I+D+i

The driving force behind our activity

The year 2024 marked a turning point in Magtel's R&D activities, consolidating a focus with a strong international and European outlook

This period has been characterized by a high volume of tasks in the field of technical management and project engineering, with a special focus on scaling highly disruptive technologies.

For example, the SolarsCO2ol project has represented a significant part of our budget, addressing a major challenge: the replacement of steam power blocks with power blocks based on supercritical CO2, operating at temperatures of up to 600°C and pressures of up to 180 bar.

During this year, key advances have been made in the engineering phase and in the acquisition of critical components for the pioneering plant that Magtel will build in Portugal. We have also completed the detailed engineering for the AD-GRHID renewable hydrogen plant that we will install in the province of Córdoba, hybridizing the production, storage, and use of hydrogen with electricity.

In addition, significant progress has been made in other strategic activities, including the implementation of artificial intelligence, the optimization of irrigation and smart fertilization in the agricultural sector, the design of a water eutrophication sensor, and the design of energy flexibility services for electrical grids.

> Technology centers and universities

aicia · CETIM · CIT Oliva · CSIC · ITI · ikerlan · Universidad Loyola · tecnalia · UCO

> Co-financing entities:

CDTI · CTA 20 · Horizonte Europa · European Commission · Clean Hydrogen Partnership · Horizon 2020 European Union Funding For Research & Innovation · CDTI · Financiado por la Unión Europea

Energy

Ad-Ghrid

Advanced technology to increase the flexibility and resilience of distribution networks

Magtel is leading an innovative initiative in Villanueva de Córdoba, developing hybrid AC/DC microgrids for renewable energy, solid oxide electrolysis, fuel cells, and recyclable, sealed hydrogen storage.

The project involves collaboration with Eléctrica Villanueva de Córdoba, H2B2, Protio Power, Carbotainer, Ingelectus, Nasika, and Premo, as well as research groups from PowerUS-AICIA, the University of Córdoba, Loyola University, AIMPLAS, and IREC.

This project is funded by the CDTI, the Next Generation EU Funds, and the Andalusian Technology Corporation (CTA).

SolarSCO2OL

Magtel is responsible for leading the EPC in the pilot plant

In addition to Magtel, the following organizations are participating in the project: Rina Consulting Spa, Kungliga Tekniska Hoegskolan, Moroccan Agency For Sustainable Energy SA, Ikerlan S. Coop, Universita Degli Studi Di Genova, Ethniko Kentro Erevnas Kai Technologikis Anaptyxis, Franco Tosi Meccanica Spa, European Solar Thermal Electricity Association, Mas Ae Proigmenes Technologies Energeias Kai Ischyos, Lointek Ingeniería y Técnicas de Montajes SL Lointek, Nuovo Pignone Srl, Seico Heizungen Gmbh, Abengoa Energía SA, Ocmiotg Spa, Universidade de Évora, Deutsches Zentrum Für Luft Und Raumfahrt Ev, and Build to Zero Energy Sociedad Limitada.

HYELD

Demonstration plant for multi-stage steam gasification and synthesis gas purification for the conversion of waste into hydrogen in Tarragona.

In this initiative, the project's KoM has been carried out, with Magtel acting as coordinator alongside Inveniam, presenting the project and the WPs in which they are participating. The clients/participants are:

- Technology and research centers (Fundació Eurecat Eut, CSIC, Sintef).
- Technology developers (Magtel, Waste-To-Energy, H2site, Mincatec)
- Industrial institutions (Cemex, Enagas, La Farga, Arcelormittal, Synhelion)
- Waste managers and suppliers (Veolia Aces, Cetaqua)
- Engineering and strategic consulting (Aris - teng, Inveniam)

Medioambiente e Infraestructuras

› Magboat

Prototype of an unmanned floating vehicle with on-board devices for analyzing and monitoring the impact on the ecosystem and managing the preventive and predictive maintenance of floating photovoltaic solar plants.

This information will enable maintenance protocols to be established to ensure the efficiency and sustainability of these plants in the future. This advance aims to promote more efficient and environmentally friendly floating solar energy.

- Research organizations: University of Córdoba

› Fic-Fighters

Demonstration of a circular solution for the regeneration of seven phosphogypsum piles in Europe.

This project targets five economic sectors: batteries, packaging, construction, detergents, and fertilizers. Magtel is leading the construction of a mobile pilot plant to recover up to 700 tons/year of phosphogypsum through sustainable processes.

Tharsis Mining operates and validates the pilot plant, managing the products obtained and shipping them to end users. The University of Seville is leading the sampling, characterization, and validation work on an intermediate scale, supporting Magtel and Tharsis Mining in the validation of the process and analysis of results.

Project partners include Tharsis Mining & Metallurgy, IDENER Research and Development, University of Seville, Åbo Akademi University, Macedonian Civil Engineering Institute, Wroclaw University of Science and Technology, Faculty of Sciences of the University of Novi Sad, National Research Council, Belgian Nuclear Research Center, Prehnit - Croatia, CapturaCO2, S.L., Association for Research and Development of Innovations and Technologies for the Protection of Environmental Heritage, European Federation of Geologists, University of Huelva, Asistencias Técnicas Clave, S.L.U., Persán - PR, Cementos Cruz, State Agency Higher Council for Scientific Research, ECTA Group, PRAYON, Fraunhofer IKTS, European Association for Local Democracy, Chrysteins, City of Energy Foundation, Barreiro City Council, Federal Agency for Nuclear Control, and Kavadarci City Council - North Macedonia.

TIC

› Critical Fog

Innovation in dual technologies for critical infrastructures

Project focused on research into distributed computing systems, combining Edge, Fog, and Cloud paradigms to offer more efficient and secure solutions. Efforts are currently focused on the design and implementation of a hybrid Fog/Cloud system for critical infrastructures, which will guarantee continuous and optimized computing capacity in all circumstances.

This initiative promotes the development of advanced technologies to improve efficiency, security, and availability in strategic environments. It is led by Magtel together with the research group: AICIA.

› Omega X

Energy data space developed by a consortium of 30 European companies and 11 countries

Creation of a data and services market, including the creation of four families of use cases that will demonstrate the value of having a common data space: renewables, local energy communities, electromobility, flexibility.

In addition to Magtel, the following companies are participating in the project:

Atos IT Solutions and Services Iberia S.L.; Atos Worldgrid Sas; Atos Spain SA; Fundacion Tecnalia Research & Innovation; Electricite de France; C4NET Centre For New Energy Technologies SA; EDP Solar España SA; Estabanell y Pahisa Energía SA; Elia Transmission Belgium; 50Hertz Transmission Gmbh; Universitat Politecnica de Catalunya; International Data Spaces Ev; Intracom Single Member SA; Telecom Solutions; Odit-E; Open & Agile Smart Cities; Rina Consulting Spa; Revolt Societa a Responsabilita Limitata; Aarhus University; Imt Transfert; Institut Mines-Telecom; Maieutica Cooperativa de Ensino Superior Crl; Institut Mihajlo Pupin; Sener Ingenieria y Sistemas SA; Estabanell y Pahisa Impulsa; Astea Spa; Universidade Catolica Portuguesa; Groupement Pour L'itinerance des Recharges Electriques de Vehicules; Energy Web Devhub Gmbh; Meteo For Energy SL; Norce Norwegian