Forschungsfabrik Mikroelektronik Deutschland

FRAUNHOFER GROUP FOR MICROELECTRONICS IN COOPERATION WITH LEIBNIZ FBH UND IHP

PRESS RELEASE

Launch of the Competence Center *Green ICT @ FMD*

Aiming to contribute to the reduction of the digital technologies' footprint via research and development, the Fraunhofer and Leibniz institutes cooperating within the framework of the Research Fab Microelectronics Germany (FMD for its acronym in German) are jointly establishing a cross-location competence center for resource-conscious information and communication technology (*Green ICT @ FMD).* The project, launched on August 1, 2022, is receiving 34 million euros in funding from the German Federal Ministry of Education and Research under the Green ICT initiative. The latter is in turn part of the German government's Climate Action Programme 2030.

Digitalization is rapidly permeating both the everyday life and the work environment – a trend unlikely to slow down in the foreseeable future. In this context, digitization can play a significant role in saving energy and thus reducing CO_2 emissions in numerous areas by means of intelligent control of devices, systems, processes and networks. Contrariwise, as sensors, electronics and artificial intelligence (AI) become more prevalent, energy consumption will itself increase due to digital technologies.

Protecting the climate with modern electronics designed for resource-concious information and communication technology

Significant advances in microelectronics and power electronics, including their manufacturing processes, are therefore required in order to reduce resource consumption in the Internet of Things, in AI applications and in data centers. Besides the central data processing infrastructures (cloud), modern networked information and communication technology systems increasingly have the capacity to collect and process information at the network edge. Consequently, there is increased flexibility in optimizing the systems between resource consumption in the cloud and the edge, as well as data transmission between them.

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The development of electronics for resource-saving information and communication technology (ICT) in conjunction with edge cloud solutions may leverage the German government's climate goals.

The *Green ICT @ FMD* competence center as contribution to the implementation of the German government's Green ICT Mission

Federal Minister of Education and Research, Bettina Stark-Watzinger, highlights the relevance of the project: "Sustainability in digitalization is an essential element towards achieving climate protection goals. We are already starting with electronics for information and communication technology. With the *Green ICT @ FMD* competence center, we are creating a central contact point for sustainable electronics. The competence center at the Research Fab Microelectronics Germany (FMD) is the core of our Green ICT initiative. Thus, we are not only reinforcing climate protection, but strengthening our competitiveness as well."

Based on the portfolio, structures and expertise created by the FMD, the projected competence center can be targeted in an efficient manner. Under the label *Green ICT @* FMD, the application-oriented research in the field of microelectronics is to be progressively expanded over the next 3.5 years in line with demand in terms of resource conservation and a significant reduction of the CO_2 footprint in the further development of ICT applications and infrastructures.

FMD as One-Stop-Shop for Green ICT system and modelling expertise

To ensure that information and communications technology is designed to be eco-friendly and to make efficient use of resources throughout its entire life cycle, the reciprocal interaction between functionality, reliability, and ecology must be considered, analyzed, and structured. In the process, the entire hardware life cycle throughout the entire system level must also constantly be taken into account.
Within the newly launched *Green ICT @* FMD competence center, specific Green ICT issues can now be coordinated and addressed as a whole, while comprehensive cross-technological ICT solutions up to a high level of technical readiness are offered to partners in industry and research under a single roof. Therefore, as

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established framework for cross-location cooperation between different R&D centers, the Research Fab Microelectronics Germany provides a two-fold opportunity: On the one hand, to perform a comprehensive systemic examination and further development of Green ICT issues with its partner network. On the other hand, to leverage the technological expertise of its Fraunhofer and Leibniz institutes to ensure the necessary technical depth in overall system analysis.

Solution approaches for sustainable digitalization

The Fraunhofer and Leibniz institutes' portfolio within the Green ICT framework will be broadened with an application-oriented approach that is closely aligned with current commercial and business demands. In Erlangen, Dresden and Berlin, new application-oriented and system-oriented Green ICT hubs will be opened to complement the existing FMD institutes' research projects and as a basis for further research work.

These hubs combine the full expertise of the FMD institutes on key issues regarding future ICT applications. Moreover, the hubs are the first point of contact for project partners from both industry and academia, thus providing a particularly low-threshold range of services. In addition to the central office, the Green ICT hubs are the key interfaces to the thematically bundled technology competencies and testbeds. These Green ICT hubs will be implemented in the thematic focus fields of sensor edge cloud systems, communication infrastructures, as well as materials and processes for the so called *Green Production*, topics of particularly high relevance for industrial partners in Germany and Europe.

Parallel to bringing together the diverse research projects and the already existing know-how in the field of Green ICT in Germany, developing them further in line with requirements and making them usable for the industry. The overall project *Green ICT @ FMD* likewise comprises accompanying measures for a sustainable digitalization. The latter address both an early raise of awareness among the upcoming generations of professionals (Academic Young Professionals Program – *Digital Green Camp*) and at providing ongoing training for experts already working in this field.

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Furthermore, the specific requirements of working with start-up companies are addressed in a separate subproject – The Hub for Green-ICT Start-ups – to enable emerging businesses to develop their product ideas using environmentally friendly and resource-efficient methods right from the outset.

greenict
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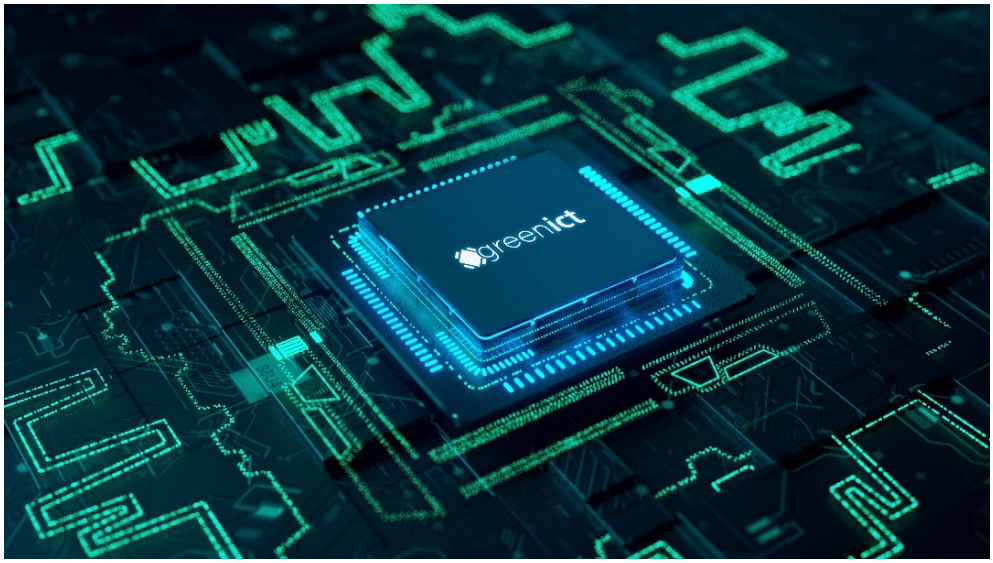

With the development of modern electronics for information and communication technology with low resource use, the competence center *Green ICT @ FMD* is contributing to meeting the German government's climate goals.
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To reduce resource consumption in the Internet of Things, in applications of AI as well as in data centers, significant progress in micro- and power electronics, including their manufacturing processes, is required. © *Fraunhofer Microelectronics*

The project partners of the competence center *Green ICT @ FMD*

Fraunhofer EMFT, Fraunhofer ENAS, Ferdinand-Braun-Institut gGmbH, Leibniz-Institut fuer Hoechstfrequenztechnik (FBH), Fraunhofer FHR, Fraunhofer HHI, Fraunhofer IAF, IHP: Leibniz Institute for High Performance Microelectronics, Fraunhofer IIS, Fraunhofer IISB, Fraunhofer IMS, Fraunhofer IPMS, Fraunhofer ISI, Fraunhofer ISIT, Fraunhofer IZM.

About the Research Fab Microelectronics Germany (FMD)

For the first time, eleven institutes of the Fraunhofer Group for Microelectronics and the two Leibniz Institutes FBH and IHP have been combining their expertise within the framework of the FMD since 2017 in order to achieve and expand a new quality level in the research, development and (pilot) production

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of semiconductor-based micro- and nanosystems. With more than 2,000 scientists, the FMD is one of the largest and world-leading R&D associations for micro- and nano-electronics applications and systems in Europe. As a global driver of innovation, the FMD provides a unique range of expertise and infrastructures, while contributing to Germany and Europe's leading position in research and development. This implies bridging the gap between basic research and cross-technology solutions, right through to customer-specific product development. Funding for the modernization of the research infrastructure of the thirteen participating institutes was provided by the German Federal Ministry of Education and Research with a total of 350 million euros from 2017 to 2021.

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