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Centre for Renewable Energy

Introduction to the ZEE Agrivoltaics Demonstrator

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ZEE Mini-Workshop: Renewable Energy Research in Laos and Germany

Freiburg, 27 July 2026



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Why Agrivoltaics?

Solar power and crop cultivation can share the same land.

- Growing demand for renewable electricity
- Limited land availability
- Land-use conflicts: energy, agriculture, nature
- Agri-PV combines PV electricity generation and crop cultivation
- Potential for climate-resilient and sustainable land use



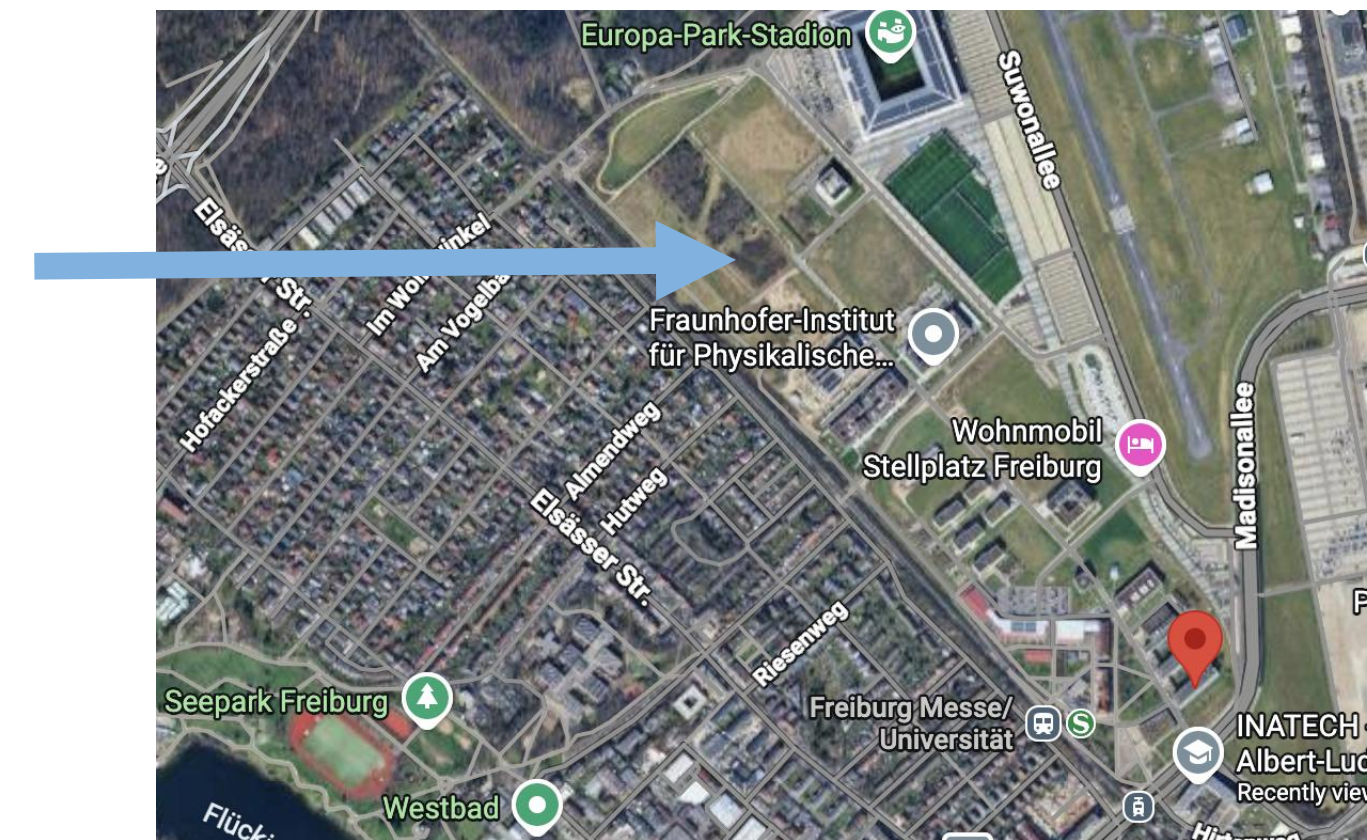


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Project Context

- Located at the Faculty of Engineering, University of Freiburg
- Implemented by ZEE, University of Freiburg
- Collaboration with Fraunhofer ISE and FRIAS Project Group Agrivoltaics
- Financial support by Alfred Ritter, University of Freiburg, and FRIAS
- Opened in May 2026
- Visible renewable energy system on campus



Dr. Max Trommsdorff, PhD in economics, expert of agrivoltaic systems, at the opening ceremony



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Construction Photos





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Technical Setup

Compact vertical bifacial PV system

- Installed PV capacity: 5.76 kWp
- 36 vertical bifacial PV modules
- Silicon TOPCon, 160 Wp per module
- Module size: 200 × 40 cm
- Dimensions: 3.8 × 9.0 × 6.3 m³
- Douglas fir wooden substructure
- Ground-anchor foundation
- SMA inverter, string configuration: 2 × 18 modules





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Cultivation and Monitoring

Crop trials under Agri-PV conditions

- Raised beds for flexible crop experiments
- Initial trial: 72 strawberry plants in 6 beds
- 2 unshaded reference beds for comparison
- Cultivars: Süsse Brumme and Meraldo
- Monitoring: light, air temperature, humidity, soil moisture
- Focus: growth, stress, yield, quality, and potential pollination effects

Friday 29.5. (sunny all day)



Saturday 30.5. (sunny afternoon)



Sunday 31.5. (rainy afternoon)





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Research Focus

1) Energy Yield Simulation

- PV simulation
- Bifacial performance and shading
- Comparison with measurements

2) Monitoring & Evaluation

- Microclimate data
- Plant growth and stress response
- Shaded vs. unshaded reference area



3) Sustainability Assessment

- Energy payback time
- Life-cycle aspects
- Scalability and land-use efficiency



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Why This Matter

A visible platform for interdisciplinary renewable energy research

- Visible renewable energy system on the University of Freiburg campus
- Strengthens solar and Agri-PV research at the University of Freiburg
- Connects energy systems, cultivation, microclimate, and sustainability
- Enables student projects, teaching, and public outreach
- Supports future concepts for accepted, landscape-friendly PV expansion



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Outlook

From campus demonstrator to future Agri-PV concepts

- Compare simulated and measured energy yield
- Analyze microclimate and crop response
- Evaluate energy payback time and life-cycle aspects
- Test transferability to other crops and sites
- Use the demonstrator as a basis for future student and research projects
- Long Term Vision: Climate Neutrality of “Campus Flugplatz” and “Solarkraftwerk Uni Freiburg”



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Thank you for your attention!

Contact

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