

Bringing research and industry closer: accelerating innovation and uptake of new technologies. Energy Storage & Solar Photovoltaics

The workshop on the [SUPEERA project](#) took part on the first day of the [Energy Conversion and Storage Days](#), a three-day event organised by the [Karlsruhe Institute of Technology \(KIT\)](#). The workshop featured a hybrid format, which attracted a total of 70 attendees in-person and 12 virtually. Among the participants were individuals from diverse backgrounds, including research, local organisations, government officials, and industry representatives.

Opening the Workshop

The keynote address was delivered by Walter Tromm, the scientific spokesperson for the [KIT Energy Centre](#). The speech provided a comprehensive overview of the KIT Energy Centre's operations within the [Helmholtz Association](#), with a specific emphasis on the Energy Storage sector.

Ivan Matejak, the coordinator of the SUPEERA project, delivered a detailed presentation on the project's objectives, which included establishing connections between industry and energy experts, analysing proposed energy measures, and offering recommendations to the European Commission. He also spoke about the [SET plan](#), which is currently being revamped to align with the [European Green Deal](#), the [Recovery Plan](#), the [Energy Union](#), and the ERA policy communications. Furthermore, Matejak provided an overview of the [REPowerEU initiative](#) and introduced the [EERA Manifesto](#) as a result of feedback to the REPowerEU by the EERA community.



Maria Oksa, Senior Scientist and Project Manager from VTT, explained how the SUPEERA project analysed the [National Energy and Climate Plans \(NECPs\)](#) to identify gaps and enabling factors. The project team examined 27 NECPs and selected the six most relevant technological pathways for energy. Oksa then presented an overview of the project team's findings on the [Energy Storage](#) and

[Solar Photovoltaics](#) pathways. The team discovered that marketing development of storage is already underway in Europe, particularly in the Northern countries. On the other hand they concluded that the expansion of solar technology will be driven by steady and predictable *funding mechanisms*, simplified permitting processes, and collaborations between project teams and international initiatives.

Collaboration between research and industry: best practices, barriers and replicability potential

Francesco Matteucci, Programme Manager from the [European Innovation Council \(EIC\)](#), delivered a presentation on the support that the EIC provides through grants and equity investments to the development and scaling up of [DeepTech startups](#). He underlined that EIC was created under the programme of [Horizon 2020](#) and is the only European Agency with the authority to make and enforce policies related to innovation in Europe. He cited the example of the first regulation on the second life of batteries, implemented in December 2020, as enabling new recycling technologies.



He concluded with the example of the first regulation on the second life of batteries which has been put in place in December 2020 to enable new type of policies of recycling technologies. To conclude Matteucci emphasised the importance of large-scale technologies in solar PV and energy storage and the need to consider market applications and strengthen existing collaborations. He finally pointed to successful collaborative projects like SUPEERA as demonstrating best practices and the benefits of working together.

Ivan Gordon, EERA Joint Programme (JP) PV Coordinator and Manager at IMO-IMOMECE/Energyville, presented the [Joint Program for Photovoltaic Solar Energy](#), which aims to achieve large-scale implementation of solar energy in the European Union and make the PV systems more affordable and accessible. This is to be achieved by improving the performance of PV systems, developing manufacturing processes that are cost-effective, and increasing the reliability and lifespan of PV components. The JP PV consists of 34 universities and research institutes across



Europe and collaborates with the [European platform of Photovoltaics \(ETIP PV\)](#) to achieve European climate targets. [The European Strategic Research and Innovation Agenda on Photovoltaics document](#) is the result of this collaboration and outlines the objectives and goals for the next ten years. The presentation also emphasised the collaboration between EERA-PV and the industry, highlighting engagement between [European Solar Manufacturing Council \(ESMC\)](#), ETIP, and SolarPower Europe. This collaboration led to the creation of the European Solar Photovoltaic Industry Alliance which aimed at accelerating solar PV deployment in the EU.



Myrial Gil Bardaji from [KIT](#), on behalf of Joint Programme (JP) Energy Storage (ES) presented a brief overview of the [Joint Programme on Energy Storage](#). The JP ES consists of 40 RTOs and universities from 15 countries and aims to accelerate European energy storage research to achieve a renewable-based carbon-neutral Europe by 2050. The JP ES has implemented several EU projects, including [SmiLES](#), [StoRIES](#), and RISEnergy, which is a proposal that has recently been submitted. Ms Gil Bardaji also emphasised that EERA Joint

Programme collaborates with industry through organising workshops focused on policy; technology, and industry-oriented topics. An example of this collaboration is the [EASE](#), developed by EASE and EERA JP Energy Storage which provides recommendations of R&I, developed by EASE and EERA JP Energy Storage which provides recommendations of R&D policies and regulatory developments.

Tim Boltken, Founder and Managing Director of INERATEC GmbH, provided a brief overview of [INERATEC GmbH](#). This German technology company specialises in the production of modular chemical plants for the decentralised and sustainable production of synthetic fuels, such as e-fuels. The company was founded in 2016 as a spin-off of the Karlsruhe Institute of Technology (KIT) in Germany and the EIC. By introducing the company, he presented various examples of collaborations between INERATEC GmbH and both industry and research institutes. As research collaboration he



presented the successful work between INERATEC GmbH and the Technical University of Munich (TUM) to develop their Power-to-Liquid technology for producing synthetic fuels using renewable energy. Another successful collaboration with research partners is the PtL/GtL project, where they installed a pilot plant in Finland in 2016, demonstrating the potential for commercialisation of their technology and the benefits of industry partnerships. Since then, INERATEC has continued to work with industry partners on projects in various sectors.

Simon Philipps, Head of R&D Strategy of the [Fraunhofer Institute for Solar Energy Systems ISE](#) and EERA JP PV Coordinator, delivered a

presentation on the advancements in photovoltaic (PV) technology and the collaboration between research and industry at the institute. According to Philipps, the PV price experience curve has seen a 25% price reduction with each cumulative doubling of PV module production over the last 41 years, which is attributed to the collaborative efforts of the research and industry sectors. This remarkable progress has been made possible

due to Fraunhofer ISE's commitment to scientific excellence, knowledge sharing and innovation, as well as its infrastructure for scaling, techno-economic considerations, and industrial R&D partnership and support.



Q&A



Following the presentation by each speaker, a 30-minute panel discussion took place where

Francesco Matteucci and **Ivan Gordon** emphasised the disparity in investments towards Europe, specifically regarding the competitiveness of innovative PV

technologies in comparison to 2011. According to **Francesco Matteucci**, it is evident that the European Commission is seeking to encourage investors who

are not ready to take the risk independently in the early stage of solar technology. He underlined that the EIC has an [equity-based funding approach](#) which should push private investors to invest in the initial scale-up phase, leading to exponential growth. He referred to the [Impact Report 2022](#), which demonstrates that providing equity to a company through EIC venture capitalists led to substantial leverage. From a policy perspective, he mentioned [the Interest project of European common interest IPCEI](#), which permits each Member State to provide funding to companies for the manufacturing and development of facilities. Similar to the project recently undertaken in Sicily with [ENEA](#), the goal of such initiatives is to scale up the production of solar technology. In conclusion, **Ivan Gordon** added that the focus should not solely be on cost competitiveness but also on sustainability. He emphasised that technology should be chosen for sustainability reasons in addition to technological advancement.

Francesco Matteucci expressed concerns regarding the potential for a sustainability-focused approach in northern countries to create incentives that may contradict other Member States within the European Union. He also highlighted the issue of energy dependency within each Member State and recognised the European Commission's acknowledgement of individual member states' responsibility for their energy policies. In response, **Ivan Gordon** acknowledged the importance of sustainability in the energy sector, but noted that cost constraints might limit some member states' potential for energy production growth. He also emphasised the north's shift towards sustainable solutions and the industry's increasing emphasis on sustainability. **Francesco Matteucci** also acknowledged that an IPCEI might not be a universal solution for all energy sector and company problems, as different situations may require different solutions. However, he recognised the EU's policy and political will to involve national value chains and enable private investment. He noted that financial investors are not deterred by costs but require the European Commission and Member States to de-risk their initial investment. He cited INERATEC as an example of successful support provided by EIC, emphasising the importance of small steps in enabling startups. Matteucci concluded by stating that European and national politicians are increasingly engaging in conversations regarding this matter.

Tim Boltken highlighted the advantages of INARETEC remaining in Europe, despite the potential short-term benefits of the new Inflation Reduction Act and the European response with the net-zero Industry Act. He emphasised the strong European identity that is fostered by conducting research and innovation with European partners and contributing to the local economy and community. In addition, having production based in Europe makes the industry more resilient to potential shutdowns, job losses, and political and regulatory risks, he added. Boltken acknowledged that while the Inflation Reduction Act may offer cost savings, it is important to consider the established supply chains and the possibility of local economic crises.

Myriam Gil Bardaji noted that hybrid storage technology has predominantly focused on batteries, which has led to increased collaboration in this area. However, she stressed that energy storage encompasses a wide range of other technologies that need to be addressed for various applications, including long-duration storage. To promote these new technology solutions, collaboration among investors, research, and industry is crucial, not just limited to batteries. Moreover, Gil Bardaji pointed out that previous feedback from energy storage collaboration indicated lower levels of collaboration compared to batteries.

Panel discussion and Q&A

The panel discussion focused on key aspects of the European energy sector, highlighting the importance of collaboration, investment, and sustainability. The speakers emphasised the need for equity-based funding approaches, such as the European Innovation Council (EIC), to encourage private investors to invest in initial scale-up projects and support startups. Sustainability was identified as a crucial consideration in the energy sector, along with the need to explore and promote other energy storage technologies beyond batteries. The impact of individual Member States' energy policies was also discussed, and collaboration among investors, research, and industry was emphasised as essential to promote new technology solutions. Finally, the importance of a strong European identity and resilience in the face of potential risks was also highlighted.

Cross-sectorial dialogue for system solutions towards the CET objectives

Spyridon Pantelis, Project Manager at EERA, provided some background on energy-related cross-cutting topics and presented the outcomes of the analysis that SUPEERA project conducted for identifying the cross-cutting issues after analysing all [SET Plan Implementation Plans](#). The dialogue on cross-cutting issues is needed in order to provide coordinated input to decision-makers for systemic solutions in the energy sector. Pantelis stressed that considering cross-cutting aspects in technological planning for the [Clean Energy Transition](#) is critical to achieving ambitious goals defined in the European Green Deal and SDGs.



Ruben Hünig, Co-Founder and CEO of [Phytonics](#), presented the company's new bio-inspired coatings for solar modules, specifically the Anti-Reflective



Coating Bionic nano & microtextures. Hünig's presentation focused on the journey from lab to market, including the company's development and testing process. Furthermore, Hünig introduced the "*Lab to farm*" concept, which aims to bridge the gap between laboratory research and real-world applications by fostering collaboration between academic research institutions and industry partners.

Sagar Venu, software engineer at [Fenecon](#), delivered a presentation on the topic of energy system integration,

specifically highlighting the company's work on grid integration with energy storage systems using their product: [OpenEMs](#). The company's Fenecon Energy Management System (FEMS) incorporates an application that utilises generation and consumption forecasting to optimise storage loading, leading to increased self-consumption and grid efficiency. Fenecon emphasises the importance of collaboration in research and industrial partnerships, citing better understanding and structure on timelines as key benefits.



Catarina Augusto, Senior Technical Advisor at [SolarPower Europe](#), presented an overview of the organisation's efforts in shaping policy and business opportunities in the solar energy industry. SolarPower Europe focuses on various workstreams, including [Grids & Flexibility](#), and works on

challenging topics to promote solar energy. Augusto emphasised the need for collaboration between industry and research and called for policies that facilitate such partnerships. She cited [ETIP-PV](#) as an example of an organisation that promotes collaboration between industry and research. SolarPower Europe is also involved in international cooperation efforts to advance solar energy.

Peter Fischer, Head of Redox Flow Battery and Stationary Storage Group at **Fraunhofer ICT**, presented the [FLORES network](#), an interest group of 15 EU-funded research projects that focuses on flow battery technology. The group offers a platform for networking, joint outreach activities, and cross-topic initiatives to increase the visibility and impact of flow battery research while avoiding duplication of efforts. Fischer highlighted the group's involvement in policy discussions, including collecting and discussing key performance

indicators (KPIs) for flow batteries during EU energy week, advocating for the recycling of critical raw materials to reduce environmental impact, and lobbying for flow batteries to be included in EU battery regulations aimed at sustainability. Additionally, he mentioned the group's work on an [LCA review article](#) based on the Battery 2030 roadmap statement that flow batteries have a poor environmental footprint.

Panel discussion and Q&A



During the panel discussion that followed the presentation of the FLORES network, **Peter Fisher** emphasised that the FLORES group aims to offer solutions and give equal importance to different strategies. He also noted the necessity for increasing lobbying efforts, citing that roadmaps are frequently late in their implementation. **Sagar Venu** addressed technical questions regarding the [FENECON Energy Management System](#). He emphasised that the FEMS operating system is designed for real-time monitoring and control of the energy system, allowing users to visualise energy consumption and production, track system performance, and adjust as needed. Caterina Augusto addressed the requirements for generators to connect with the grids, which involve standardisation and harmonisation. She emphasised the need for two different networking codes - the first code pertains to connecting generators to the grid, while the second code focuses on bringing flexibility to the grid. The aim is to ensure that all involved actors in the energy transition have a close collaboration and a common understanding. She finally discussed the benefits of research communities' involvement in solar power activities, highlighting the role of SolarPower Europe in shaping policies related to solar power.

Ruben Hünig emphasised the importance of outdoor test stand measurements to determine the performance of solar modules under real-world conditions. These measurements validate the expected increase in energy production calculated by software programs used to model the performance of solar photovoltaic systems. He also noted that using an anti-reflective coating with bionic nano and macrot textures could increase the efficiency of solar modules and reduce the cost of solar energy. **Peter Fisher** elaborated on the FLORES network's global cooperation with experts, ministries, and researchers outside of Europe. He further mentioned the network's plans after the EU-funded projects are under consideration, with a focus on catering to the next generation and possibly becoming an association. It was noted that real-time R&I applications at

the grid and industrial scale are already in place, and although collaboration with China is ongoing, establishing a connection with the USA has been challenging.

Conclusion

The workshop on the [SUPEERA project](#) was a key part of the activities in the framework of the [Energy Conversion and Storage days](#), and it brought together a wide range of experts from the research sector, local organisations active in R&I activities, government officials, and industry representatives. In the first part, following the presentations of each speaker, the panellists discussed key aspects of the European energy sector, highlighting the importance of collaboration, investment, and sustainability. The speakers emphasised the need for equity-based funding approaches, such as the European Innovation Council (EIC), to encourage the private sector to invest in initial scale-up projects and support startups. Sustainability was identified as a crucial consideration in the energy sector, along with the need to explore and promote other energy storage technologies beyond batteries. The impact of individual Member States' energy policies was also discussed, and collaboration among investors, research, and industry was emphasised as essential to promote new technology solutions. The importance of a strong European identity and resilience in the face of potential risks was also highlighted. In the second session of the workshop, the discussion touched upon a wide range of topics, including European partnerships, energy management systems, networking schemes, solar modules, and the benefits of research communities' involvement in solar PV deployment. The participants emphasised the importance of lobbying efforts and standardisation at national and European level to achieve sustainable energy solutions.