Programme: "CENTRAL MACEDONIA" 2021–2027

Action: "Investments for the creation, expansion or upgrading of RTDI infrastructure in public academic or research institutions in the Region of Central Macedonia"

Project Title:

"Research infrastructures for the saving of natural resources and the development of Innovative Processes for the green transition of industrial pRoduction and trAnsport – FAIDRA"

Description:

The Centre for Research & Technology Hellas (CERTH), is participating in the "Central Macedonia" Programme of the "Partnership Agreement on Regional Development 2021-2027" through the Action "Investments for the creation, expansion or up grading of RTDI infrastructure in public academic or research institutions in the Region of Central Macedonia" co-funded by the European Union and National Resources.

The project titled "Research infrastructures for natural resources conservation and development of innovative Processes for tHe grEen transition of inDustrial pRoduction and trAnsport – FAIDRA" aims at the modernization and green transition of industrial biofuel production, by developing and integrating an innovative resource-efficient system at CERTH's new pilot plant for the production of second-generation biofuels. The project will focus on installing novel water management and smart waste management systems, as well as maximizing the energy efficiency of the unit, facilitating the use of local raw materials such as agricultural residues and biomass. The new research infrastructures will enable the promotion of the novel technologies to industrial stakeholders and investors towards for the upgrading of existing biofuel production units, as well as the creation of new ones.

Indicative expected benefits through the project interventions include:

- Modernization of existing biodiesel industries. The demonstration of the second-generation biofuel pilot plant operation, upgraded through the FAIDRA project, will allow the existing biodiesel industry to evaluate a pioneering and innovative system for the modernization and green transition of biofuel industrial production within the Region of Central Macedonia. The on-site and direct evaluation of the required equipment, as well as of operational data and the quality of the produced biofuels, will help minimize the business risk associated with upgrading existing biodiesel industries.
- Rational use of natural resources via novel technologies applicable to biofuel production processes in RCM. These technologies include the efficient water and energy management within production, as well as the recycling and

utilization of organic waste, significantly contributing to resource savings. For wastewater treatment and recycling, the Moving Bed Biofilm Reactor (MBBR) technology will be used, which offers significant advantages compared to conventional activated sludge technologies.

- Energy transition and climate change mitigation. The promotion of renewable fuels for maritime and aviation sector, can contribute to immediate compliance with environmental policy strategies, address regulatory pressures and tax incentives, and promote infrastructure upgrades and innovation in energy production, abiding directly to climate change mitigation principles.
- Waste minimization in RCM. The production of second-generation biofuels uses agricultural waste and residues (such as straw, branches, leaves, and crop residues), reducing the need for landfilling or burning such waste and decreasing the volume of overall waste.

The objective of the project is the modernization of biofuel industrial units through an innovative technology for the energy utilization of residual biomass, by combining thermochemical and enzymatic technologies, and linking this with an innovative system that integrates rational water use, wastewater management and valorization, and air pollutant control—thus enabling the sustainable operation of a demonstration unit for second-generation biofuel production without environmental burdens.

The importance of modernizing the biofuel sector in the Region of Central Macedonia also aligns with the agricultural potential of the Thessaloniki plain, which is associated with the highest quantities of agricultural residues—serving as the main raw materials for advanced second-generation biofuels.

Duration: *16.06.2025 – 31.12.2027*
Total Project Budget: *1.000.000,00€*