

European Partnership on Metrology Decision (EU) 2021/2084

FINANCIAL FRAMEWORK PARTNERSHIP AGREEMENT 2021/METROLOGY/01

**European Partnership on Metrology ANNUAL REPORT
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Publishable Summary

The European Partnership on Metrology was established in 2021 by twenty-three participating countries and the European Union, utilising Article 185 of the European Treaty. It follows on from the European Metrology Programme on Innovation and Research (EMPIR) which held its last call for Joint Research Projects in 2020. EURAMET - the European Association of National Metrology Institutes - is the body responsible for the implementation of European Partnership on Metrology. The decision of the European Parliament and of the Council on the participation of the Union in the European Partnership on Metrology jointly undertaken by several Member States (COM(2021)0089 – C9-0083/2021 – 2021/0049(COD)) was adopted in November 2021. The legislation was published in the Official Journal at the end of November 2021 and entered into force on 1 December 2021.

The core activity of European Partnership on Metrology consists of funding multi-partner transnational joint research projects to advance metrology and its applications. In view of the concentrated capacities in metrology, the core part of European Partnership on Metrology is executed by National Metrology Institutes and Designated Institutes assigned by the participating states.

The key differences between the European Metrology Programme for Innovation and Research (EMPIR) and the European Partnership on Metrology are the reformation of the co-funding scheme as well as the closer collaboration among other partnerships within the Horizon Europe.

The year 2024 saw the completion of the fourth annual call and the first projects from the 2021 call are expected to complete in 2025. The two-stage process for joint research projects on Targeted Programmes on Green Deal, Digital Transformation, Metrology for Pre- and Co-normative Research commenced with a call for needs, followed by a call for proposals against the selected needs. EURAMET launched the first stage of this call requesting ideas addressing metrology needs in January, with Stage 1 closing in February. The ideas received were prioritised by EURAMET in April, and the preparatory work for the second stage dedicated call was completed in June. The Stage 2 call was published and launched in June and closed in September, addressing 50 topics which had been distilled from the best of the ideas received in Stage 1. For each of the topics published a supporting document was provided identifying the need or opportunity, the scientific objectives and potential impact.

The proposals received were checked for eligibility and were then subject to an independent expert evaluation at European level culminating in a Review Conference. The experts deemed 6 of the 8 Digital Transformation proposals, 20 out of 21 Green Deal proposals, 8 out of 10 Metrology for Pre- and Co-normative Research proposals, 7 out of 8 Research Potential proposals, and the Coordination of Impact and Communication proposal to be of suitable quality for funding. Considering the budget restrictions, the Partnership Committee decided to fund the top 5 Digital Transformation proposals, top 11 Green Deal proposals, top 3 Metrology for Pre- and Co-normative Research proposals, top 3 Research Potential proposals and the Coordination of Impact and Communication (CSA) proposal. These proposals were sent for ethics screening with a view to being funded.

The projects provisionally selected for funding in 2024 are:

Digital Transformation

- Trustworthy and quality-assured quantitative magnetic resonance imaging
- Digitalisation route for dimensional nanometrology
- Automated, adaptive and uncertainty-aware smart measurements using machine learning
- Traceability for industrial 3D digitalisation by advanced scanning systems
- Metrology for reliable power grid data analytics

Green Deal

- Metrology to support ammonia use in emerging applications
- Metrology to support zero pollution from industrial emissions
- Metrology for harmonisation of field isotope ratio measurements

- Metrology supporting large-scale deployment of efficient and resilient photovoltaic systems
- Metrological infrastructure for traceable electrical insulation testing for a reliable electricity grid
- Metrology for comparable and trustworthy greenhouse gas remote sensing datasets
- Metrology for reliable liquefied energy gases measurement
- Metrology for efficient grid-forming converters to stabilise future power grids
- Hybrid metrology for sustainable and low-carbon footprint battery materials
- Metrology for smart metering in gas networks
- Metrology for hydrogen vehicles 3

Normative

- Traceable dosimetry for FLASH radiotherapy
- Establishing traceable concentration measurements of particles for a more sustainable industry
- Establishing metrology standards in microfluidic devices II
- Research Potential:
- Establishing traceability routes in nuclear medicine
- A European infrastructure for low magnetic field metrology
- Advancement of air temperature metrology capabilities
- Communication and Impact Coordination:

In addition, a project for Strengthening Communication and Impact for European Metrology with European Metrology Networks was selected for funding.

Formal notification including outcome, evaluation marks, ranking and the comments of the independent referees and ethics reviewers will be sent to the proposers in 2025. The list of selected projects along with the names of the referees and some basic statistics will appear on the EURAMET website on the formal announcement dates.

Highlights of Metrology Partnership outcomes in 2024: progress towards Technical Sovereignty of Europe.

The Metrology Partnership's recent achievements showcase the vital role of precision measurement in shaping sustainable energy solutions and advancing industrial innovation. This program has catalysed collaborations across Europe, addressing energy storage, digitalisation, and environmental monitoring challenges.

One standout achievement is the development of a [world first calibration service to support the use of renewable energy resources](#). This service enhances the reliability of measurements critical for integrating renewables into the energy grid. Complementing this, a [project on energy storage materials](#) developing the new cell designs, paving the way to establish traceable, validated and quantitative operando methodology for energy storage materials suitable for use in battery systems. These advancements are instrumental in supporting Europe's clean energy transition.

Industrial innovation has also seen significant progress. A [new open source software](#) was designed to streamline the analysis and visualisation of light exposure data from wearable devices, improving data accuracy, comparability, and usability for research on light's impact on human health. Meanwhile, [adaptations for heavy-duty hydrogen refuelling stations](#) supporting the deployment of hydrogen-powered trucks across Europe and contributing to the EU's goal of reducing CO₂ emissions in transport. Environmental monitoring has advanced through projects like the creation of [reference materials for stable isotope ratios in seawater](#), which aid in studying climate change impacts. Another initiative focuses on improving the [thermal comfort of public buildings](#), providing solutions for energy-efficient construction in diverse climates.

Finally, the Metrology Partnership's focus on dissemination and collaboration has fostered widespread knowledge exchange. Presentations at industry fairs and workshops, such as those on [digital substations](#), highlight the program's commitment.

Through the research conducted in projects, the Metrology Partnership underscores the critical importance of precision measurement in achieving Europe's sustainability and innovation goals. By fostering collaboration across disciplines, it ensures that scientific advancements translate into tangible benefits for society.

More highlights and details of the running and completed EMPIR & Partnership projects are available from the EURAMET website www.euramet.org.

The European Partnership on Metrology is a good example of European Joint Programming - pooling national research efforts in order to make better use of Europe's precious public R&D resources to tackle common European challenges more effectively. The first stage of the call selects research areas where the stakeholder need is clear, and the metrology community have the appropriate resources to make a significant impact. The second stage is a competition where the best proposals (in terms of scientific excellence and potential impact) are chosen by independent referees. The result is collaborative European projects where critical mass is brought to bear on clear objectives, with agreed project plans and enhanced stakeholder engagement. All the participants abide by the European level independent evaluation, clearly demonstrating the true "European Research Area" nature of the partnership.