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Emission of Oily Chemicals from Offshore Windfarms and Effects on Biodiversity

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Wind turbines are machinery that requires a significant amount of lubrication for gearboxes and more, transformer oils, cooling liquids and other control fluids such as hydraulic fluids to control rotor, brakes and blade position.

The failure rate on such systems is indicated in the open literature to be approximately 5 % which may result in leaks, which are also reported to be much higher in case of poor maintenance procedures. For large size turbines the liquid volumes carried are in the hundreds to thousands liters which are non-trivial leak sizes offshore in case of accidents. Combined up to 8000 liters may be onboard covering all categories of fluids in separate systems.

The nature of the fluids used is complex as there are numerous additives involved to protect the systems many of these with known effects on the aquatic life.

As these fluids may accidentally leak to the marine ecosystem and as wind farms offshore are planned to be upscaled dramatically both in numbers of installations and size of turbines, there is a need to assess the environmental risk and impact such leaks can have.

Therefore a project has been initiated that will look at how such leaks may affect the environment from ecotoxicity and effects of fish eggs to persistency test of abundantly used fluid formulations as well as generating the knowledge of how these fluids spread in the marine environment.

Contrary to the regulations in the oil and gas offshore industry there is no environmental requirements to what can be used in the wind farm installations and no tools in place to assess or approve the use of ecotoxic components. We present the first ecotoxicity data and data on the partitioning of compounds into a water phases.

The data indicates that there indeed will be a need of control as installations increase in size and the presence of large volumes of ecotoxic compounds increase. The project is supported by the Velux Foundation.