



Sustainable membrane distillation for industrial water reuse and decentralised desalination: MELODIZER project takes off at Politecnico di Torino

The project, funded by the European Union under the Horizon Europe program, aims to sustainably manufacture the components needed to reuse and valorise contaminated water, thanks to the work of a consortium of 18 partners from nine European countries, Switzerland and Israel, coordinated by Politecnico di Torino

Torino, January 31st 2023

The European project **"MELODIZER"** (SUSTAINABLE MEMBRANE DISTILLATION FOR INDUSTRIAL WATER REUSE AND DECENTRALISED DESALINATION APPROACHING ZERO WASTE) which brings together a **consortium of 18 partners from 9 European Union countries, plus Switzerland and Israel, and coordinated by Politecnico di Torino** (Italy), officially took off in Turin.

The topic of the project is **membrane distillation, a very promising technology both for the desalination of highly salinity waters and for the reuse and valorisation of wastewaters**. At present, the full potential of this technology is hampered by the lack of high-performance membranes and membrane modules, the environmental impact of their production and use, as well as their implementation in unsuitable configurations and environments.

The heart of the research will be the **manufacturing of membrane distillation components that can be used on a large scale and are sustainable**, by replacing the current potentially harmful materials with non-harmful ones and following the **principles of green chemistry**. Emphasis will also be placed on improving the design of the technology and on maximizing its energy efficiency, which will operate using only waste heat and solar energy. The improved design of this technology when combined with the most appropriate mix of renewable energy resources will be the key to its effective application in different fields, both in industry and at domestic or community scale.

The MELODIZER project, funded by the **European Union** under the **Horizon Europe program** (grant agreement n° 101091915 – topic HORIZON-HLTH-2021-DISEASE-04-04) with a contribution of more than 7 million euros (of which **1.4 million euros to Politecnico di Torino**), will have a **duration of 4 years**.

Specifically, **prototypes will be developed and tested at an industrial level (textile, chemical, aquaculture, and beverage sectors)** to achieve a high percentage of recovery of contaminated water (70-90%), thus reducing the freshwater footprint of these activities and approaching the zero-waste target, at the same time recovering valuable secondary raw materials from contaminated waters.

Furthermore, MEloDIZER intends to **demonstrate the functioning of passive, autonomous, economical and small-scale drinking water production systems**, using solar energy as the only energy source.

The ambition of the project is therefore to contribute to three of the **strategic objectives for the European Union and worldwide**, namely, the sustainable use of water resources - both at an industrial level and in small communities, access to critical raw materials, and the transition to processes powered by renewable energy.

“With this project, we will demonstrate the next generation of the technology, considering its performance and energy efficiency, but also from the point of view of the sustainability of the materials and the type of energy resources used to power the systems, thus demonstrating their implementation for the reduction of water footprint of industries and for the supply of drinking water in areas subject to severe drought” says **Prof. Alberto Tiraferri**, associate professor of the **Department of Environmental, Land and Infrastructure Engineering-DIATI** at Politecnico di Torino and project coordinator together with **Prof. Matteo Fasano** of the **Department of Energy-DENERG**. At Politecnico di Torino, the interdepartmental center **CleanWaterCenter@Polito** will host the laboratories which, thanks to the contribution of the European Union, will develop some of the prototypes of this innovative technology for the sustainable treatment of water.

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