

ReOil – abstract for general public (ENG)

The ReOil project is a response to the problem of waste oils and used lubricating oils, which are essential for the functioning of modern industry, from ships and cars, to turbines and machines in production plants. Although these oils are critical for the economy, their fate after use is a serious environmental challenge. Globally, nearly 37 million tonnes of oil are consumed each year, of which an estimated half is not recycled but ends up in the environment or is incinerated, harming nature and increasing CO₂ emissions. An additional problem is that the increasingly popular eco-friendly lubricating oils, which decompose more easily in natural conditions, are also not recyclable using available methods.

ReOil aims to develop a completely new method of recovering used oils, giving them a "second life". Instead of incineration or costly and energy-intensive thermal treatment, a team of scientists from Norway, Poland and the Czech Republic will work on the use of special polymer membranes that act as super-precise filters. These will make it possible to separate contaminants, degradation products and chemical additives from the rest of the mixture, so that the recovered pure "oil base" can be reused to produce new lubricants.

This idea requires the creation of materials with unique properties. The membranes must remain stable when in contact with aggressive substances, a wide pH range and temperatures reaching 90°C, while at the same time precisely separating molecules that differ in size and chemical nature. If this solution proves successful, it will be possible to recover oils in a process that does not require high energy consumption, which is a much more environmentally friendly solution than the technologies currently in use.

This means that used oil, instead of being treated as waste, can be reused as a valuable raw material. For the environment, this will translate into lower CO₂ emissions and a reduction in the amount of substances entering the soil and water. In industry, it will lead to lower disposal costs and cheaper access to the ingredients necessary for the production of lubricants. In the economy, it will contribute to the development of new business segments related to advanced recycling.

The aim of the project is not only to develop the filtration technology itself, but also to demonstrate that recovered oil can achieve the same performance parameters as a product made from crude oil. If the research is successful, ReOil could become a milestone in the transition to a circular economy in the industrial lubricants sector. In practice, this would mean that lubricating oil would be used multiple times rather than just once, as is currently the case.

In the long term, ReOil could help reduce pressure on natural resources and develop new environmentally friendly models for heavy industry. It is a project that combines advanced materials science with a real impact on the environment and the economy, showing that the technologies of the future can simultaneously drive development and protect the planet.