EU GREEN WEEK – EVENT MAGELLAN/ORANO

"Rare-earth permanent magnets and the triple paradigm: circularity, resilience and decarbonization."

This event will bring together key European stakeholders to discuss the challenges and opportunities of recycling rare earth permanent magnets to create a more resilient value chain for high-performance applications, such as electric vehicle traction motors and wind turbines.

Location (TBC)

Maison Irène et Frédéric Joliot Curie
Rue du Trône 100, 1050 Ixelles
maison-joliot-curie.eu
Capacity : 80 persons

PROGRAM

10:00 AM – Opening keynote by DG GROW[i]: The role of permanent magnets in advancing circularity and competitiveness.

The keynote will open with a reflection on the importance of the Critical Raw Materials Act (CRMA) in promoting a more sustainable and circular supply of critical raw materials (CRMs) within the EU, with a particular focus on rare-earth permanent magnets.

It will highlight the overarching objectives of the regulation and outline the specific provisions related to permanent magnets. The presentation will also address the upcoming steps in the EU's policy agenda, including the forthcoming Circular Economy Act to be presented by the European Commission.

10:20 AM – Presentation of the MAGELLAN[ii] project by Orano[iii], Coordinator of the project.

MAGELLAN is a three-year project started on 01.01.2024 which is coordinated by Orano, a world leader in nuclear technology and energy solutions, and will be developed with a €7.5 million budget. MAGELLAN brings together leading experts from a range of disciplines - material science, EVTM design, manufacturing, recycling, and end-users - to engineer a highly efficient and sustainable rare-earth-element (REE) permanent magnet (PM) value chain. The MAGELLAN consortium comprises of 15 partners from 8 different EU countries.

Through innovative techniques such as neodymium substitution and functionally shaped permanent magnets through Powder Injection Moulding (PIM), MAGELLAN will produce a new EVTM rotor design that improves assembly, motor performance, reduces PM content and facilitates dismantling of end-of-life motors. The project's optimisation of magnet recovery and

recycling will minimise the dispersion and dilution of heavy REEs, avoid downcycling, and support standardised magnet labelling.

10:40 – 11:30 AM – First Roundtable discussion. Empowering Europe's magnet industry: pathway toward sustainable production

With DG GROW, Orano, CRF[iv], John Ormerod[v]

This roundtable will explore how Europe can strengthen its magnet industry by reconciling strategic autonomy, circularity, and industrial realities. It will focus on high-performance magnets used in traction motors and wind turbines, and how to integrate recycled content without compromising performance. Speakers will discuss how to rebalance production within the EU and what it takes to scale up industrialisation effectively. With industrial deployment often difficult to materialize, the session will address the key conditions for success.

11:30 – 11:40 AM – Coffee break

11:40 AM – 11:55 AM – Recycled magnets as key to a more sustainable EU industry – LCA perspective

LOMARTOV[vi] is an environmental engineering and consultancy firm with a focus on fostering innovative and circular solutions. Under the MAGELLAN project, it will calculate the environmental impacts associated with the entire recycling process with an LCA study and will also perform a Life Cycle Cost (LCC) study comparing the economic impacts of the new recycling process with the current scenario.

11h55 - 12:30 PM – Second Roundtable discussion – Bridging research and industry: making sustainable magnet production a reality

With CEA[vii], IFRI[viii], JSI[ix]

This roundtable will provide an opportunity to discuss, beyond the scope of the MAGELLAN project, the key enablers needed to support the development of sustainable magnet production in the EU. The discussion will address the necessary conditions for fostering a circular market, including the creation of a waste code, investment in research and innovation, and the adoption of a holistic approach—from raw materials to the final product through a value chain perspective—to help achieve the objectives of the Critical Raw Materials Act (CRMA).

12:30 – 12:45 PM – Q&A session

12:45 – Closing remarks by ERMA[x]

The European Raw Materials Alliance was established by the European Commission in 2020 to address the EU's dependency on raw materials. It aims to ensure a sustainable and secure supply within Europe, by fostering collaboration between stakeholders. ERMA published a report in 2021 focusing on the supply of rare earth elements used in the production of permanent magnets, promoting both circular economy and recycling.

[i] **DG GROW**: The Directorate General for Internal Market, Industry, Entrepreneurship and SMEs is the Commission department that works to support an open, seamless and resilient Single. The DG supports the competitiveness, growth and resilience of the EU economy market.

[ii] **MAGELLAN EU Project** is a Horizon Europe innovation action. MAGELLAN aims to develop and demonstrate in operational environment a novel and disruptive cost-competitive, environmentally friendly solution leveraging functional recycling, highly advanced processes for manufacturing Permanent Magnets, and new optimized designs for Electric Vehicle Traction Motors. The sustainability of the MAGELLAN solution will also be assessed through extensive Life Cycle Assessment (LCA) and Life Cycle Costing (LCC) analysis.

[iii] **ORANO** is a leading international group and a key player in the nuclear energy sector. With 17,500 employees worldwide, the group is committed to meeting the world's energy challenges on a daily basis, by helping deliver plentiful, safe, low-carbon and competitive electricity. The nuclear industry does not only generate electricity. With its expertise in nuclear materials and cutting-edge nuclear technology, the sector is investing in other uses that contribute to the energy transition. The Group is diversifying in sectors of the future, such as the circular economy with the recycling of electric vehicle batteries, the energy transition with the recycling and manufacturing of permanent magnets.

[iv] **CRF** (Centro Ricerche FIAT) is the reference for the research and development activity of STELLANTIS. CRF represent a bridge between the basic research world and the world of the industrial manufacturing, realizing the selection and transfer of the technology innovation in develop and manufacturing area of STELLANTIS. Stellantis is a constellation of 14 iconic automotive brands: alfa romeo, Citroën, Fiat, Opel, Peugeot, Chrysler...

[v] **Dr. John Ormerod** graduated from the University of Manchester, UK metals, with a BSc, MSc and PhD in Metallurgy in 1975, 1976 and 1978 respectively. He has over forty years of research, product development, and manufacturing experience in soft and permanent magnets and magnetic materials. He has published and presented numerous papers in the field of magnetic materials. In 2015 John founded JOC LLC a consultancy specializing in the magnetics and metals-related industries. Clients include IP law firms, major magnet manufacturers, magnetic equipment manufacturers, medical device R and D companies, motor manufacturers, tier 1 automotive suppliers and new magnetic material R and D businesses. He recently co-authored the book titled Modern Permanent Magnets that gives an overview of the key advances of permanent magnet materials that have occurred in the last twenty years.

[vi] **LOMARTOV** supports companies and innovative projects becoming more sustainable, mitigating and balancing their daily impact on our planet and resources. Lomartov integrates Life Cycle anlaysis as a decision-making tool to help companies, research projects, and policymakers develop more sustainable and circular solutions. Lomartov provides methodologies that ensure innovations are not only sustainable but also economically viable in the competitive global market by Techno-Economic Assessment (TEA: Evaluates the technical feasibility and economic viability of emerging technologies) and Life Cycle Costing (LCC: Analyses the total cost of a product or service over its lifecycle—from production to disposal.

[vii] **CEA** is the French Alternative Energies and Atomic Energy Commission (CEA). CEA is a key player in research, development and innovation in four main areas: defense and security, low carbon energies (nuclear and renewable energies), technological research for industry, fundamental research in the physical sciences and life sciences. The CEA has positioned itself as a key player in building the European research area through its involvement and recognition in numerous European research initiatives and bodies.

[viii] **IFRI** is the leading independent research and debate institution in France dedicated to the analysis of international issues and global governance. Created in 1979, Ifri has become a reference institution, listened to by decision-makers and recognized by its peers. Ranked among the world's most influential think tanks, the French Institute of International Relations (Ifri) is a platform where free, responsible, operational and forward-looking thinking is

developed. Ifri's work is intended to provide food for thought for public and private decision-makers, academia and representatives of civil society.

[ix] **The Jožef Stefan Institute (JSI)** is the leading Slovenian scientific research institute, covering a broad spectrum of basic and applied research. The staff of about 1050 specializes in natural sciences, life sciences and engineering. The mission of the Jožef Stefan Institute is the accumulation - and dissemination - of knowledge at the frontiers of natural science and technology to the benefit of society at large through the pursuit of education, learning, research, and development of high technology at the highest international levels of excellence.

[x] **ERMA** is the European Raw Materials Alliance. ERMA aims to build resilience and strategic autonomy for Europe's rare earth and magnet value chains. It will identify barriers, opportunities and investment possibilities in the raw materials value chain, while also addressing sustainability and social impact. The alliance addresses the challenge of securing access to sustainable raw materials, advanced materials, and industrial processing know-how.