Agri-PV Demonstrator on the University of Freiburg Campus

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Introduction

- Agri-PV combines crop cultivation and PV electricity generation.
  → One land area can serve two functions.
- Shaded cultivation can be compared with unshaded reference plots.

Project Context

- Demonstrator at the Faculty of Engineering, University of Freiburg.
- Collaboration with Fraunhofer ISE, FRIAS Project Group Agrivoltaics, and the ZEE, University of Freiburg.
- Opened in May 2026.

From Concept to Installation

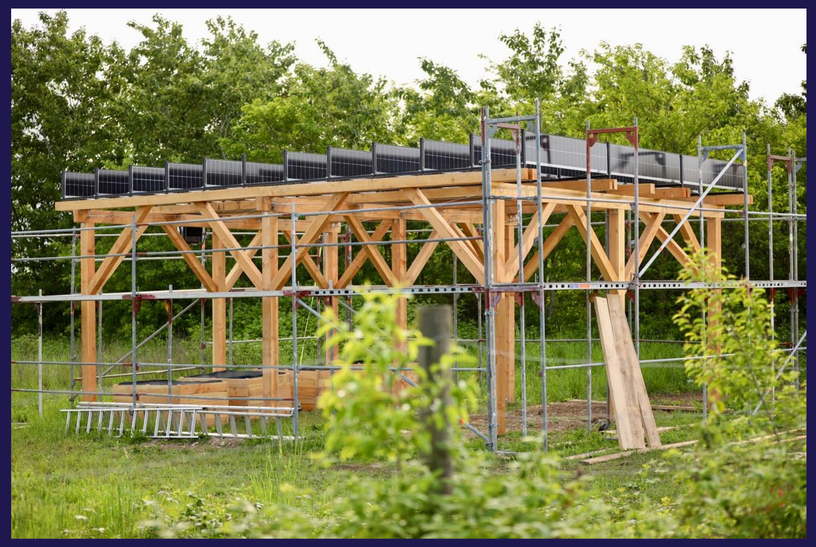
- Early Agri-PV demonstrator concept at ZEE.
- Construction and installation in 2025/26.
- Monitoring system established
- Simulation and sustainability assessment ongoing.

My Contribution

- Supported practical implementation of the demonstrator.
- Assisted with wooden substructure, PV module installation, and grid connection.
- Helped build raised beds for crop cultivation.
- Documented project progress and supported partner communication.
- Current focus: energy-yield simulation, data evaluation, and sustainability assessment.

Solar power and crop cultivation can share the same land.

Vertical bifacial PV, flexible cultivation, and sensor-based monitoring enable research on energy yield, microclimate, and sustainable dual land use.



Constructionsite (May 2026)

Location research site:
Georges-Köhler-Allee 401a,
79110 Freiburg

Opening Ceremony May 20, 2026

1) Energy yield simulation

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

2) Monitoring and evaluation

- Local irradiance and weather data
- Plant growth, stressresistance
- Comparison with unshadded reference area

3) Sustainability assessment

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

More information

Download the poster

ZEE Agri-PV webpage

zee
Zentrum für Erneuerbare Energien
Centre for Renewable Energy

universität freiburg

Technical Data

- Dimensions: 3.8 m × 9.0 m × 6.3 m
- Installed PV capacity: 5.76 kWp
- Substructure: Douglas fir wood
- Foundation: ground anchors
- Silicon TOPCon technology
- 36 vertical bifacial PV modules
- Module size: 200 cm × 40 cm
- 160 Wp per module
- Inverter: SMA Sunny Tripower Smart Energy 6.0
- String configuration: 2 strings à 18 modules

Cultivation and Monitoring

- 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 availability, air temperature, humidity, soil moisture.
- Focus: plant growth, heat stress, yield, fruit quality, and potentional pollination effects.

Why This Matters

- Visible renewable energy system on campus
- Interdisciplinary research platform.
- Strengthens solar research at the University of Freiburg.
- Enables student projects, teaching, and public outreach.
- Compact demonstrator for testing design choices.

Outlook

- Compare simulation results with measured data
- Analyze microclimate, crop response and energy yield.
- Evaluate energy payback time and life-cycle aspects.
- Test transferability to other crops and scalability of Agri-PV concepts.