

# INTERDISCIPLINARY RESEARCH FOR SUSTAINABLE ENERGY SYSTEMS AT THE SUSTAINABILITY CENTER FREIBURG

In the pursuit of making the world more sustainable one step at a time, the latest results and ideas from research and science must find their way into practice as quickly as possible.

This is precisely where the Sustainability Centre Freiburg (LZN) comes in: on the one hand, we want to support scientists at the five Fraunhofer institutes in Freiburg and the University of Freiburg in transforming their scientific findings into innovations. On the other hand, we provide a networking link for small and large companies, start-ups, associations, and networks when they are looking for progressive and innovative new, sustainable ideas for their institutions.

## Key research areas and thematic fields

The key research areas form the scientific framework of the Sustainability Center. The selection corresponds to the competencies in the LZN, which receive added value through the cooperation with several LZN stakeholders and which are highly relevant in both the research and sustainability discourse.

The key research areas form their own spheres of activity, which exist in the form of expert communities. Expert communities are formed through regular exchange, thus facilitating consortium projects funded by third parties and other collaborations.



In the area of sustainable energy systems, we support projects in the fields of sustainable and safe batteries, sustainable and resilient electricity supply, and hydrogen technologies.



Our promotion of sustainable materials, components and products centers around digitalization and AI for circular value generation, R-technologies like reuse, repair, and recycling for components and products, and increasing the energy and resource efficiency of production processes.



To create more resilient infrastructure and habitats, we support projects in the areas of holistic analyses, modelling and evaluation of critical infrastructure and living habitats, resilience management in organizations (companies, cities, municipalities), and traffic safety research.

## Interdisciplinary research projects

In our research projects, interdisciplinary teams work on innovations for sustainable development in the key research areas of the Sustainability Centre Freiburg. Our aim is to accompany ideas from basic research through to the development of demonstrators or prototypes. This development path is reflected in the project formats pilot project, demonstrator project, and transfer project.

## Floating PV for Resilience

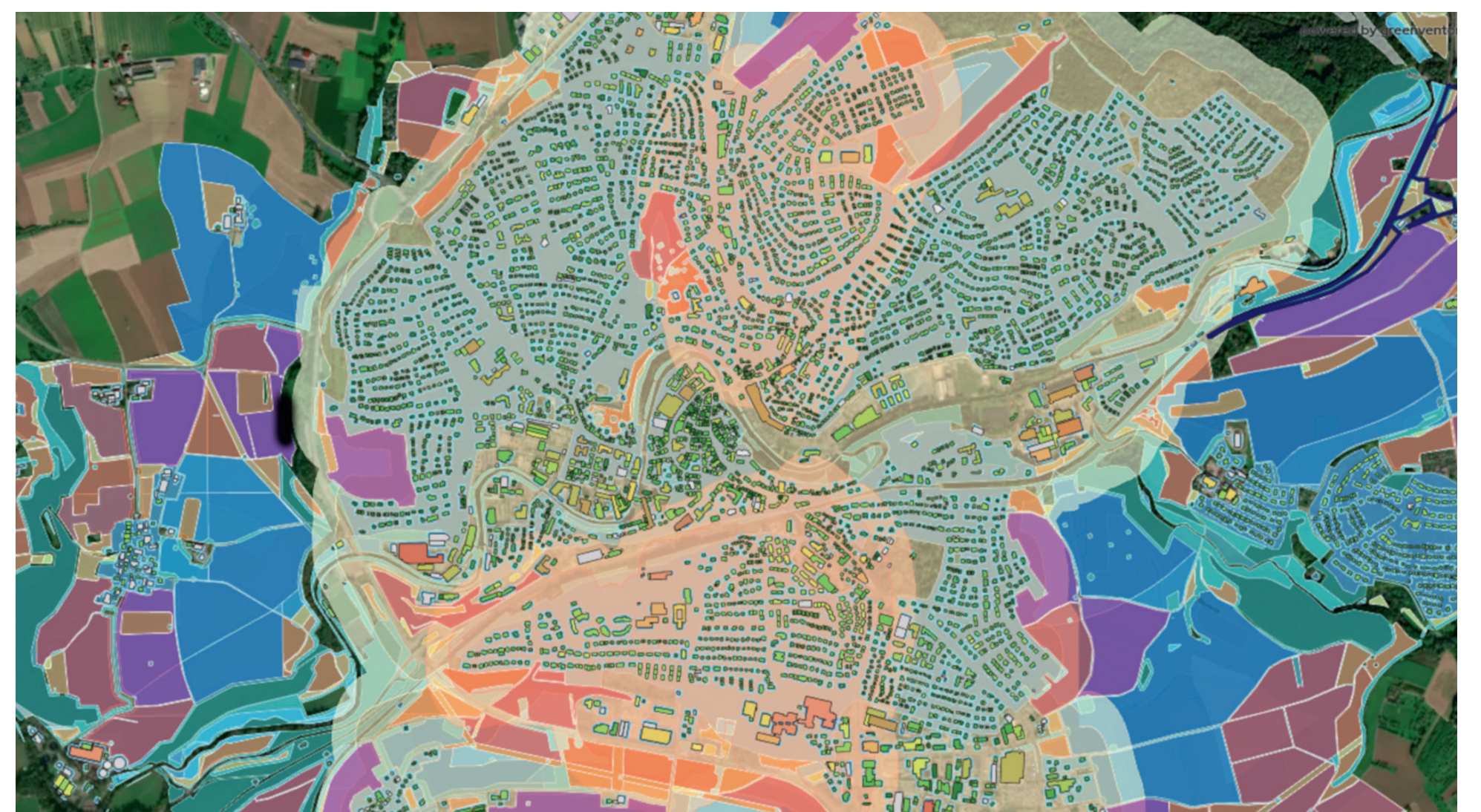
In the FPV4Resilience project, Fraunhofer Institute for Solar Energy Systems (ISE) and the Chair of Hydrology at the University of Freiburg investigated how floating photovoltaic systems can be operated in harmony with nature while still being as energy-efficient as possible. To this end, photovoltaic systems were installed in different configurations on three different lakes and the effects on the ecosystems of the lakes were analysed using various parameters, such as oxygen content and nutrient composition. The findings have demonstrated that, under certain conditions, the surface area occupied on lakes can be considerably increased compared to existing standards, all while ensuring the most sustainable utilization possible. At none of the three locations with different system designs and sizes, significant impacts on water quality were observed. Slight changes in water temperature and the use of PV systems by shellfish colonies could also contribute positively to the condition of the water bodies in the context of climate change. While local birds do not exhibit fear of floating PV, the long-term effects still need to be investigated further.



Installation of measuring devices (left) and floating PV system near Renchen/Baden (right).  
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## Sustainability start-ups made in Freiburg

We provide funding and advisory support to research teams from the five Fraunhofer Institutes in Freiburg who are interested in founding a company. Our aim is to provide the necessary freedom to pursue their business idea and put it on the right track. Since 2020, we have supported 8 teams on their way to starting their own business based on research findings.



Software tool for the conception of energy projects. © greenventory GmbH.

As a spin-off of the Fraunhofer Institute for Solar Energy Systems (ISE) and the Karlsruhe Institute of Technology (KIT), greenventory has developed a unique approach to record the energy requirements and potential for renewable energies using comprehensive data analyses and to plan small and large energy transition projects on this basis. This significantly accelerates planning processes in the energy sector. The solution portfolio includes a customized planning service, corresponding software products, and a basis for follow-up products.

*Are you interested in being part of our network?*

*Our **expert communities** within the key research areas provide a space for professional exchange and networking. Contact us here:*

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fpv4resilience



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