



Experimental device built by the University of Pavia to extract bioethanol from waste materials

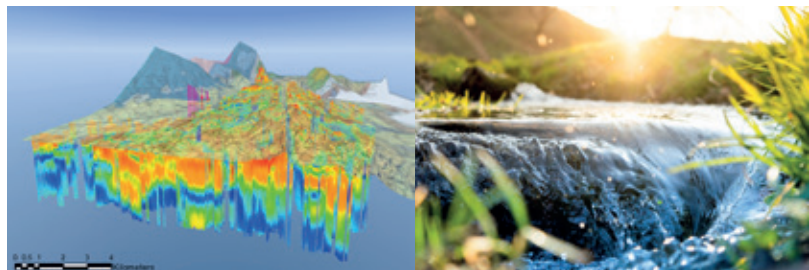
The two main challenges for society in the future revolve around water and energy. Overcoming them will require the industrial water and energy chains to work together. Only a virtuous interaction will make it possible, for example, to address the consequences of climate change on the water cycle, to extract pollutants from contaminated groundwater, to reduce and improve the quality of waste by extracting useful materials to produce biofuels. These are the primary goals of 'Ce4We - Circular economy for water and energy', a project financed by the Por Fesr - Lombardy Region that is led by the Department of Earth and Environmental Sciences of the University of Pavia, leading a series of entities including major companies in the Lombardy region, such as the Cap Group, A2A and Eni, together with small innovative companies such as Mogu and NeoruraleHub. The project, of considerable size (8 million budget, over 150 people involved), is now entering its final phase. "We are starting simulations to predict the effect of climate change on Lombardy's water resources," explains Professor Andrea Di Giulio, project coordinator. "We are monitoring how things are changing in seasonal terms, with changes in agricultural land use; we are finalising the geological models of the subsoil as far as the water part is concerned. In recent months, various experiments have been carried out to extract pollutants (heavy metals, pharmacological molecules, etc.) from water using environmentally friendly materials," while,



If water and energy go hand in hand

An interdisciplinary project with several goals, including jointly addressing the effects of climate change

as for the energy aspect, we are studying, for example, how to separate the oily fraction from waste water and then extract material for biofuels. In addition, an experimental plant has also been set up to produce bioethanol from dairy waste, which can also be used for automotive or other purposes. The University of Pavia, moreover, participates in the project across several fields, ranging from chemistry to physics, from engineering to microbiology. However, the importance of the project is not only in the practical results. "What is important above all is the relationship that is emerging between water and energy, the two souls of research - continues Di Giulio - Things are working, some important developments are taking place, such as a new PhD financed by the Ministry of University and Research". Professor Di Giulio's department is also working on various fronts related to the UN Agenda for Sustainable Development: among other things, it has just activated a new bilingual master's degree course in 'Geosciences for Sustainable Development'. ■



A geological model of the subsoil of the upper Brescian plain created to predict the effects of climate change on the water cycle