M-ERA.NET CALL 2025:

Results & Funded Projects

TABLE OF CONTENTS

RESULTS OF M-ERA.NET CALL 2025

383	106	28	35 MIO €
Pre-Proposals	Full-Proposals	Funded projects	Project volume

The M-ERA.NET Call 2025 was launched on 4 March 2025. 38 funding organisations from 30 countries participated with a preliminary total commitment of more than 38 million €.

- 383 pre-proposals were submitted, requesting 370 Mio € funding in total.
- 106 pre-proposals were recommended for a full-proposal submission. 106 full-proposals were submitted and 101 were sent to M-ERA.NET central evaluation.
- 88 full-proposals passed the full-proposal evaluation, requesting around 88 Mio € funding.

Depending on national/regional budgets and rules the national/regional funding organisations finally
Selected 28 full-proposals for funding corresponding to requested funding of 28 Mio EUR

The funded projects address key priorities in sustainable advanced materials for energy and the green transition, strengthening European research and innovation cooperation.

These projects are allocated to the call topics as follows:

- Sustainable materials for energy applications: **12** funded projects
- Innovative surfaces, coatings and interfaces: **5** funded projects
- Advanced composites and lightweight materials: **2** funded projects
- Functional materials: **6** funded projects
- Materials addressing environmental challenges: **1** funded project
- Next generation materials for electronics: **2** funded projects

The total success rate (selected full-proposals vs total submitted pre-proposals) is 7.3% (Fig. 1). For the different topics the rates of success vary:

Sustainable materials for energy applications	10.9%
Innovative surfaces, coatings and interfaces	10.0%
Advanced composites and lightweight materials	5.7%
Functional materials	5.7%
Materials addressing environmental challenges	1.6%
Next generation materials for electronics	10.0%

The success rate for the second stage (selected full-proposals vs. total submitted full-proposals) is 29%.

Sustainable materials for energy applications	27%
Innovative surfaces, coatings and interfaces	30%
Advanced composites and lightweight materials	26%
Functional materials	30%
Materials addressing environmental challenges	29%
Next generation materials for electronics	30%

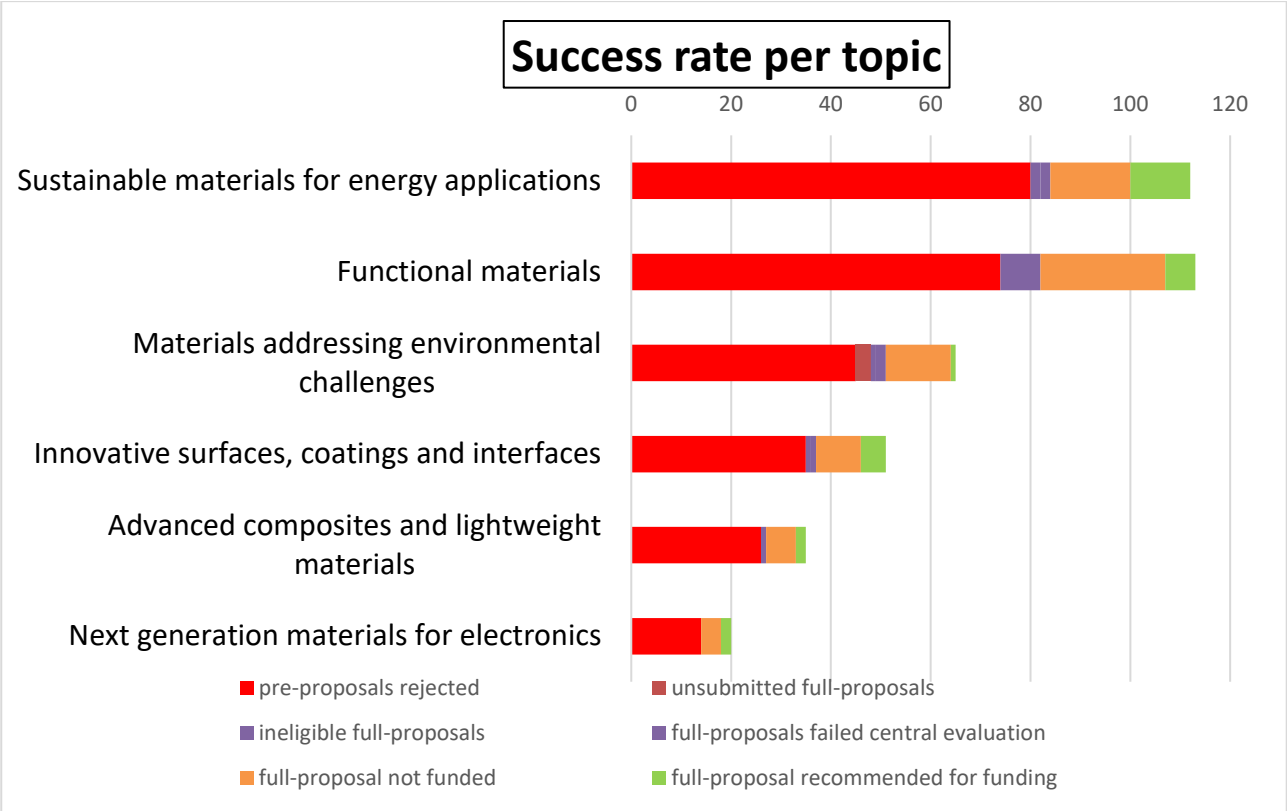

Fig 1: Number of participations: selected full-proposals compared to rejected pre-proposals for all six call topics.

The success rates (selected full-proposals vs total submitted pre-proposals) per organisation type are shown in Fig. 2. The success rate for SMEs is 9%, for research organisation 8%, for universities 7% and for large companies 7%.

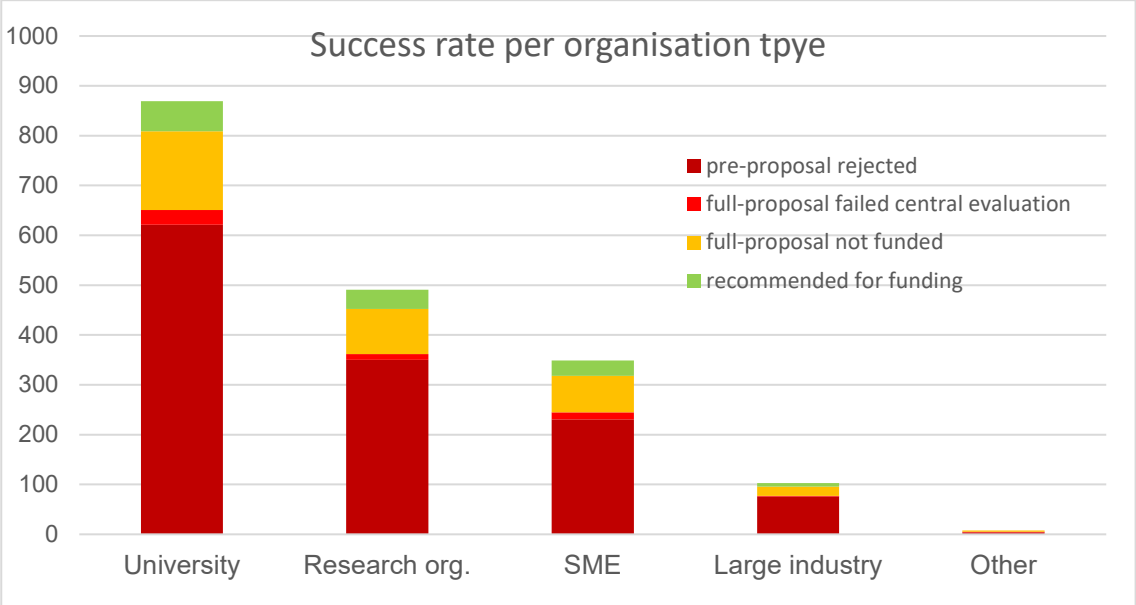

Fig 2: Number of participations: selected full-proposals compared to rejected proposals for all organisation types.

The success rates per individual national/regional funding organisation (number of selected full-proposals vs number of submitted proposals) are shown in Fig. 3.

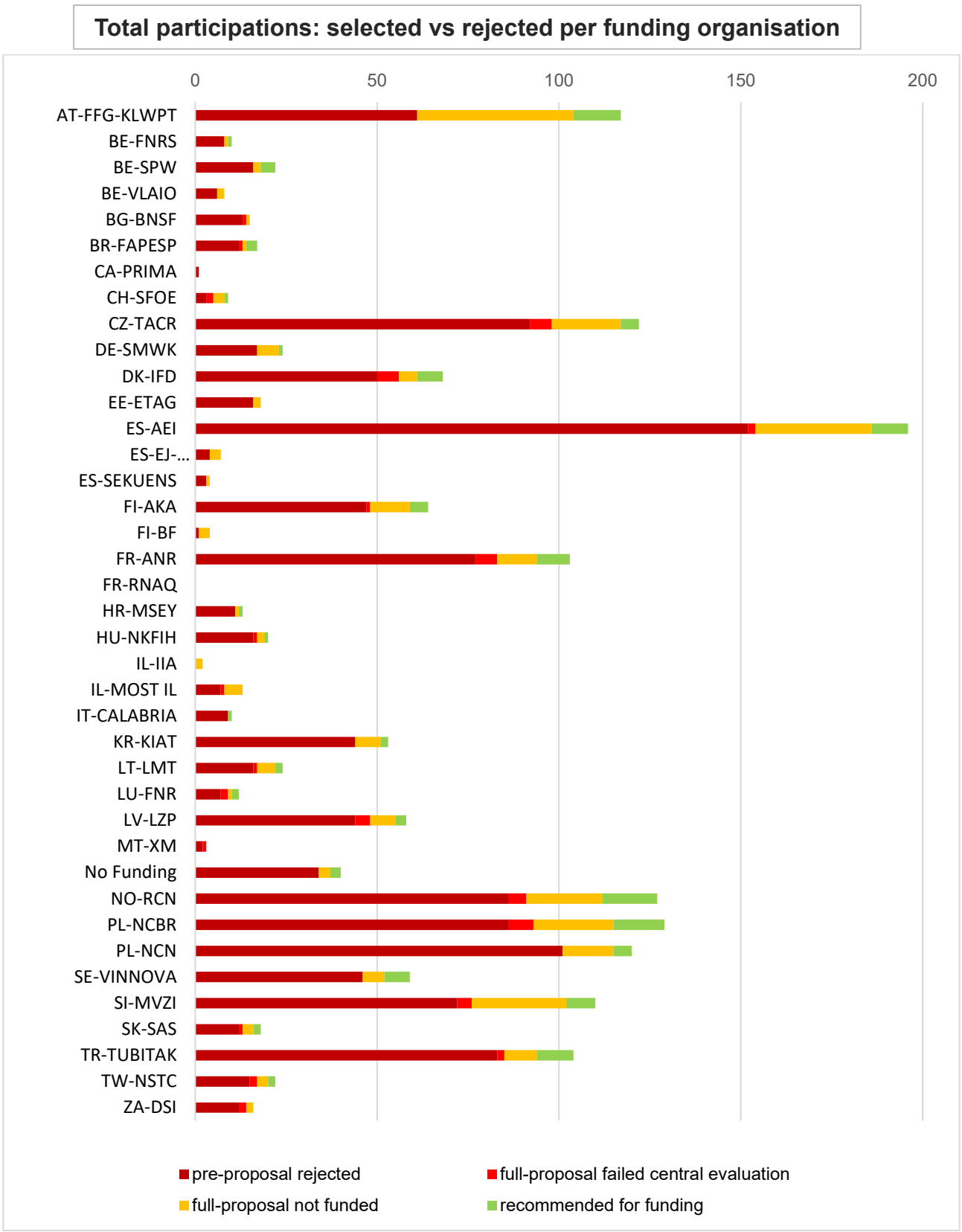

Fig 3: Total number of participations: success rate from pre-proposal phase to selected full-proposals.

With 11 of the EU-13 (widening) countries (except Romania and Cyprus) participating in the Call 2025, hence researchers from EU-13 countries play a substantial role (fig. 4a-e). 75% of the funded projects include at least 1 research group from an EU-13 country; 27% of the total project funding is contributed by funding agencies from EU-13 countries; 30% of the funded applicants and 25% of the project coordinators come from EU-13 countries.

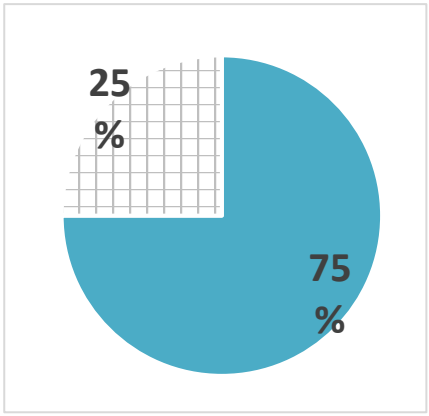

Fig. 4a: 75% of the funded projects include at least 1 research group from EU-13 countries.

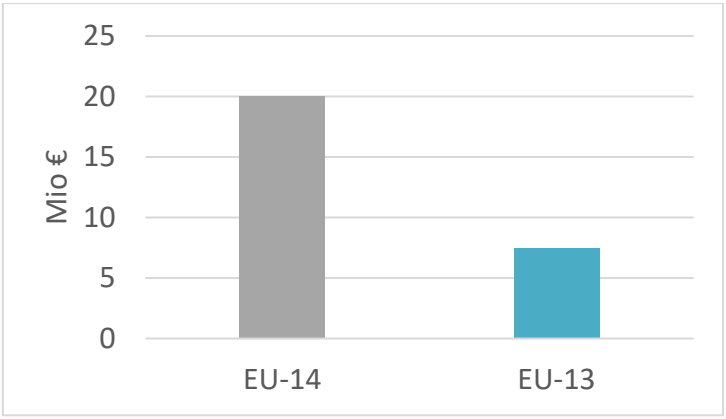

Fig. 4b: Total requested funding for selected full-proposals.

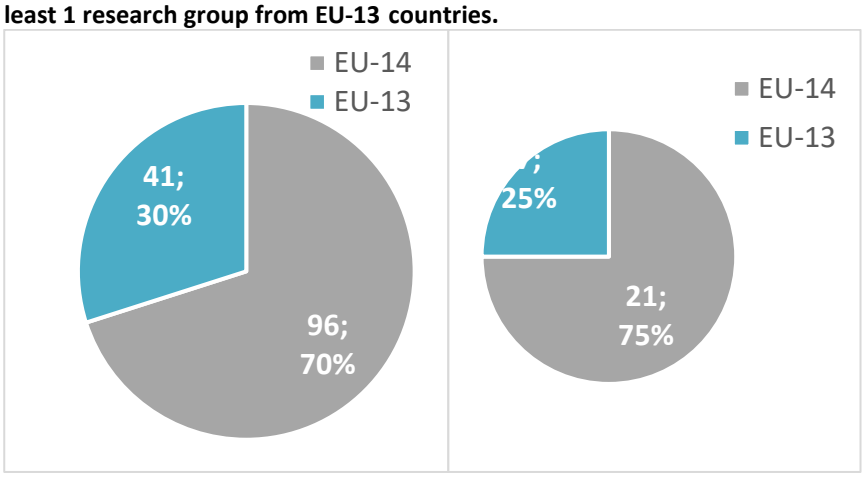

Fig 4c-d: Number of funded applicants (c) and coordinators (d) in selected full-proposals.

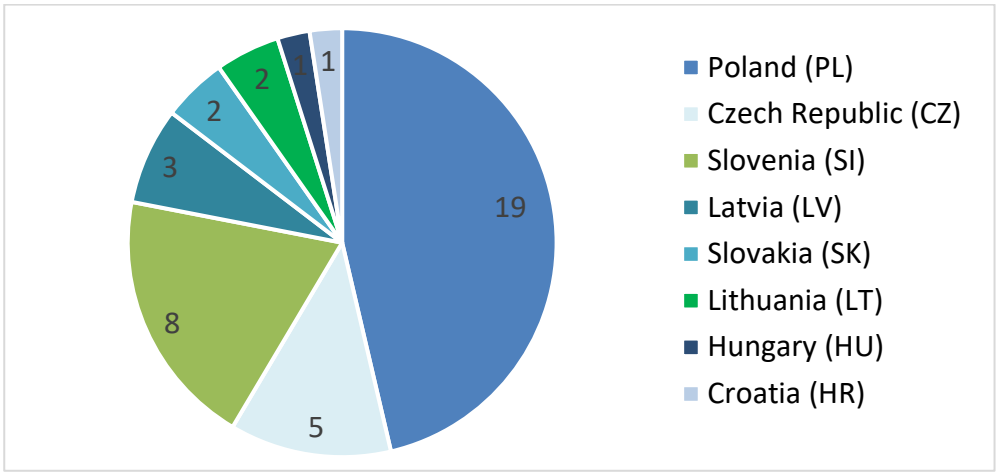

Fig 4e: Number of participants from EU-13 countries per country in selected full-proposals.

The total project volumes and corresponding requested funding per call topic are shown in Fig. 5.
The topic with the highest amount of requested funding is the topic “Sustainable advanced materials for energy” with 12.4 Mio €. This is followed by the topic “Functional materials” with 5.3 Mio €. For the topics “Innovative surfaces, coatings and interfaces”, “Materials addressing environmental challenges” and “Next generation materials for advanced electronics” and “Advanced composites and lightweight materials” 5.2 Mio €, 1.7 Mio €, 1.6 Mio € and 1.6 Mio € funding are requested, respectively.

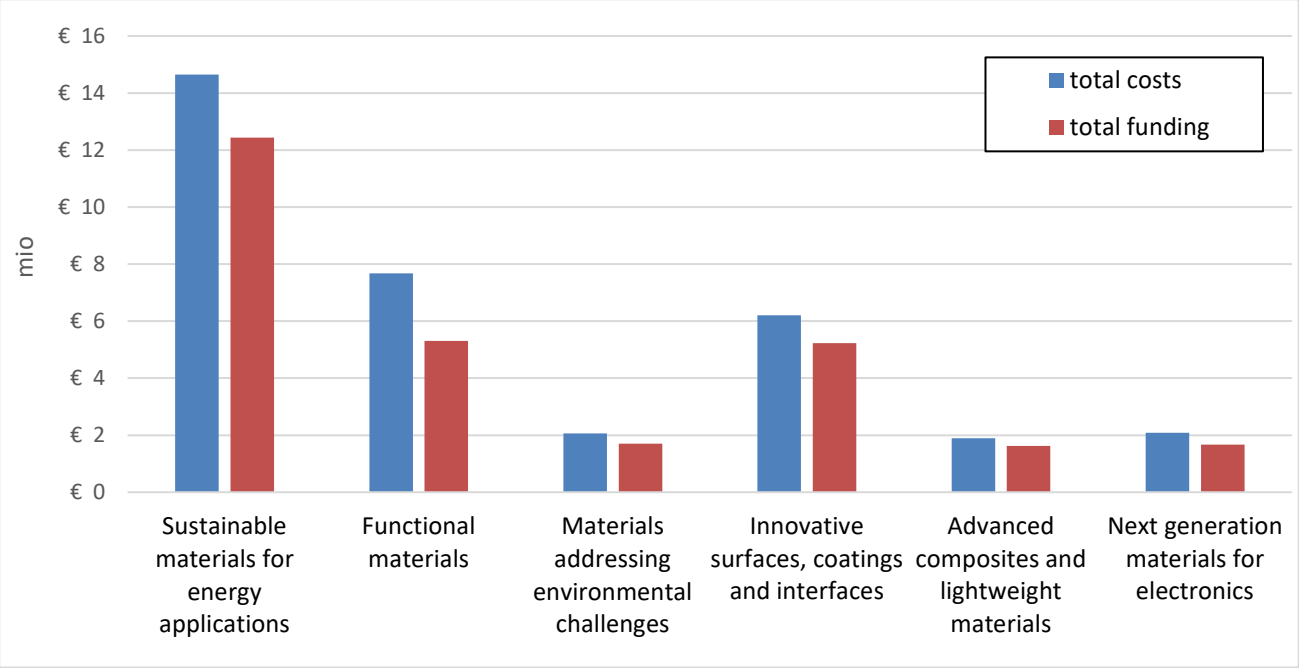

Fig 5: Selected full-proposals: total project volumes and requested funding (€) per call topic.

The distribution of total project costs and requested funding per organisation type is shown in Fig 6. In the selected full-proposals universities (12.3 Mio €) and research organisations (10.1 Mio €) request the highest amount of funding. A smaller ratio of 20.0% of the total funding is requested by enterprises: 19.0 Mio € funding by SMEs and 1.1 Mio € funding by large enterprises.

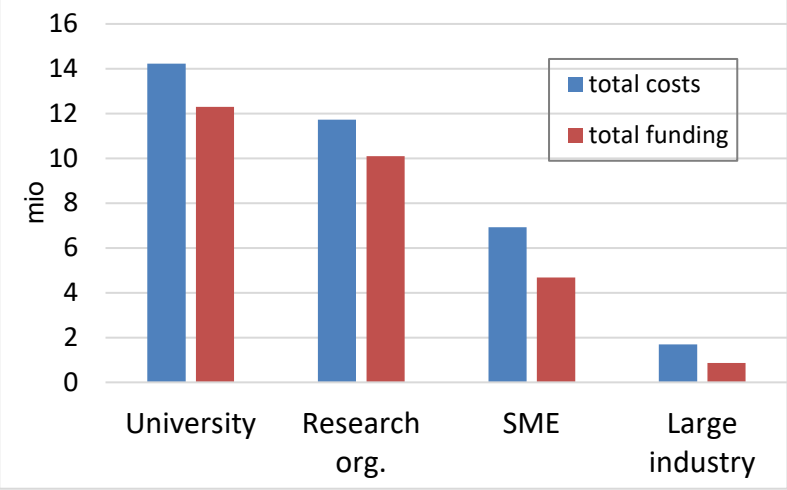

Fig 6: Selected full-proposals: total requested funding and total planned costs (€) per organisation type.

Out of 28 recommended projects, the majority of the coordinators are from research organisations (13 projects) and universities (12 projects). Two projects are coordinated by an SME and one project by a large company (Fig. 7).

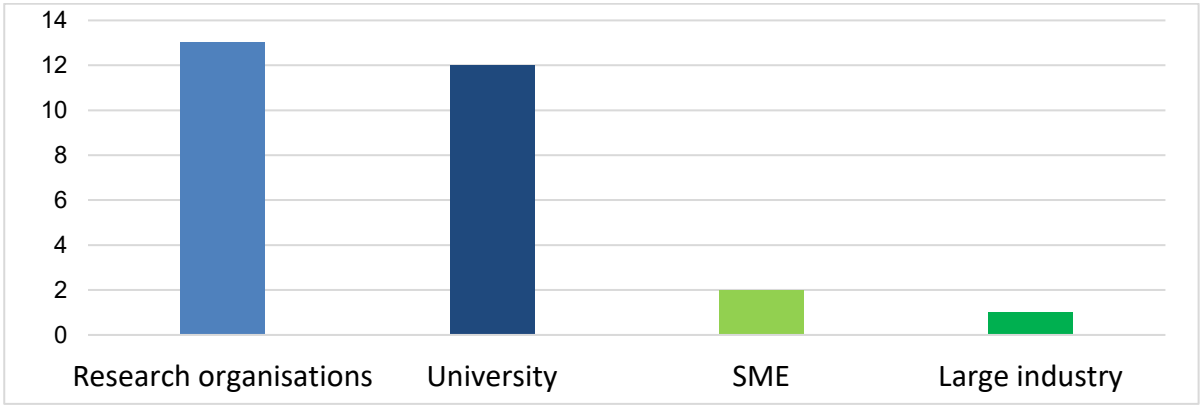

Fig 7: Selected full-proposals: number of coordinators per organisation type.

The successful organisation types per topics are shown in Fig. 8. The highest share of industry involvement with approx. 33% is in the topics “Advanced composites and lightweight materials”, “Functional materials” and “Sustainable materials for energy applications”.

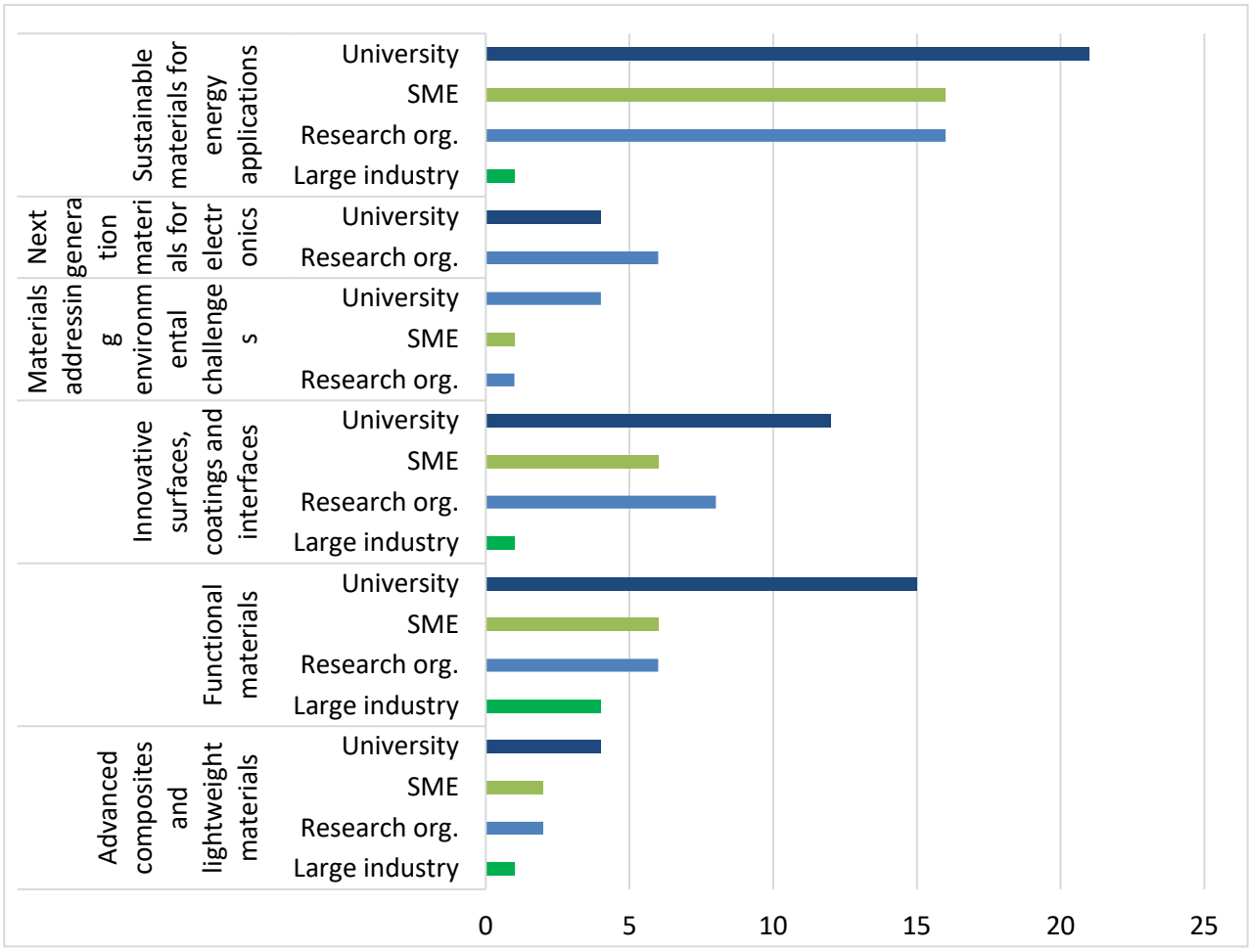

Fig 8: Selected full-proposals: organisation types per topic

The selected projects start from Technology Readiness Level (TRL) 1 (basic principles observed)) to some extent TRL 4 (technology validated in lab) (Fig. 9).

Most of them start with TRL 2 (technology concept formulated) or TRL 3 (experimental proof of concept).

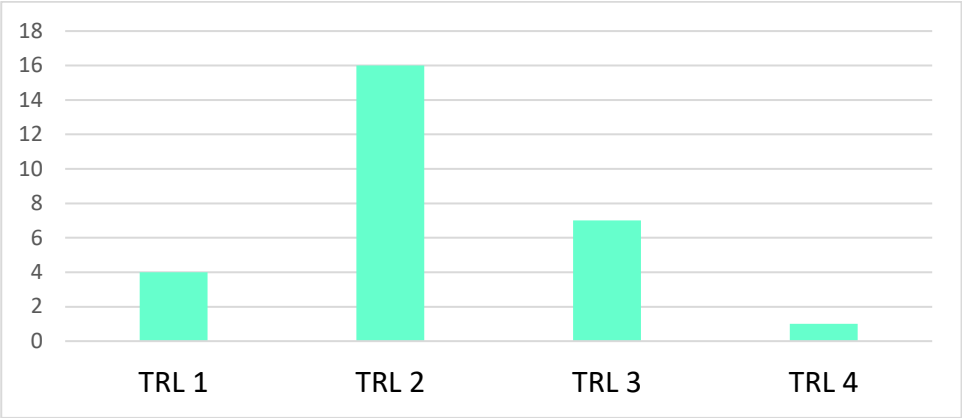

Fig 9: Selected full-proposals: number of applicants per TRL (project start)

The TRL targeted on the end of the project are mainly between TRL 3 and TRL 6 (technology demonstrated in relevant environment), see Fig. 10.

Most projects indicate a two or three step advance of the TRL, resulting in a broad distribution of the end-TRL between TRL 4 (technology validated in lab) and TRL 5 (technology validated in relevant environment).

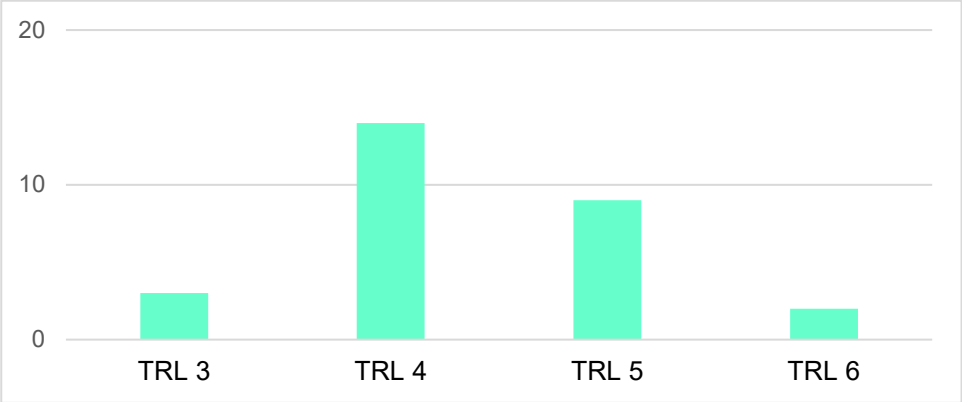

Fig 10: Selected full-proposals: number of applicants per TRL (project end)

The requested funding of selected full-proposals per funding organisation is illustrated in Fig. 11.

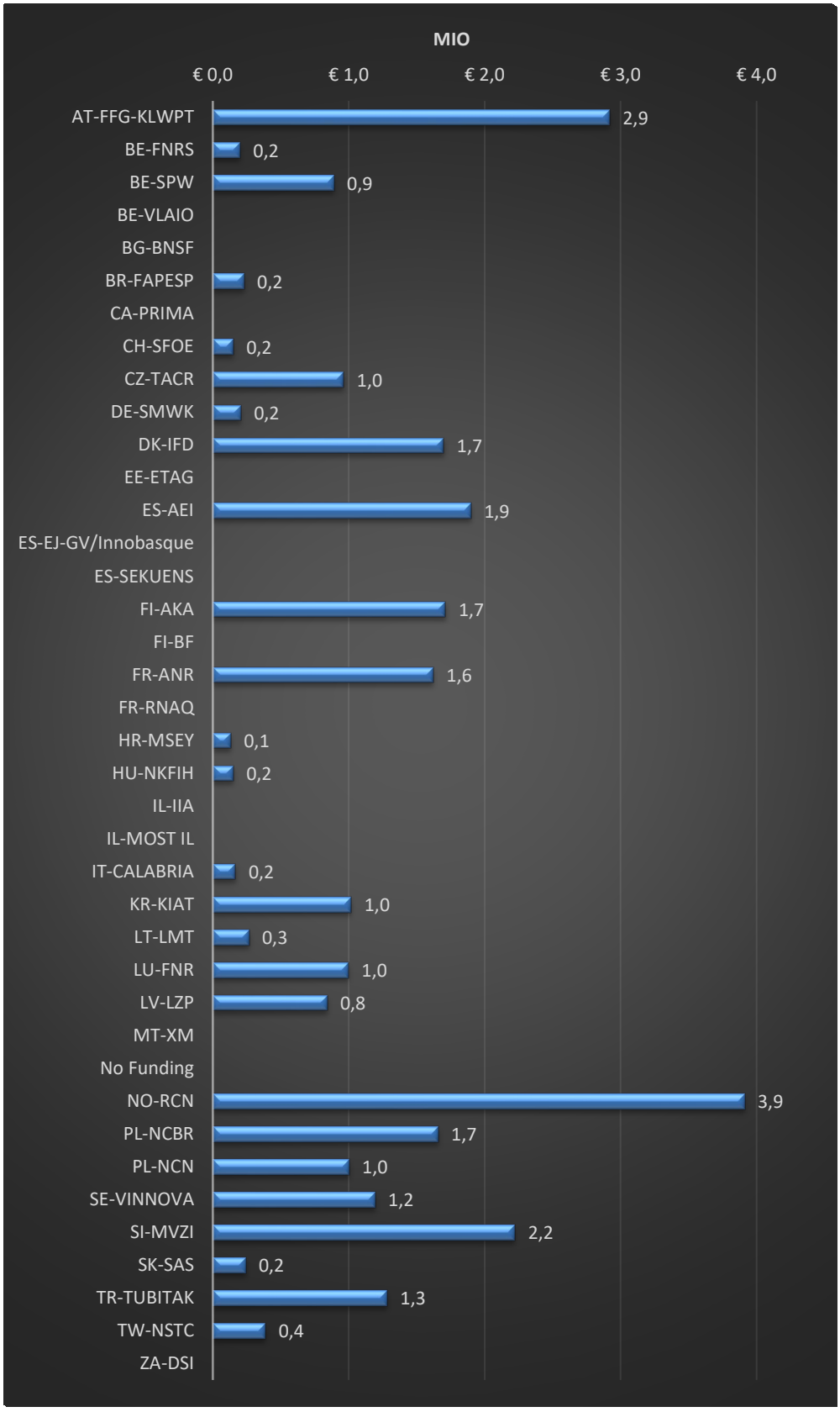

Fig 11: Select full-proposals: requested funding per funding organisation (€).

CALL TOPIC 1

Sustainable materials for energy applications

The main scope is the development of advanced materials that can play a key role in enabling new and cleaner energy storage, conversion, efficiency and utilisation. Sustainable advanced materials development should also address aspects such as circularity, end of life treatment, recyclability, Life Cycle Assessment (LCA), Techno-Economic Analysis (TEA) and RRI. Furthermore, methodologies supported by digitalisation (computational modelling, Artificial Intelligence (AI), design of experiments, etc.) are needed for accelerated materials design and optimisation for energy applications. These methodologies, together with experimental high throughput screening of materials, are expected to save time and cost in the materials discovery and design process versus traditional trial and error approaches.

Sustainable materials for energy applications

CARBONEX-S

Sustainable Nanocellulose-Carbon Hybrid Electrodes for Advanced Flexible Supercapacitors

Call Topic: Sustainable materials for energy applications

Coordinator: Gdańsk University of Technology (PL)

Funding: € 698 610	**Duration**: 24 months	**No. of Partner:** 6

Participants:

- Gdańsk University of Technology (PL)
- KTH Royal Institute of Technology (SE)
- FineCellOx AB (SE)
- **University of Warwick (GB)*
- **Universidade Estadual de Campinas (BR)*
- University of São Paulo (BR)

Funding organisations:

- PL-NCN (Poland)
- SE-VINNOVA (Sweden)
- BR-FAPESP (Brazil)

Project summary:

- Rationale/Needs to be addressed

The transition to renewable energy demands efficient, safe, and sustainable energy storage systems. Conventional supercapacitors rely on fossil-based carbons and toxic solvents, creating environmental and recycling challenges.

- Objectives

CARBONEX-S develops flexible, eco-designed supercapacitors built from boron-doped carbon nanowalls, cellulose nanofibrils (CNFs), and bio-based activated carbon, integrated with aqueous or CNF-gel electrolytes and metal-free laser-induced graphene current collectors.

- Potential applications

The resulting devices target flexible electronics, wearables, and renewable-energy storage modules, offering alternatives to conventional systems.

- Impact and potential benefits

By advancing from TRL 2→5, CARBONEX-S will deliver high-performance and recyclable supercapacitors that reduce CO_2 emissions and resource use, strengthening Europe's leadership in sustainable energy materials.

[1] Participants requesting no funding are marked with an asterisk and printed in *italic* type.

CYCLOPEM

Recycling & Reuse of Ionomers and Platinum Group Metals from Proton Exchange Membrane Water Electrolysers

Call Topic: Sustainable materials for energy applications

Coordinator: LUXEMBOURG INSTITUTE OF SCIENCE AND TECHNOLOGY (LU)

Funding: € 1 099 153	**Duration**: 36 months	**No. of Partner:** 3

Participants:	**Funding organisations:**
- LUXEMBOURG INSTITUTE OF SCIENCE AND TECHNOLOGY (LU) - National Institute for Chemistry (SI) - Aalborg University (DK)	- LU-FNR (Luxembourg) - SI-MVZI (Slovenia) - DK-IFD (Denmark)

Project summary:

Rationale/Needs Addressed

• Anticipate large scale Proton exchange membrane water electrolyser (PEMWE) roll out in coming years

• Critical raw material (CRM) use raises supply risks and negative environmental impacts

• Recycling required to enhance supply chain resilience and circularity

Objectives

• Develop a novel, low-impact approach to CRM recycling from PEMWE

• Combine computational modelling, materials chemistry, and electrochemical engineering to optimise recovery, reuse and performance

• Demonstrate low CRM, high-performance electrodes through innovative design and fabrication

Potential Applications

• Improved PEMWE performance with a sustainable lifecycle

• Extendable to other CRM-dependent devices (e.g. fuel cells)

Impact & Potential Benefits

• Support CRM Act, Net Zero Industry Act and EU Green Deal via resilient, circular CRM use in H2 production, at reduced cost and environmental impact

• Innovations improve PEMWE performance and support large scale deployment

H2SAFE

Safe and Durable Sealing for H2-Systems

Call Topic: Sustainable materials for energy applications

Coordinator: SCIOFLEX Hydrogen GmbH (AT)

Funding: € 934 198	**Duration**: 36 months	**No. of Partner:** 5

Participants:

- SCIOFLEX Hydrogen GmbH (AT)
- University of Ljubljana (SI)
- Innseals Dichtungstechnik GmbH (AT)
- Kocaeli University (TR)
- Johannes Kepler University Linz – IPPE (AT)

Funding organisations:

- AT-FFG-KLWPT (Austria)
- SI-MVZI (Slovenia)
- TR-TUBITAK (Turkey)

Project summary:

Reliable hydrogen (H2) infrastructure requires sealing materials that can withstand extreme pressures, temperature variations, and cyclic loads. Seals are vital components throughout the H2 value chain, including in storage tanks, pipelines, fuel cells, and refueling systems. Current elastomeric seals are prone to gas permeation, rapid gas decompression (RGD), and limited durability, posing safety and sustainability challenges. H2SAFE develops next-generation elastomer compounds that offer enhanced gas barrier performance, RGD resistance, and recyclability. Advanced mechanical and AI-assisted modeling will predict long-term durability of demonstrator sealing, supported by in-situ H2 testing up to 1000 bar. The project will enhance the safety, efficiency, reliability, and sustainability of H2 technologies, extend the lifetime of sealing components by ≥20%, reduce H2 leakage by ≥15%, integrate recycled materials, and strengthen Europe's technological leadership in clean energy materials.

Hydro-Mat

Hydrogen and Energy Storage Materials for Sustainable Solutions

Call Topic: Sustainable materials for energy applications

Coordinator: SINTEF INDUSTRY (NO)

Funding: € 1 130 616	**Duration**: 36 months	**No. of Partner:** 5

Participants:

- SINTEF INDUSTRY (NO)
- CSIC (ES)
- Graz University of Technology (AT)
- Rouge H2 Engineering AG (AT)
- CerPoTech (NO)

Funding organisations:

- NO-RCN (Norway)
- ES-AEI (Spain)
- AT-FFG-KLWPT (Austria)

Project summary:

Rationale

Current H2 production relies on fossil fuels with high carbon emissions. Hydro-Mat addresses this by developing a novel chemical looping process using advanced energy storage oxide materials (ESOMs) to produce clean H2 from biogas, biomethane, natural gas with inherent carbon capture.

Objectives

The project designs and validates novel ESOMs using defect chemistry and machine learning, demonstrating >90% H2 yield and >95% CH4 conversion in dual reactor systems, with integrated CO2 capture, advancing from TRL 2 to 4.

Potential applications

The technology enables carbon-negative hydrogen/syngas production for hard-to-abate sectors like steel, chemicals, and renewable fuels, supporting both decentralized and industrial-scale clean energy systems.

Impact and benefits

Hydro-Mat reduces fossil fuel dependence, lowers production costs, and aligns with EU decarbonization goals (REPowerEU). It positions Europe as a leader in clean H2 technology while enabling sustainable growth.

HYPER-AMP

HYdrogen-combustion improved PERformance systems enabled by Advanced Metal Powder processing

Call Topic: Sustainable materials for energy applications

Coordinator: UNIVERSIDAD DE CASTILLA LA MANCHA (ES)

Funding: € 939 556	**Duration**: 36 months	**No. of Partner:** 5

Participants:

- UNIVERSIDAD DE CASTILLA LA MANCHA (ES)
- SIMTEC SOFT (SE)
- INCUS (AT)
- SIEMENS ENERGY (SE)
- Chalmers University of Technology (SE)

Funding organisations:

- ES-AEI (Spain)
- SE-VINNOVA (Sweden)
- AT-FFG-KLWPT (Austria)

Project summary:

The transition to hydrogen-fuelled gas turbines requires materials and advanced manufacturing routes that ensure high performance and hydrogen tolerance under extreme thermal and chemical loads. Conventional fusion-based AM suffers from residual stresses, segregation, and cracking in high-γ' Ni-based superalloys such as Alloy 247, limiting its use for critical components.

Objectives: Develop and validate sinter-based MIM and LMM processes for Alloy 247, with controlled debinding and sintering atmospheres, to achieve high density, stable γ/γ' microstructures, and reliable high-temperature and hydrogen performance.

Potential applications: Small and medium turbine components, including fuel injectors, nozzles, and parts with internal cooling channels.

The project enables complex, high-performance, hydrogen-compatible components with reduced manufacturing waste, enhanced reliability, and lower environmental impact compared to conventional fusion-based AM.

LAMA

Lithium manganese iron phosphate cathodes enabled through Aqueous electrode MAnufacturing

Call Topic: Sustainable materials for energy applications

Coordinator: University of Oslo (NO)

Funding: € 975 000	**Duration**: 36 months	**No. of Partner:** 4

Participants:

- University of Oslo(NO)
- SME (NO)
- POLYMAT (ES)
- Istitute (LV)

Funding organisations:

- NO-RCN (Norway)
- ES-AEI (Spain)
- LV-LZP (Latvia)

Project summary:

Sustainable and high performing cathode materials for Li-ion batteries (LIBs) are needed to complete the green energy transition without compromising on nature and human wellbeing. In response to this challenge, the goal of LAMA project is to demonstrate high performing, inexpensive and sustainable lithium manganese iron phosphate (LMFP) cathodes for LIBs. This will involve development of a sustainable, scalable and cost-effective synthesis of high-quality LMFP materials and develop aqueous electrode processing with new water-soluble polymer binders. To facilitate the optimization of the electrochemical performance, we will obtain a detailed understanding of the cycling mechanism of LMFP through advanced X-ray based operando characterization. The product of LAMA will be the LMFP-based cathodes relevant for the use in the next generation of LIBs. As a result, the LAMA project will enable the use of LMFP cathodes in a complete European battery value chain.

MACAROON

Ammonia Production via Electrochemical Reduction of Nitrogen

Call Topic: Sustainable materials for energy applications

Coordinator: SINTEF (NO)

Funding: € 1 723 881	**Duration**: 36 months	**No. of Partner:** 5

Participants:

- SINTEF (NO)
- NitroVolt (DK)
- Aalto University (FI)
- National Institute of Chemistry (SI)
- NanoScientifica (SE)

Funding organisations:

- NO-RCN (Norway)
- DK-IFD (Denmark)
- FI-AKA (Finland)
- SI-MVZI (Slovenia)
- SE-VINNOVA (Sweden)

Project summary:

Rationale/Needs to be Addressed:

The MACAROON project addresses the urgent need for decentralized, zero-emission ammonia production.

Objectives:

MACAROON employs a bottom-up approach to materials design that aims to overhaul the current state-of-the-art (SoA) electrochemical ammonia production technologies to deliver decentralized, green ammonia production with increased energy efficiency, increased ammonia production rates, and increased sustainability through reduced reliance on critical raw materials.

Potential Applications:

Green ammonia is important for several applications, including its use as a zero-emission fuel for transportation and the sustainable production of nitrogen-based fertilizers.

Impact and Potential Benefits:

MACAROON will deliver scientific excellence, industrial innovation, and societal benefits, including reduced dependence on fossil-based ammonia, improved energy security, and strengthened European leadership in sustainable energy technologies.

MagShape

Advanced multi-principal element magnets via controlled shape anisotropy

Call Topic: Sustainable materials for energy applications

Coordinator: VTT Technical Research Centre of Finland Ltd. (FI)

Funding: € 1 148 122	**Duration**: 36 months	**No. of Partner:** 4

Participants:

- VTT Technical Research Centre of Finland Ltd. (FI)
- SINTEF AS (NO)
- Magneti Ljubljana, d.d. (SI)
- 3-D Components (NO)

Funding organisations:

- FI-AKA (Finland)
- NO-RCN (Norway)
- SI-MVZI (Slovenia)

Project summary:

MagShape develops new rare earth element (REE)-free permanent magnets (PMs) using multiscale modelling and additive manufacturing to support EU's independence on critical magnet technology.

Rationale: PMs are vital for clean energy technologies. Reliance on REEs creates severe supply risks for EU due to geopolitics, showing an urgent need for REE-free substitutes.

Objectives: MagShape develops new AI/ML-guided multiscale modelling and high-throughput experimental validation methods to enable the rapid design of novel REE-free PMs outperforming existing REE-free technologies in cost and performance.

Potential applications: Generators in renewable energy and motors in smart mobility systems with high operation temperatures and requirements of strong and reliable magnetic performance.

Impact and potential benefits: Developed platform for rapid alloy design will accelerate materials discovery. The new magnet class strengthens EU's strategic supply on PMs and supports green transition.

MEDUSAH

Metamaterials Engineered Design of MOFs for Ultra-efficient and Sustainable Adsorption-based Hydrogen storage

Call Topic: Sustainable materials for energy applications

Coordinator: SINTEF AS (NO)

Funding: € 1 042 844	**Duration**: 36 months	**No. of Partner:** 5

Participants:

- SINTEF AS (NO)
- Planck Technologies AS (NO)
- UNIVERSITA DELLA CALABRIA (IT)
- UNIVERSIDAD DE LLEIDA (ES)
- CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE CNRS (FR)

Funding organisations:

- NO-RCN (Norway)
- IT-CALABRIA (Italy)
- ES-AEI (Spain)
- FR-ANR (France)

Project summary:

Rationale / Needs to be addressed: Hydrogen storage for stationary applications lacks cost-effective, safe, and scalable options. Existing technologies are energy-intensive or unsuitable for near-ambient conditions, limiting their application in refueling stations and energy grids.

Objectives: MEDUSAH seeks to create a hydrogen storage system utilizing machine learning for MOFs and metamaterials engineered tank. It aims for high volumetric (>36 g/L) and gravimetric (>4%wt) uptake at temperatures above -5°C while minimizing costs and environmental impact through green chemistry and thermally optimized storage devices.

Potential applications: The technology is designed for stationary hydrogen storage in refuelling stations, supporting both light and heavy-duty transport and grid decarbonization.

Impact and potential benefits: MEDUSAH will advance TRL 2 to TRL 4, enabling safer, cost-effective hydrogen storage (<15 $/kWh).

MOFTherm

Metal-Organic Framework-enhanced Battery Thermal Management Composites

Call Topic: Sustainable materials for energy applications

Coordinator: National Institute of Chemistry (SI)

Funding: € 950 000	**Duration**: 36 months	**No. of Partner:** 4

Participants:

- National Institute of Chemistry (SI)
- SINTEF Energi AS (NO)
- Hochschule Luzern (CH)
- ProfMOF AS (NO)

Funding organisations:

- SI-MVZI (Slovenia)
- NO-RCN (Norway)
- CH-SFOE (Switzerland)

Project summary:

Efficient and sustainable battery thermal management (BTM) is crucial for ensuring batteries safety, performance and lifespan. Current active cooling systems consume energy, while passive systems based on phase change materials (PCM) suffer from low thermal conductivity and leakage. Innovative and eco-friendly materials are urgently needed to meet the growing sustainability demands of thermal management applications.

MOFTherm project develops novel PCM@MOF@C composites for BTM (e.g. electric vehicles, portable electronics, data centers) using non-toxic metal-organic frameworks (MOFs) as porous supports for bio-based PCMs and recycled carbon structures. The project aims to optimize synthesis, shaping, and battery integration while assessing sustainability and scalability, advancing the technology from TRL 1 to 4.

MOFTherm will deliver safer, longer-lasting batteries, supporting the green transition and enhances European battery competitiveness by employing sustainable materials.

PUNCH

Predictive Uncovering of Next-gen protonic Ceramics for Hydrogen and ammonia electrolysis

Call Topic: Sustainable materials for energy applications

Coordinator: SINTEF AS (NO)

Funding: € 1 100 000	**Duration**: 36 months	**No. of Partner:** 4

Participants:

- SINTEF AS (NO)
- Technical University of Denmark (DK)
- Cerpotech Powder Technology AS (NO)
- University of Ljubljana (SI)

Funding organisations:

- NO-RCN (Norway)
- DK-IFD (Denmark)
- SI-MVZI (Slovenia)

Project summary:

Rationale / Needs to be addressed: Most hydrogen (H2) and ammonia (NH3) are produced from fossil feedstock. To scale green routes, electrolysers must have longer lifetime and decreased cost. Operating below 500 °C lowers thermo-mechanical stress and allows cheaper steels and seals, improving durability and reducing costs.

Objectives: Use machine learning (ML), atomistic modelling and experimental screening to identify new proton-conducting electrolytes for <500 °C operation, scale powder synthesis, fabricate 5×5 cm cells, and validate them for H2, and proof-of-concept direct NH3 production.

Potential Applications: On-site green H2 for industry, modular NH3 for fertilizer and fuel, and flexible Power-to-X using renewables and waste heat.

Impact and potential benefits: Electrolysers at 350–500 °C can lower CAPEX, simplify balance-of-plant, and extend lifetime. Open ML/modelling will speed materials discovery and support EU climate targets, CO2 cuts, and energy security.

SELF-energy

Smart, Efficient and Lightweight Facade for low-energy buildings

Call Topic: Sustainable materials for energy applications

Coordinator: Lodz University of Technology (PL)

Funding: € 690 000	**Duration**: 36 months	**No. of Partner:** 4

Participants:

- Lodz University of Technology (PL)
- LNW Polska Sp. z O.O. (PL)
- Institute of Construction and Architecture of the Slovak Academy of Sciences (SI)
- Riga Technical University (LV)

Funding organisations:

- PL-NCBR (Poland)
- SK-SAS (Slovakia)
- LV-LZP (Latvia)

Project summary:

Buildings account for a major share of energy use, and current façade systems cannot fully exploit renewable energy or provide dynamic thermal performance. The project addresses the need for highly efficient, adaptive envelope solutions suitable for diverse climates and modernization of existing buildings. The objective is to develop and validate a multifunctional façade integrating active thermal insulation, PV-T energy harvesting, and latent heat storage, forming a modular prefabricated unit. Potential applications include new and renovated buildings requiring improved energy efficiency and on-site renewable integration. The proposed solution solves several important challenges of the housing market such as demand for new cheap houses, attempting the autonomous building standard and increasing energy performance. The approach supports sustainable construction, accelerates market uptake of advanced façade technologies, and strengthens the competitiveness of involved company.

CALL TOPIC 2

Innovative surfaces, coatings and interfaces

Surface and coating technology is a key enabler for new solutions in numerous industrial sectors worldwide. This call will stimulate application driven development of innovative surfaces, thin films, coatings, interfaces and related process technologies, including a broad spectrum of industry needs and applications in various fields as specified in objectives and transversal aspects.

Projects that increase the synergy between industry and academia during and after the end of the project are welcome, including but not limited to: stimuli-responsive and adaptive coatings, surfaces with antimicrobial, anti-icing, anti-slippery, antiwear, anticorrosion, self-healing properties, thermal barrier and high temperature coatings applications, tribological low friction coatings and/or surface modification for energy saving and/or noise mitigation and barrier coatings.

The proposals should consider the energy efficient development, processing or production aspects including modelling and circular economy. Sustainable use of materials in an environmentally friendly manner with special attention to CRM and recyclability should be considered.

Innovative surfaces, coatings and interfaces

COLOUR2FOIL

Development of customizable, efficient and reliable coloured interlayers via roll-to-roll processing for photovoltaic applications on buildings

Call Topic: Innovative surfaces, coatings and interfaces

Coordinator: Technical University of Denmark (DK)

Funding: € 1 137 798	**Duration**: 36 months	**No. of Partner:** 6

Participants:

- Technical University of Denmark (DK)
- University of Southern Denmark (DK)
- Stensborg (DK)
- Austrian Research Institute for Chemistry and Technology (AT)
- Sunplugged (AT)
- Aalto University (FI)

Funding organisations:

- DK-IFD (Denmark)
- AT-FFG-KLWPT (Austria)
- FI-AKA (Finland)

Project summary:

Integration of solar photovoltaics in urban areas requires combining high PV performance with aesthetic design, including colouration. However, colour solutions for PV modules often suffer from limited dimensional flexibility, poor performance, or strong iridescence (change in colour appearance with viewing angle).

In the COLOUR2FOIL project a multidisciplinary consortium of universities and industrial partners is developing a large-area, roll-to-roll, flexible coloured interlayer. Based on detailed optical modelling, aperiodic thin film stacks, optimized to minimize performance losses, are conformally applied to a microtextured foil substrate. This enables uniform colour saturation and hue across various viewing angles. Rigorous, application-specific reliability tests ensure compatibility of materials used and a long product lifetime. In addition, a colour measurement tool is being developed to allow for precise colour characterization and matching to existing construction materials.

MOONRISE

Modulation of Organic Emissive Surfaces via Self-Assembly

Call Topic: Innovative surfaces, coatings and interfaces

Coordinator: Riga Technical University (LV)

Funding: € 715 987	**Duration**: 36 months	**No. of Partner:** 3

Participants:

- Riga Technical University (LV)
- University of South Bohemia České Budějovice (CZ)
- Kaunas University of Technology (LT)

Funding organisations:

- LV-LZP (Latvia)
- CZ-TACR (Czech Republic)
- LT-LMT (Lithuania)

Project summary:

Organic light-emitting materials are crucial for various modern technological solutions, such as organic light-emitting diodes (OLEDs). Unfortunately, the production stage of many organic emitters is associated with the generation of a considerable amount of chemical waste. The MOONRISE project will develop innovative surface-based organic light-emitting materials whose photophysical properties can be tuned through the formation of self-assembled monolayers (SAMs) on gold, glass, or metal oxide surfaces. The resulting SAMs will demonstrate tunable multi-color emission from a single luminophore, providing novel materials for the use in luminescent (LED), electroluminescent (OLED), and sensing devices. By reducing the need for a large selection of industrially produced luminophores, through modulation of the photophysical properties with surface structures, the project aims to lower waste generation and energy consumption in the organic electronics sector.

NIPURE

Development of Isocyanate-Free Polyurethane-Based Thermal Insulation Coating

Call Topic: Innovative surfaces, coatings and interfaces

Coordinator: Kalekim Kimyevi Maddeler San. Ve Tic. A.Ş (TR)

Funding: € 741 980	**Duration**: 36 months	**No. of Partner:** 3

Participants:

- Kalekim Kimyevi Maddeler San. Ve Tic. A.Ş (TR)
- TBW RESEARCH GESMBH (AT)
- KEMIJSKI INSTITUT (SI)

Funding organisations:

- TR-TUBITAK (TR)
- AT-FFG-KLWPT (Austria)
- SI-MVZI (Slovenia)

Project summary:

Europe's insulation industry consumes ~16 million tonnes of polyurethane (PU) annually, with over 90% based on toxic isocyanates and fossil feedstocks. This leads to health risks, fossil dependence, and unsustainable end-of-life practices. NIPURE breaks this linear model by developing non-isocyanate PU (NIPU) foam from domestic waste oils and cenospheres from power-plant ash. This eliminates toxic precursors and valorizes waste for circular carbon and mineral reuse. The project supports EU climate goals by avoiding virgin fossil inputs, reducing emissions, and enabling recyclability. LCA will quantify the environmental benefits. To enhance EU industrial resilience, NIPURE builds domestic feedstock value chains and delivers a TRL6 demonstrator aligned with REACH. TEA will guide its scale-up, ensuring the solution meets technical, economic, and regulatory needs.

safeHEARTassist

Toward safer Artificial Heart Implants: R&D on sensor-enhanced blood interfaces by AI-assisted Artificial Patient model

Call Topic: Innovative surfaces, coatings and interfaces

Coordinator: Institute of Metallurgy and Materials Science Polish Academy of Sciences (IMIM) (PL)

Funding: € 1 324 086	**Duration**: 36 months	**No. of Partner:** 9

Participants:

- Institute of Metallurgy and Materials Science Polish Academy of Sciences (IMIM) (PL)
- Prof Zbigniew Religa Foundation of Cardiac Surgery Development (FRK) (PL)
- Fabryka Narzędzi Medycznych CHIRMED Marcin Dyner (CHIRMED) (PL)
- Silesian University of Technology (SUT) (PL)
- Lodz University of Technology (TUL) (PL)
- Jan Dlugosz University in Czestochowa, Faculty of Science and Technology (JDU) (PL)
- JOANNEUM RESEARCH Forschungsges. mbH (JR) (AT)
- Bionic Surface Technologies GmbH (BST) (AT)
- Kocaeli University (KU) (TR)

Funding organisations:

- PL-NCBR (Poland)
- AT-FFG-KLWPT (Austria)
- TR-TUBITAK (TR)

Project summary:

Rationale / Needs to be addressed: Short-term ventricular assist devices (“artificial hearts”) and ventricular plugs to close access holes through the heart muscle after patient’s recovery lack localized, real-time monitoring of the blood-device interface. Thrombus, hemolysis, infection and failed endothelialization often originate at these surfaces. Objectives: (i) Develop flexible screen-printed piezoelectric sensor arrays (PyzoFlex® based) for spatiotemporal pressure mapping. (ii) Integrate biomimetic riblets and antifouling biocoatings. (iii) Train explainable AI models to detect early clotting, pseudointima formation and flow anomalies using Artificial Patient models (TRL 4). Potential applications: Real-time telemetry for pulsatile VADs, monitored ventricular plugs. Impact and potential benefits: Enables early complication detection, fewer revision surgeries, shorter hospital stays, improved explantation outcomes and accelerated recovery by safer, monitored implants.

SmartSens

Advanced Materials for Sustainable Nucleic Acid Biosensing

Call Topic: Innovative surfaces, coatings and interfaces

Coordinator: AIT AUSTRIAN INSTITUTE OF TECHNOLOGY GMBH (AT)

Funding: € 1 303 025	**Duration**: 36 months	**No. of Partner:** 6

Participants:

- AIT AUSTRIAN INSTITUTE OF TECHNOLOGY GMBH (AT)
- Attophotonics Biosciences GmbH (AT)
- MASARYKUV ONKOLOGICKY USTAV (CZ)
- University of Turku (FI)
- Sabancı University (TR)
- Łukasiewicz Intitute (PL)

Funding organisations:

- AT-FFG-KLWPT (Austria)
- CZ-TACR (Czech Republic)
- FI-AKA (Finland)
- TR-TUBITAK (Turkey)
- PL-NCN (Poland)

Project summary:

In the field of printed electronics, a key challenge is to reduce the environmental impact through innovative materials and surface coatings. SmartSens focuses on the development of an innovative screen-printed biosensor system for the detection of nucleic acids, with a particular focus on the detection of PIK3CA point mutations in circulating tumour DNA that can be analysed during liquid biopsy for breast cancer therapy.

To achieve this goal, the project will investigate several innovative materials starting at TRL 2 stage of development: a) biopolymer-based microfluidics, b) stimuli-responsive cellulose DNA purification materials, c) copper nanowire screen-printing pastes and d) thin films for non-enzymatic, label-free DNA sensing. In conclusion, SmartSens will investigate innovative materials with an end TRL 4, which are of great importance not only for biosensors and medical technology, but also for the wider field of printed electronics.

CALL TOPIC 3

Advanced composites and lightweight materials

Advanced composites and lightweight materials can provide solutions to a number of important challenges. Current topics of interest in this context include reduced energy consumption, improved structural performance and durability. However, these materials can be challenging to design and process or manufacture, and present new difficulties related to circular economy. This call is focused on novel materials solutions that deliver the attractive features of these materials while minimising their drawbacks. Within this context, bio-inspired solutions are also welcomed.

Within the scope of this call, advanced composites are defined as engineered materials (incl. hybrids) composed of ≥2 constituents (for example: a polymer, metallic or ceramic matrix reinforced by a textile, fibre, particle, container or filler) that meet requirements which cannot be fulfilled by a single material. The constituents can be metallic, ceramic, mineral, synthetic, natural or bio-based, and may possess one or more nanoscale dimensions. In parallel, here lightweight materials are defined as single or multi-phase materials providing similar or better performance with reduced weight vs. existing state-of-the-art materials.

Proposals specifically targeting only one application among energy, electronics or environmental applications should be submitted to the corresponding call topic, with the exception of advanced composites and lightweight materials for wind energy.

Advanced composites and lightweight materials

EcoMold		
Eco-friendly Geopolymer Mold Made of High-Performance Composite for Casting Ultralight Alloys		
Call Topic: Advanced composites and lightweight materials		
Coordinator: University of Kalisz (PL)		
Funding: € 672 750	**Duration**: 36 months	**No. of Partner:** 6
Participants: - University of Kalisz (PL) - Lodz University of Technology (PL) - Spoldzielnia Pracy Armatura (PL) - Techno-fly Barbara Kolodziejek (PL) - MYKOLO ROMERIO UNIVERSITETAS (LT) - Development and Training Centre for the Metal Industry - Metal Centre Cakovec (HR)		**Funding organisations:** - PL-NCBR (Poland) - LT-LMT (Lithuania) - HR-MSEY (Croatia)
Project summary: EcoMold introduces a novel, sustainable alternative to traditional casting, which remains costly, waste-intensive and environmentally harmful. The project develops high-performance geopolymer composite molds for non-ferrous alloys, using recycled fly ash and carbon fibres. This innovative solution replaces expensive ceramic, metal and toxic sand molds, reducing preparation time, production costs and environmental impact. The reusable and recyclable geopolymer molds enable precise casting of highly reactive alloys, expanding applications in aerospace, automotive and electronics. EcoMold strengthens circularity by minimizing waste and reintroducing used materials into new molds. The expected benefits include lower manufacturing costs, improved process efficiency and enhanced competitiveness. EcoMold marks a significant step toward a greener and more resource-efficient foundry industry.		

HIPSOFIC

HIgh Performance and SOundproofing of Natural FIber Composites

Call Topic: Advanced composites and lightweight materials

Coordinator: Luxembourg Institute of Science and Technology (LIST) (LU)

Funding: € 949 318	**Duration**: 36 months	**No. of Partner:** 3

Participants:	**Funding organisations:**
- Luxembourg Institute of Science and Technology (LIST) (LU) - Technical University of Denmark (DK) - BSH (TR)	- LU-FNR(Luxembourg) - DK-IFD (Denmark) - TR-TUBITAK (Turkey)

Project summary:

HIPSOFIC addresses the growing need for sustainable, recyclable, and low-noise materials in the appliance industry, where glass fibre-reinforced plastics remain difficult to recycle and have a high environmental footprint. The project develops circular bio-based composites combining bamboo fibres and recycled polypropylene, enhanced through eco-functional dopamine-based surface treatments and damping fillers. AI-assisted formulation and modelling ensure reproducibility, fibre integrity, and optimal acoustic and mechanical performance. Demonstrated in a washing machine tub, the technology is transferable to other sectors such as mobility, building, and consumer goods requiring lightweight, durable, and low-noise components. HIPSOFIC will replace over 1,000 tons of glass fibre and reduce CO_2 emissions, enabling scalable and recyclable materials that reinforce Europe's leadership in sustainable composites and support responsible, circular innovation across the manufacturing chain.

CALL TOPIC 4

Functional materials

Functional materials are essential for advancing nearly all technologies and contribute significantly to Europe's economy and job market. Innovative functional materials at nano and micro scales should be developed through novel synthesis processes, aligning with the UN Sustainable Development Goals. These materials should minimize reliance on non-renewable resources and critical raw materials while promoting recycling and sustainable solutions, particularly by avoiding hazardous substances. Proposals submitted to this topic are encouraged to incorporate advancements in materials design, production, and integration, supported by modelling, characterization, high-throughput screening, and advanced manufacturing for precise property control.

Projects focused on a specific area covered by another call topic, rather than on functional materials themselves, should be submitted to the relevant, more specialized topic.

Functional Materials

BREATHTAKING

BREATH moniToring mAsK triboelectric NanoGenerators

Call Topic: Functional Materials

Coordinator: Middle East Technical University (TR)

Funding: € 531 952	**Duration**: 24 months	**No. of Partner:** 5

Participants:

- Middle East Technical University (TR)
- Marmara University (TR)
- Grenoble-INP (FR)
- Warsaw University of Technology (PL)
- NOVELINKS (PL)

Funding organisations:

- TR-TUBITAK (Turkey)
- FR-ANR (France)
- PL-NCBR (Poland)

Project summary:

Rationale / Needs: Chronic respiratory diseases such as COPD, asthma, and pneumonia require continuous and non-invasive monitoring solutions. Current systems are bulky and unsuited for daily use, creating a need for lightweight, wearable alternatives.

Objectives: BREATHTAKING develops a sustainable and flexible breath-monitoring mask integrating self-powered triboelectric nanogenerator (TENG) sensors onto biodegradable polymer layers using screen-printed silver inks, advancing from TRL 3 to 5 within 24 months.

Potential Applications: The smart mask enables real-time respiratory monitoring and wireless data transmission via a battery-assisted Bluetooth module, suitable for clinical, home, and occupational use.

Impact and Potential Benefits: Combining eco-designed materials, scalable printing, and silver recovery with 80–85% yield, BREATHTAKING strengthens Europe's leadership in sustainable printed electronics and supports the UN SDGs on health, innovation, and responsible production.

NEFIBER

Nanoparticle-Embedded glass FIBERs: pioneering multifunctional materials for advanced photonics applications

Call Topic: Functional Materials

Coordinator: CNRS - Research national agency (FR)

Funding: € 1 070 065	**Duration**: 36 months	**No. of Partner:** 6

Participants:

- CNRS - Research national agency (FR)
- Tampere University (FI)
- São Paulo State University (BR)
- Nyfors Teknologi AB (SE)
- LEUKOS (FR)
- Glass Glass Technologies (BR)

Funding organisations:

- FR-ANR (France)
- FI-AKA (Finland)
- BR-FAPESP (Brazil)
- SE-VINNOVA (Sweden)

Project summary:

Currently, one of the main needs in photonics is the advancement of research on functional materials with enhanced optical responses compatible with integrated photonic platforms as optical fibers, which is essential for the development of next-generation devices. In this context, NEFIBER will develop the first commercially viable nanocomposite glass fibers that combine the properties of glass and functional nanoparticles, targeting future applications in optical communication, sensing, and laser technologies, while promoting eco-innovation through the reuse of rare-earth-containing waste materials. By merging academic and industrial expertise from France, Finland, Sweden, and Brazil, NEFIBER will reinforce European leadership in functional photonic materials. The outcomes will strengthen innovation in photonics, create opportunities for industrial advancement, and foster environmentally responsible manufacturing of high-performance fiber-based photonic systems.

PRIME_

Printed Resistive Integrated Multimaterials for Electronics

Call Topic: Functional Materials

Coordinator: AMAREA Technology GmbH (DE)

Funding: € 545 600	**Duration**: 24 months	**No. of Partner:** 3

Participants:

- AMAREA Technology GmbH (DE)
- AGENCIA ESTATAL CONSEJO SUPERIOR DE INVESTIGACIONES CIENTIFICAS (ES)
- INSTITUT JOZEF STEFAN (SI)

Funding organisations:

- DE-SMWK (Germany)
- ES-AEI (Spain)
- SI-MVZI (Slovenia)

Project summary:

PRIME addresses critical challenges in developing high-performance functional materials for semiconductor and electronic manufacturing. The project establishes an integrated framework combining biomass-derived feedstocks, multi-material additive manufacturing, and ultrafast thermal consolidation (sintering) to enable single-step fabrication of electroceramic components with co-integrated conductive and insulating regions. This approach overcomes current limitations of multi-step joining and coating processes, enhancing material compatibility and structural integrity. The technology will be validated through prototype demonstrators such as wafer chucks and process heaters with embedded thermal management. PRIME advances the additive manufacturing of electroceramics from laboratory feasibility to prototype validation, aiming to reduce energy consumption and material waste while increasing functional integration, reliability, and sustainability in advanced manufacturing environments.

ReOil

Repurposing, reuse and recycling of used lubricant and waste oils

Call Topic: Functional Materials

Coordinator: SINTEF (NO)

Funding: € 870 460	**Duration**: 36 months	**No. of Partner:** 4

Participants:

- SINTEF (NO)
- Nicolaus Copernicus University in Toruń (PL)
- University of chemistry and technology Prague (CZ)
- Norsk Spesiaolje (NO)

Funding organisations:

- NO-RCN (Norway)
- PL-NCN (Poland)
- CZ-TACR (Czech Republic)

Project summary:

- Rationale / Needs to be addressed: Recycling of waste lubricants is difficult and often involves re-refining. For environmentally acceptable lubricants there are no viable recycling methods, and today disposal by burning is used. Alternatives to current methods that allow lubricants to be re-used are greatly needed.
- Objectives: The main objective of the ReOil project is to significantly enhance the re-utilization of used lubricating oils, reducing environmental impact while unlocking commercial potential.
- Potential applications: Recycling by reuse of both waste oil, lubricants and environmentally acceptable lubricants (EALs).
- Impact and potential benefits: Development of polymer membranes specifically allowing the selective filtration of waste lubricants poses the opportunity to greatly increase the recycling and re-use of waste lubricants, reducing need for new oil production and CO2 output.

RETIN-A-EYE

Machine Learning Platform for Personalized Intravitreal Anti-VEGF Therapy Using Drug-Loaded Polymeric Nanoparticles

Call Topic: Functional Materials

Coordinator: Warsaw University of Technology (PL)

Funding: € 949 318	**Duration**: 36 months	**No. of Partner:** 5

Participants:

- Warsaw University of Technology (PL)
- Ming Chi University of Technology (TW)
- Ege University (TR)
- Medical University of Warsaw (PL)
- Middle East Technical University MEMS Center (TR)

Funding organisations:

- PL-NCN (Poland)
- TW-NSTC (Taiwan)
- TR-TUBITAK (Turkey)

Project summary:

• Rationale / Needs to be addressed - Retinal diseases, like AMD, cause major vision loss and require frequent anti-VEGF intravitreal injections, increasing risks and lowering patient compliance. Current PLGA-based ocular drug delivery systems still show burst release and cannot be personalized. • Objectives - RETIN-A-EYE will develop a plasma-functionalized PLGA platform for personalized, sustained intravitreal anti-VEGF delivery. Remote atmospheric-pressure plasma (rAPP) will tune anti-VEGF release from PLGA microparticles. The platform will combine an ML model of drug kinetics and efficacy with a Genetic Algorithm to personalize rAPP settings. The ML model will be trained in active-learning mode using data from in vitro experiments. • Potential applications - The platform enables customizable long-acting anti-VEGF intravitreal treatments. • Impact and potential benefits - This approach offers safer, more effective, and cost-efficient therapy, improving patients' quality of life.

STITCHING

Starring Innovative Treatments for Component Healing with New Grade-aluminium alloy

Call Topic: Functional Materials

Coordinator: Institute of Mechanics, Materials and Civil Engineering, iMMC (BE)

Funding: € 1 600 839	**Duration**: 36 months	**No. of Partner:** 8

Participants:

- Institute of Mechanics, Materials and Civil Engineering, iMMC (BE)
- Any-Shape - Additive Manufacturing for Industry S.A. (BE)
- Euro Heat Pipes SA (BE)
- Belgian Welding Institute (BE)
- CEITEC BUT (CZ)
- CactuX (CZ)
- ONERA (FR)
- Institut MAUPERTUIS (FR)

Funding organisations:

- BE-SPW (Belgium)
- CZ-TACR (Czech Republic)
- FR-ANR (France)

Project summary:

The STITCHING project aims to extend the additive manufacturing (AM) capabilities of ALMAZIUM®, a lightweight, self-healing Al-Mg-Zr alloy with high strength (350–400 MPa), ductility (20–25%) and unique heat-activated self-healing capabilities. Building on M-ERA.Net's HAMAAC results, STITCHING will (1) adapt ALMAZIUM® for wire-based AM (DED-arc/laser) to enable large-scale and sustainable production, (2) assess its weldability and thermal stability, (3) perform multiscale in-situ characterisation of healing mechanisms, and (4) conduct a full Life Cycle Assessment. Potential applications include thermal management systems, aerospace and defence structures, and high-performance industrial components. The project targets TRL 3 to 5, demonstrating the alloy's reliability in relevant environments. STITCHING will enhance the European expertise in advanced AM materials, reduce environmental impact and manufacturing costs, and strengthen industrial competitiveness across the consortium.

CALL TOPIC 5

Materials addressing environmental challenges

It is a main objective of M-ERA.NET to address current and future environmental challenges and to support the Green Deal and the SDGs, where this topic covers specifically numbers 6, 7, 9, 12, and 13.

The topic will support the transition towards a circular economy by addressing design, synthesis, shaping, production, use and recovery of advanced materials covering: SSbD materials; biodegradable, bio-based materials; substitution or reduction of hazardous substances, fossil-based and/or critical materials; sensing and removal of hazardous substances; materials recycling.

The reduction of resources and waste and increased materials recyclability, in accordance with a sustainable development, is becoming a necessity related to decarbonization and circular economy.

Materials addressing environmental challenges

ECOHEAL

Biodegradable nanoformulations from olive waste for skin care to reduce antimicrobial resistance spread and protect human and environmental microbiome

Call Topic: Materials addressing environmental challenges

Coordinator: Universitat Politecnica de Catalunya (ES)

Funding: € 1 699 334	**Duration**: 36 months	**No. of Partner:** 6

Participants:

- Universitat Politecnica de Catalunya (ES)
- Universidade de Santiago de Compostela (ES)
- University (TR)
- University (KR)
- Company (KR)
- Research Centre (TW)

Funding organisations:

- ES-AEI (Spain)
- TR-TUBITAK (Turkey)
- KR-KIAT (Korea, Republic Of)
- TW-NSTC (Taiwan)

Project summary:

Rationale / Needs to be addressed: ECOHEAL will address the growing environmental threat of antimicrobial resistance (AMR) and the accumulation in the ecosystem of antimicrobial ingredients from skincare products. 10 million people per year could die due to AMR by 2050 if immediate actions are not taken.

Objectives: ECOHEAL develops bio-based nanoscale delivery systems containing antimicrobial actives from renewable resources with efficient, low-dose antimicrobial activity, limiting the AMR emergence and protecting human and environmental microbiomes.

Potential applications: ECOHEAL multidisciplinary scientific knowledge and technologies will be easily implemented for a broad range of applications, from healthcare to aerospace.

Impact and potential benefits: ECOHEAL will help reduce AMR spread, valorize agricultural waste, promote circular economy and eco-benign manufacturing and deliver significant environmental, health and economic benefits aligned with the EU Green Deal.

CALL TOPIC 6

Next Generation
Materials for Electronics

Disruptive evolution of electronics always came hand-in-hand with the development and integration of advanced materials, illustrating the transformative potential of materials in our daily life. The European Union is becoming more and more aware of the need of creating a diverse and dynamic microelectronics ecosystem and, at the same time, is concerned about the sustainability challenges related to deploying electronics applications like Internet of Things (IoT), Industry 4.0, AI and Advanced Computing that will require a huge production of electronic components. This challenge also opens a window of opportunity to research in developing and designing the next generation of materials for responsible and beneficial electronics to reduce electronic waste, enhancing the recyclability of the electronic components moving towards greener production processes. This aligns with the Green Deal that seeks to accelerate technological progress reducing the carbon footprint and promoting a circular economy.

The topic supports proposals on materials research and its application, with special focus on specific properties for electronics. This may include materials informatics for SSbD, biomimetic design principles, circularity of materials (e.g. magnetic, bio-based, biodegradable, etc.).

Next generation materials for electronics

ALTMAG

Altermagnets: from theory to reality

Call Topic: Next generation materials for electronics

Coordinator: Universidad Autónoma de Madrid (ES)

Funding: € 710 054	**Duration**: 36 months	**No. of Partner:** 6

Participants:

- Universidad Autónoma de Madrid (ES)
- Asocación CIC nanoGUNE (ES)
- CINaM-CNRS-AMUTech (FR)
- Institute of Experimental Physics, Slovak Academy of Sciences (SK)
- CEA/CNRS (FR)
- **FUNDACION DONOSTIA INTERNATIONAL PHYSICS CENTER (ES)*

Funding organisations:

- ES-AEI (Spain)
- FR-ANR (France)
- SK-SAS (Slovakia)
-

Project summary:

Rationale / Needs to be addressed: A new class of magnetic materials—altermagnets—has emerged, bridging the gap between ferromagnets and antiferromagnets and offering energy-efficient spintronic and optoelectronic functionality. Many candidates are theoretically predicted, but experimental validation, sustainability assessment, and device integration remain major challenges.

Objectives: ALTMAG will (i) compile a catalogue of promising altermagnets, prioritising abundant and recyclable ones; (ii) broaden the scope to non-collinear orders, topological traits, or engineered architectures; and (iii) synthesize, characterize, and benchmark those of interest.

Potential applications: Devices include spin-splitter elements, spin valves, and spin-photodetectors enabling field-free, ultra-low-power logic, memory, and sensing.

Impact and potential benefits: ALTMAG will establish a sustainable materials platform for next-generation electronics and reinforce Europe's technological sovereignty.

NEUROMAT

Ultralow-Power Neuromorphic Computing with Molecule – 2D Material Hybrids

Call Topic: Next generation materials for electronics

Coordinator: Materials Physics Center (ES)

Funding: € 950 325	**Duration**: 36 months	**No. of Partner:** 6

Participants:

- Materials Physics Center (ES)
- University of Strasbourg (FR)
- Budapest University of Technology and Economics (HU)
- University of Mons (BE)

Funding organisations:

- ES-AEI (Spain)
- FR-ANR (France)
- HU-NKFIH (Hungary)
- BE-FNRS (Belgium)

Project summary:

Rationale/Needs to be addressed: Neuromorphic computing offers a low-energy alternative to conventional technologies, yet existing materials lack the multifunctionality and responsiveness needed to emulate brain-like architectures.

Objectives: NEUROMAT will develop a new class of responsive hybrid materials enabling multifunctional devices with multiple programmable states for neuromorphic operations at ambient and cryogenic conditions.

Potential applications: The hybrid materials and devices created in NEUROMAT will support next-generation, energy-efficient neuromorphic hardware with applications in artificial intelligence, data centers, and classical-quantum interfaces.

Impact and potential benefits: NEUROMAT will establish scalable, multifunctional materials that bridge molecular design and device engineering. Advancing from fundamental research (TRL 1) to lab-tested prototypes (TRL 4), it will reinforce Europe's leadership in sustainable, brain-inspired electronics.