

PRESS RELEASE

PRESS RELEASEJune 6, 2025 || Page 1 | 4

Newly formed consortium unites 58 partners in project *GENESIS*

Project *GENESIS* minimizes ecological footprint in Europe's semiconductor industry

A pan-European consortium dedicated to developing sustainable processes and technologies for the semiconductor-manufacturing supply chain announces the launch of the *GENESIS* project. This integrated, large-scale initiative aims to enable Europe's chip industry to meet its sustainability goals – from material development to final waste treatment. Fraunhofer IPMS takes a managing role for one of the central work packages in order to minimize chemical waste and reduce emissions.

Coordinated by CEA-Leti, the three-year project brings together 58 partners spanning the entire European semiconductor value chain, from large industrials and SMEs to research institutes, universities, and industry associations. *GENESIS* will drive innovative solutions in emission control, eco-friendly materials such as alternatives to PFAS-based ones, waste minimization, and raw material reuse, directly aligned with the European Green Deal and European Chips Act.

"*GENESIS* is designed to address the complex challenges of building a truly sustainable semiconductor ecosystem," says Laurent Pain, Sustainable Electronics Program director at CEA-Leti. "Its structure reflects both the urgency and the opportunity of Europe's green transition, powered by the complementary expertise and close collaboration of its partners."

Fraunhofer IPMS to minimize chemical waste and reduce emissions in the *GENESIS* project

Fraunhofer IPMS takes a managing role for one of the central work packages in order to minimize chemical waste and reduce emissions. In addition, the research institute is investigating the substitution of harmful materials and substances used in semiconductor production. The focus here lies on alternatives for PFAS (perfluorinated and polyfluorinated alkyl substances) and climate-damaging gases in the BOSCH process. The respective project section will examine certain improved recycling techniques, analyze abatement efficiency and even develop new systems.

Editor

Julia Schulze | Fraunhofer Institute for Photonic Microsystems IPMS | Phone +49 351 8823-1314 |
Maria-Reiche-Straße 2 | 01109 Dresden | www.ipms.fraunhofer.de | julia.schulze@ipms.fraunhofer.de

FRAUNHOFER INSTITUTE FOR PHOTONIC MICROSYSTEMS IPMS

“The mindful use of resources will be central to our efforts in the GENESIS project,” says Dr. Erik Schumann, scientific project leader at Fraunhofer IPMS. “We are concentrating on replacing and reducing the emission of climate-damaging gases such as SF₆ or NF₃. These gases are 10,000 times more harmful than CO₂, but are needed in the semiconductor industry. We are also working to reduce the waste produced during chemical mechanical polishing,” he adds.

PRESS RELEASEJune 6, 2025 || Page 2 | 4

45 sustainability goals make a green fit for Europe’s chips agenda

Laurent Pain, manager of the project, noted that the team expects to deliver approximately 45 sustainability-driven innovations covering the semiconductor lifecycle, guided by four strategic pillars that form the technological foundation of GENESIS’s vision for a green European semiconductor industry:

- Pillar 1 – Monitoring & Sensing: Real-time emissions tracking, traceability, and process feedback systems,
- Pillar 2 – New Materials: PFAS-free chemistries and low-GWP alternatives for advanced semiconductor processes,
- Pillar 3 – Waste Minimization: Innovations in recycling (solvent, gas, slurries), reuse, and sustainable replacements, and
- Pillar 4 – Critical Raw Materials Mitigation: Strategies to reduce dependency on CRM and strengthen resource security.

Complimenting these pillars, the project’s objectives establish an overall framework that includes deploying sensor-integrated abatement systems to reduce PFAS and GHG emissions. It also aims to position Europe as a leader in green semiconductor innovation by aligning supply-chain practices with environmental regulations

A Green Fit for Europe’s Chips Agenda

“The launch of the GENESIS project marks a critical step toward aligning Europe’s semiconductor ambitions with its climate commitments,” says Anton Chichkov, head of programs at Chips Joint Undertaking (Chips JU), a public-private partnership created to bolster Europe’s semiconductor industry by fostering collaboration between the EU, member states, and the private sector.

FRAUNHOFER INSTITUTE FOR PHOTONIC MICROSYSTEMS IPMS

“As chips become the backbone of everything from AI to energy systems, their environmental footprint is rapidly growing,” he adds. “GENESIS responds to this urgent challenge by pioneering sustainable alternatives in materials, waste reduction, and resource efficiency. Through this initiative, Europe is not only investing in cleaner technologies—it’s positioning itself as a global leader in green semiconductor manufacturing.”

With a budget of close to €55 million, the GENESIS project is co-funded through the Chips Joint Undertaking by the European Commission, participating EU member states, and the Swiss State Secretariat for Education, Research and Innovation (SERI).

PRESS RELEASEJune 6, 2025 || Page 3 | 4

About GENESIS

GENESIS (GENERate a Sustainable Industry for Semiconductors) is a pan-European project co-funded by the EU, Chips JU, Member States, and the Swiss State Secretariat for Education, Research and Innovation (SERI). Coordinated by CEA-Leti, it includes 58 partners from across Europe, focused on leading semiconductor manufacturing into a circular economy model, which aims to minimize waste and maximize resource reuse, and a low-impact, innovation-driven industry. <https://www.genesiseu.eu/>

About Fraunhofer IPMS

Fraunhofer IPMS is a leading international research and development service provider for electronic and photonic microsystems in the application fields of Smart Industrial Solutions, Bio and Health, Mobility as well as Green and Sustainable Microelectronics. Research focuses on customer-specific miniaturized sensors and actuators, MEMS systems, microdisplays and integrated circuits as well as wireless and wired data communication. The institute develops systems and components on 200 and 300 mm wafers in their state-of-the-art clean rooms. Services range from consulting and design to process development and pilot series production.

FRAUNHOFER INSTITUTE FOR PHOTONIC MICROSYSTEMS IPMS

Images

PRESS RELEASE

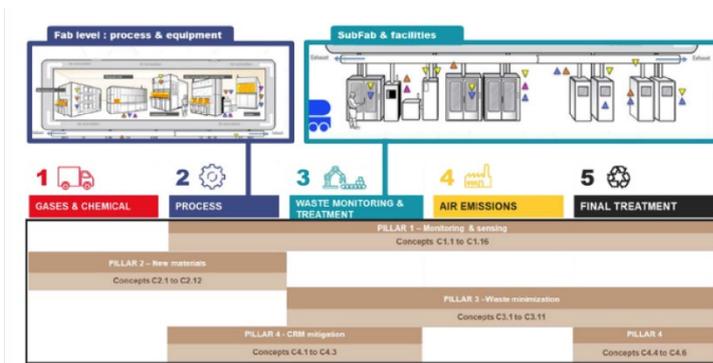
June 6, 2025 || Page 4 | 4



Chemical processes in the clean room of Fraunhofer IPMS. © Fraunhofer IPMS



GENESIS Kick-off. © CEA-Leti



The Five Critical Stages in Chip-Making Lifecycle addressed by GENESIS
© CEA-Leti

The Fraunhofer-Gesellschaft, headquartered in Germany, is one of the world's leading organizations for applied research. It plays a major role in innovation by prioritizing research on cutting-edge technologies and the transfer of results to industry to strengthen Germany's industrial base and for the benefit of society as a whole. Since its founding as a nonprofit organization in 1949, Fraunhofer has held a unique position in the German research and innovation ecosystem. With nearly 32,000 employees across 75 institutes and legally independent research units in Germany, Fraunhofer operates with an annual budget of €3.6 billion, €3.1 billion of which is generated by contract research — Fraunhofer's core business model.