberg, who is now leading the VELUX Center MarinePlastic II.

“The offshore wind energy generation is a relatively young technology. Wind turbine blades should work 20 or more years, with minimum repair, and be of lowest possible weight. This necessitates the application of polymers as the main material component. Polymer structures, being subject to



environmental loading over years, degrade, and some parts can fall into the water. We seek exact and detailed knowledge on how these particles might influence the marine life, today or in twenty years. That is why we started this project.” says Leon Mishnaevsky Jr., project leader, privatdozent and senior researcher at DTU Wind.

Jes comments *”It is important to analyse the potential pollution from wind turbine blade erosion in general context of marine pollution. We are super excited to collaborate with great teams from DTU and RUC”.*

Associate Professor Kristian Syberg noticed: *“We start with testing the effect of micro-plastics on the sensitive benthic species in Danish and Scandinavian waters. By understanding impacts on these important and often sensitive species we will be able to provide assessment of whether potential shedding of microplastics from wind turbines pose an environmental risk”.*

Birgit Junker, Blade Specialist, at Statkraft, Europe's largest generator of renewable energy, and member of the PREMISE Strategic Committee, said: *“Energy providers that develop and expand offshore wind energy need absolute clarity on possible environmental effects of wind turbines. Involving the specialists from three leading universities, we expect to get clear answers and recommendations whether any environmental impacts can be foreseen, and how they can be mitigated”.*

Matthieu Povidis Delefosse, Bioscience team lead, Environment and Sustainability, at Vattenfall, leading European energy provider, agrees *“As the wind industry continues to grow on the way towards fossil freedom, we are committed to minimising the impact our projects have on ecosystems. Our ambition is towards net positive impact on biodiversity by 2030. Therefore, it is essential for us to participate in environmental research projects that provide insights into potential risks and mitigation measures in off- and on-shore wind. We look forward to learning from the findings from this comprehensive and unique scientific research”.*

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