Press release

Fraunhofer at IFAT Munich 2026

Water, Energy, Circularity: Technologies for a Resilient Future

At Booth 115 in Hall B2 at IFAT Munich 2026, the Fraunhofer-Gesellschaft will showcase pioneering solutions for a sustainable water and raw materials management industry, ranging from the removal of heavy metals and rare metal recovery to recycling of wind turbines. In line with the motto Water, Energy, Circularity—Green Technology for a Resilient Future, eight Fraunhofer institutes will show how reusable materials can be extracted from wastewater, how key raw materials can be recovered from electronic waste and how linear processes can be turned into closed circles.

We are faced with enormous challenges: Micropollutants are a burden on natural bodies of water, precious metals are lost in waste streams, and the pressure on water resources is rising around the world. The Fraunhofer-Gesellschaft and the Fraunhofer Water Systems Alliance (SysWasser) will present solutions that cover the entire water cycle, from water analytics through to wastewater treatment and reuse. Here is a selection of the Fraunhofer projects that will be presented:

Quaternary treatment eliminates micropollutants

Pharmaceutical residues, cleaning products, X-ray contrast medium: Anthropogenic micropollutants are becoming an ever-greater burden on natural bodies of water and groundwater. The Fraunhofer Institute for Environmental, Safety and Energy Technology UMSICHT will present an innovative combination of adsorption, desorption and concentration of micropollutants. “The immediate regenerability of the adsorber resins enables us to considerably lower energy and resource consumption in micropollutant elimination and to dispose of a highly concentrated micropollutant sludge at the end of the process,” Lukas Rüller from Fraunhofer UMSICHT explains. The process aims to reduce operating costs and the carbon footprint in equal measures. By 2045, quaternary treatment will gradually be made mandatory in the EU, based on plant size. In Germany, this is going to affect around 9,000 sewage treatment plants.

New solutions for value creation using organic residues

The production of artificial fertilizers is a very energy-intensive process with high carbon emissions. At the same time, large amounts of nutrients, for example, in manure, fermentation

residues and sewage sludge remain unused. In connection with over-fertilization, these can be a burden on the soil, on bodies of water and groundwater. In addition to these agricultural waste products, organic residues that are frequently unused are also created in a number of other sectors, including in the bioeconomy, foodstuffs, paper and timber industries. In this context, the Fraunhofer Institute for Ceramic Technologies and Systems IKTS is acting as the coordinator of the abonocare cluster, an interdisciplinary innovation network from central Germany that is working toward scaling up value chains based on organic residues to allow for industrial use. At the intersections of industry, bioeconomy, plant construction, agriculture and research, the network is bringing together stakeholders, encouraging technology transfer and supporting the development of marketable solutions. It relies on practical projects, targeted training and public outreach to reinforce regional value chains and support the transformation toward a resource-efficient economy.

Biomining—microorganisms as a source of raw materials

The Fraunhofer Institute for Interfacial Engineering and Biotechnology IGB is also working on recovering reusable materials such as phosphorus and nitrogen and will present projects from this area, such as "RoKKa—Sewage sludge as a source of raw materials and climate protection at wastewater treatment plants." However, at IFAT 2026, the institute will be mostly presenting projects related to e-waste recycling: Every year, millions of tons of this type of waste are produced that constitute a source of raw materials that is still underestimated. Fraunhofer IGB will present a fixed-bed circulation reactor at the trade show that was developed for this particular purpose and is characterized by its robust and efficient operation and ease of use. The institute will also showcase some biological processes for recovering valuable metals such as copper, zinc and rare earths with the help of microorganisms. The institute relies on four biological mining processes here: Bioleaching is a process in which metabolic processes of bacteria are used to dissolve metals in liquids. Biosorption is the process in which the dissolved metals are then bound to microbial surfaces. It is also possible for cells to actively absorb and store metals; this process is called bioaccumulation. Bioprecipitation is the fourth of these methods and a process in which dissolved metals are transferred to particulate components that are difficult to dissolve and can be easily separated. The advantage of these methods is that no poisonous chemicals are needed, and they are potentially cost-efficient, too. Biomining allows for critical raw materials to be recovered from waste streams, thus reducing dependency on imports and strengthening the resilience of European supply chains.

Recycling turbine blades

The RECREATE EU project is dedicated to the development of innovative technologies that allow for composite components to be reused, with a particular focus on wind turbine blades. The goal is to make reuse more profitable and to increase sustainability by using renewable raw materials. Together with its partners, the Fraunhofer Institute for Machine Tools and Forming Technology IWU is working on the development of reusable fiber composite structures for wind turbine blades. The research focuses on efficient dismantling, separable adhesive joints, non-destructive testing and recycling technology. The project aims to contribute to a new approach for fiber-reinforced plastics that will fit the circular economy, to ensure that new applications are designed from the outset with circularity in mind and to enhance environmental compatibility and cost efficiency. The different recycling options will be demonstrated at IFAT using a section of an actual wind turbine blade.

Joining forces to promote a circular future

This research work is enormously relevant to society: In a world in which we are increasingly relying on digital technologies while struggling with water shortages at the same time, Fraunhofer technologies are offering solutions that are both sustainable and cost efficient. These solutions are opening up new perspectives for the circular economy, in which wastewater and waste are no longer disposed of but thought of as sources of raw materials.

Visit the Fraunhofer-Gesellschaft's joint booth at IFAT Munich 2026 between May 4 and 7 (Hall B2, Booth 115).

Further information is available here: Fraunhofer at IFAT 2026

The Fraunhofer Water Systems Alliance (SysWasser)

The Fraunhofer Water Systems Alliance (SysWasser) is a strong partner for viable solutions for the water industry. SysWasser is a highly productive group of leading Fraunhofer institutes in which outstanding scientific expertise is combined with many years of practical experience to create innovative, practical and financially viable solutions that cover the entire water cycle value chain.

Figure 1 Laboratory tests on plant compatibility in the context of the abonocare cluster

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Figure 2 Fraunhofer IGB has developed a fixed-bed circulation reactor for recovering materials such as rare earths from electronic waste.

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Figure 3 Municipal water treatment plants: Mandatory quaternary treatment will be gradually introduced in the EU by 2045.

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The Fraunhofer-Gesellschaft, headquartered in Germany, is one of the world's leading organizations for applied research. It plays a major role in innovation by prioritizing research on cutting-edge technologies and the transfer of results to industry to strengthen Germany's industrial base and for the benefit of society as a whole. Founded in 1949, the Fraunhofer-Gesellschaft currently operates 74 institutes and research units throughout Germany. Its nearly 30,000 employees, predominantly scientists and engineers, work with an annual business volume of 3.6 billion euros; 3.2 billion euros of this stems from contract research.

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