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RESEARCH CENTER FOR ADVANCED WATER, ENERGY AND RESOURCE MANAGEMENT – AWAM

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PROJECT SPEC SHEET (EN)

FIRE-RESIST – FOREST INNOVATION FOR RESILIENT, ECOLOGICAL AND SMART TERRITORIES

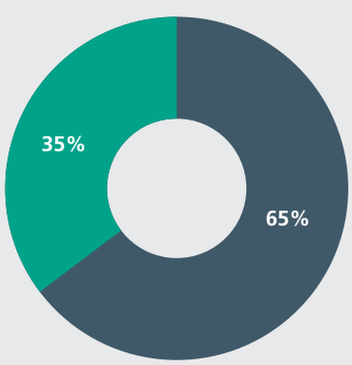
Project no.: 26608

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Partners: Drivetel, Universidade de Trás-os-Montes e Alto Douro (UTAD), Associação Fraunhofer Portugal Research, CoLAB ForestWISE, Immera, Fisola, Electroclima and Turnpage

Start date: 01.09.2026
Conclusion date: 31.08.2029

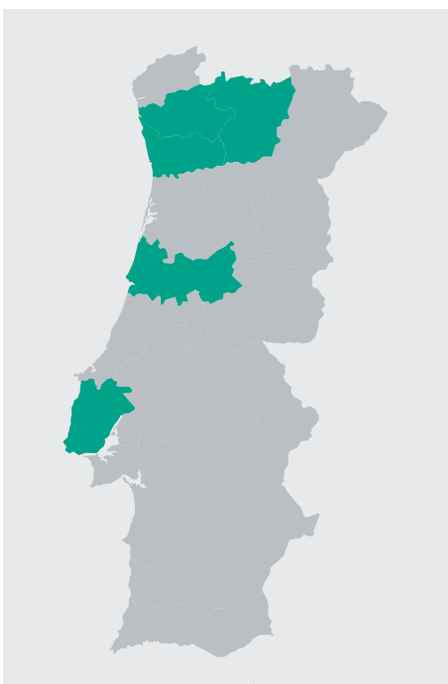
Total eligible cost: 9.767.489,60€
EU Funding: 6.324.187,63€
Copromotors funding: 3.443.301,97€



Project's overview

The FIRE-RESIST project aims to transform forest management through the development of an integrated technological model that combines prevention, early detection, initial firefighting response, waste valorization, and carbon certification. The initiative stems from the urgent need to address the critical vulnerability of Portuguese and Mediterranean forests, increasingly exposed to extreme climate events, rural abandonment, and uncontrolled biomass accumulation — factors that worsen the frequency and intensity of forest fires. Portugal records an average of over 100,000 hectares burned per year, one of the highest rates in Europe, causing environmental, social, and economic losses exceeding two billion euros annually.

FIRE-RESIST proposes a systemic, science- and technology-based approach that replaces the reactive firefighting paradigm with a preventive, intelligent, and sustainable model. The project will develop an integrated aerial surveillance and intervention system, composed of cooperative drone swarms equipped with multispectral sensors and thermal cameras, along with interconnected smart monitoring towers linked to a central digital platform based on forest digital twins. This platform will collect and process real-time data on temperature, humidity, vegetation, and other environmental variables, using artificial intelligence algorithms to predict



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ignitions, identify heat sources, detect pests, and support management decisions. The goal is to reduce response time to incipient ignitions to under ten minutes, minimizing fire spread and the associated ecological and human damage.

In addition, the project will develop a modular, transportable forest biomass energy valorization unit, capable of converting forest biomass residues into electricity, heat, and biochar, contributing to the circular bioeconomy and carbon emissions mitigation. This decentralized technology will help reduce fuel load in forests, generate economic value from waste, and create income opportunities for rural communities. Another key pillar of FIRE-RESIST is the creation of a SaaS carbon certification platform (MRV – Monitoring, Reporting, and Verification), fully digital and auditable, enabling the calculation and validation of forest carbon sequestration in a transparent, fast, and low-cost manner. The solution will operate under international standards such as Verra and ISO 14064, allowing small and medium forest owners to access carbon markets and economically capture the value of the ecosystem services their land provides.

The FIRE-RESIST consortium, led by Drivetel, S.A., brings together universities, research centers, and technology SMEs with complementary expertise in electronic engineering, robotics, data science, bioeconomy, and renewable energy. This multidisciplinary composition ensures a holistic, interconnected approach spanning all phases — from fundamental research and experimental development through to demonstration and validation in real-world conditions. The project will be implemented collaboratively, ensuring the integration of results and their future commercial and industrial exploitation. FIRE-RESIST is fully aligned with European and national green and digital transition policies. It contributes directly to the goals of the European Green Deal, the EU Forest Strategy 2030, and the EU Biodiversity Strategy, promoting decarbonization, climate neutrality, and the sustainable valorization of ecosystems. On the technological front, it is aligned with the European Digital Agenda through the application of AI-based solutions, digital twins, and interoperable platforms, and it supports the United Nations Sustainable Development Goals (SDGs), namely SDG 9 (Industry, Innovation and Infrastructure), 12 (Responsible Consumption and Production), 13 (Climate Action), and 15 (Life on Land).

With a 36-month timeframe, FIRE-RESIST aims to achieve concrete, measurable results, including a reduction in combustible biomass, improved fire detection efficiency, economic valorization of forest residues, generation of biochar and renewable energy, and the creation of an accessible, reliable digital carbon certification system. The expected impacts span multiple dimensions: environmental, through reduced emissions and ecosystem regeneration; technological, through the creation of advanced, replicable solutions; economic, through the diversification of forest income sources; and social, through the creation of skilled jobs and the revitalization of local economies.

Keywords: Forest resilience; Smart Fire Management; Circular Bioeconomy; Biomass Valorization; Carbon Certification