

# Status Quo and LCOE of Agrivoltaic Systems

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Agri-PV in Deutschland und Frankreich, DFBEW, 19. November 2025

[www.ise.fraunhofer.de](http://www.ise.fraunhofer.de)

## 1. Data collection through german federal grid agency (MaStR)

- Survey, mandatory to be answered
- Focus on general and grid specific data

## 2. Data collection through Fraunhofer ISE survey

- Not mandatory
- Focus on general, agricultural and economic data

## 3. Data collection on the crop specifics through Fraunhofer ISE

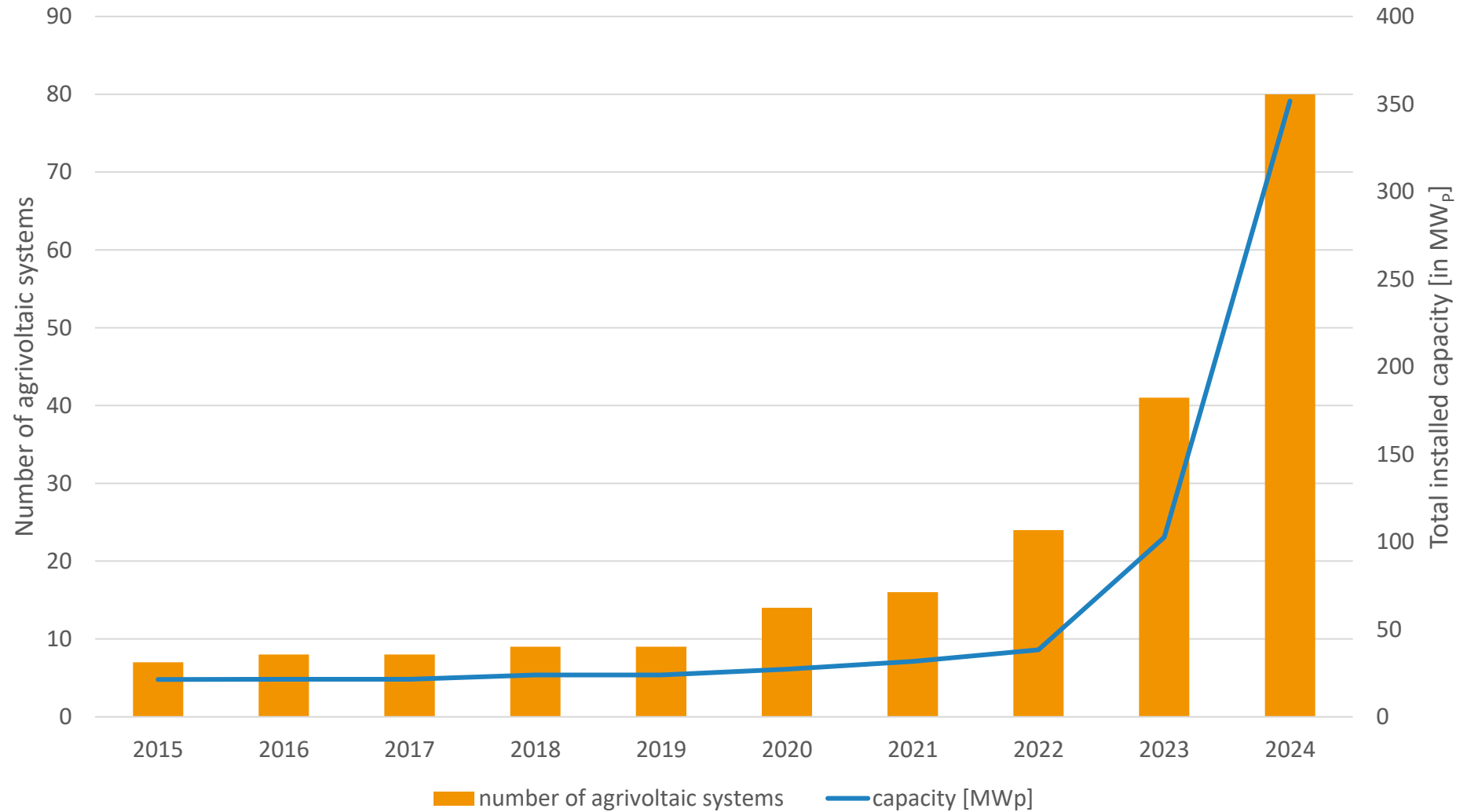
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# Agrivoltaic data collection

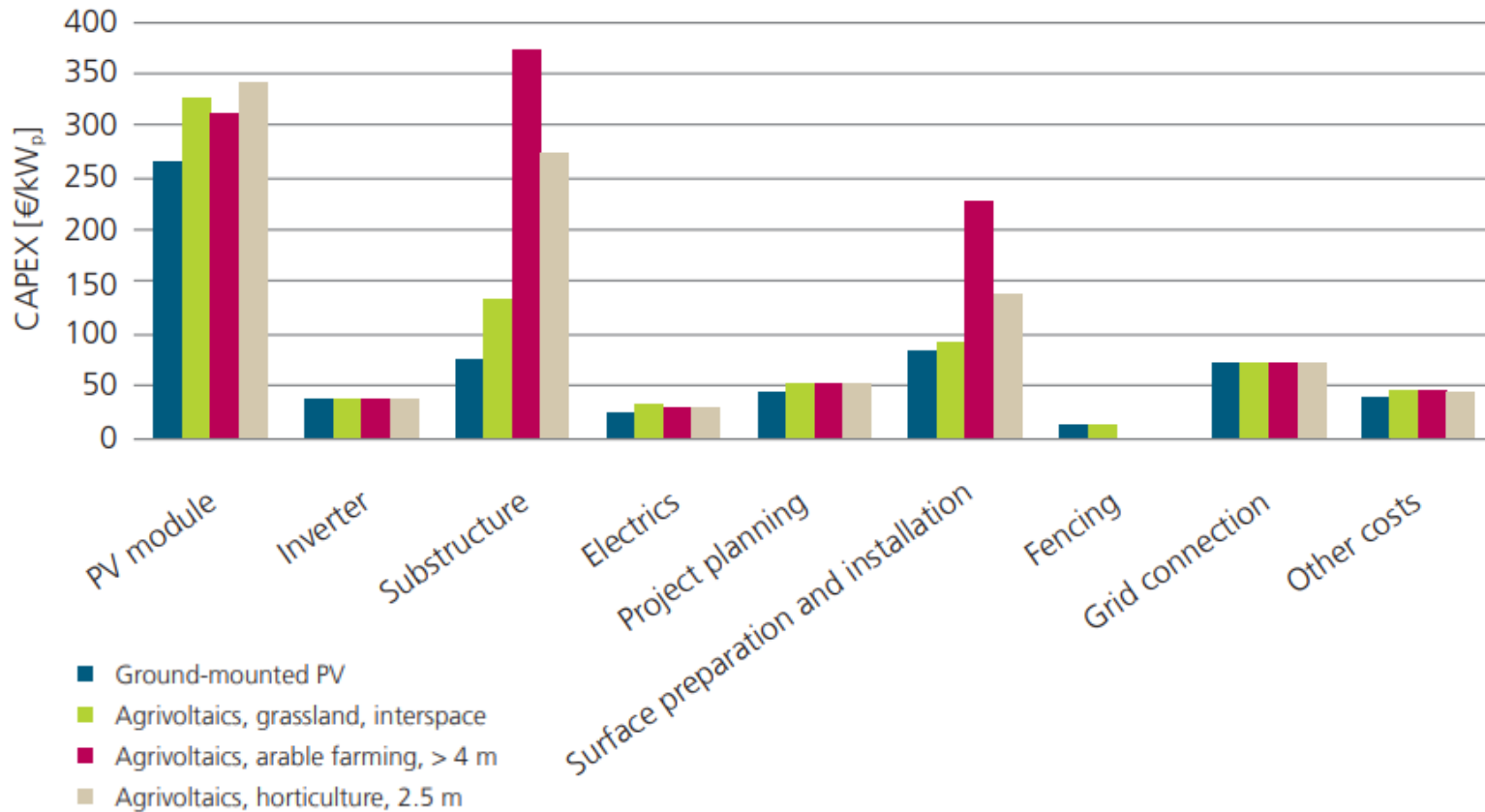
Link to the database survey:



# Development of agrivoltaics in Germany (as of Juli 2025)



# Economics of agrivoltaics



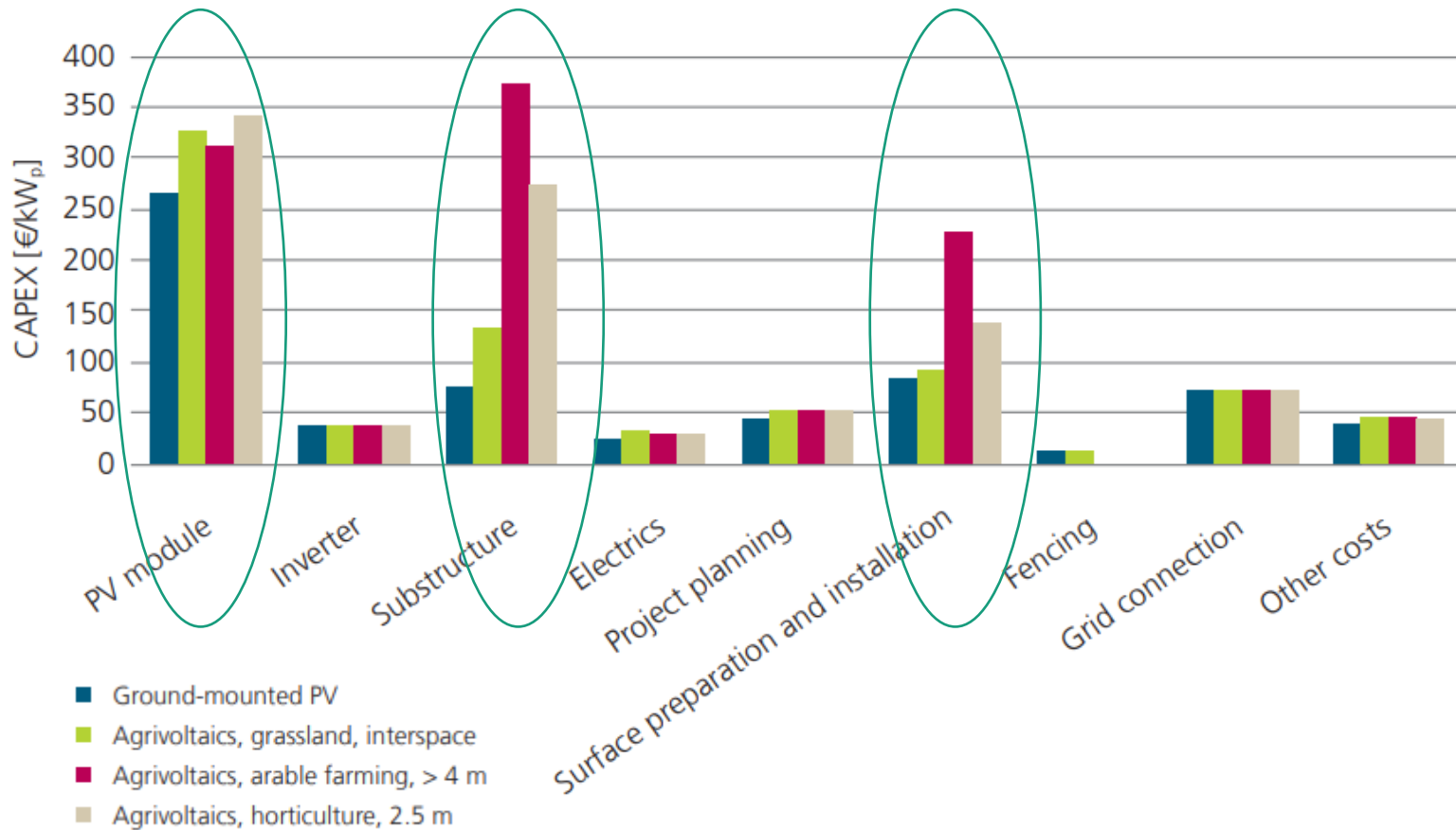
Estimated capital expenditure (CAPEX) for ground-mounted PV and different agrivoltaic systems.

- The differences in investment costs can essentially be attributed to three cost centers:
  - Module price (due to semitransparent modules)
  - Substructure costs
  - Site preparation and installation costs
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- Costs for electronic components and project planning, which in most cases are comparable to PV-FFA

Not considered in the cost estimate:

- (1) Scaling effects in arable farming due to tendency of higher field sizes (fixed costs of project planning for large plants)
- (2) Fluctuating prices of resources (modules, steel)

# Economics of agrivoltaics



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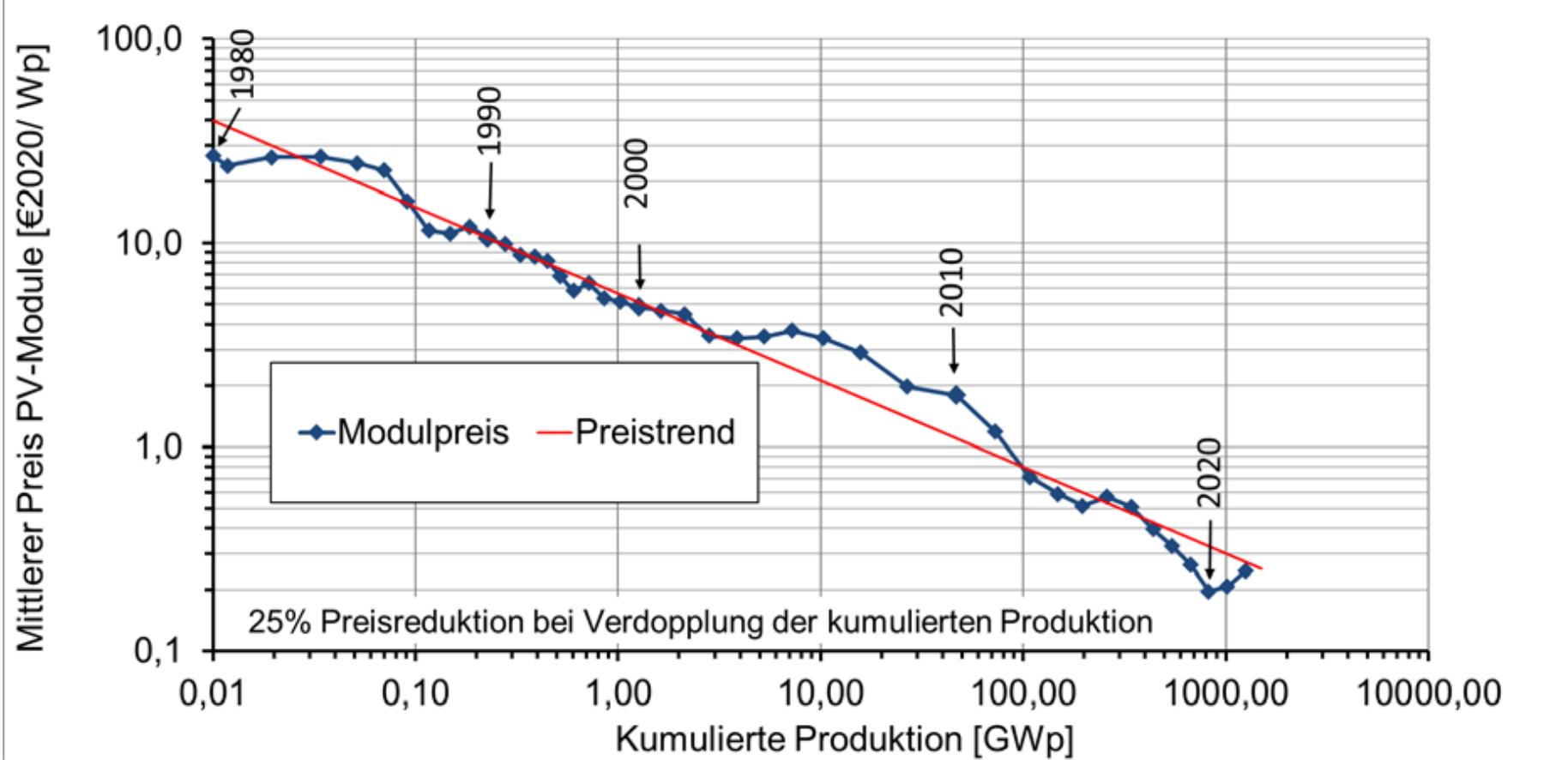
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# Economics of Agrivoltaics – module prices

Historical development of prices for PV modules (PSE AG/Fraunhofer ISE, Datenquelle: Strategies Unlimited/Navigant Consulting/EuPD). The straight line shows the trend in price development. Source: „Stand der Photovoltaik, H.Wirth“ (2023) © Fraunhofer ISE



Latest literature: *Zidane et al. (2025): Economic evaluation of one-axis, vertical, and elevated agrivoltaic systems across Europe: a Monte Carlo Analysis. Applied Energy*

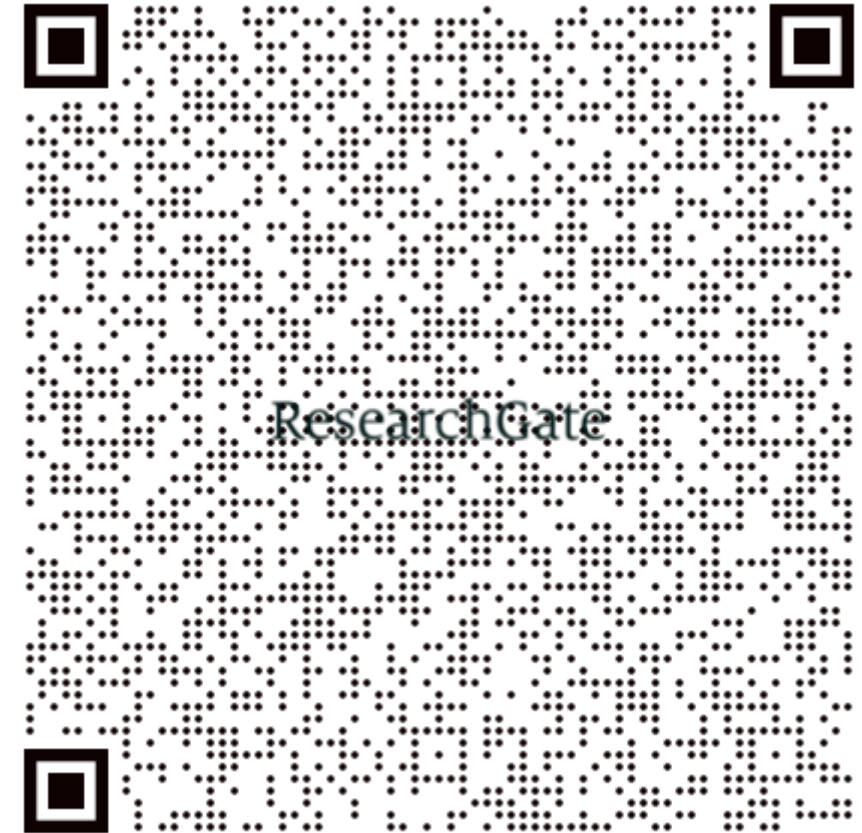
Table 1: input parameters for the LCOE calculation according to Zidane et al. (2025)

Parameter/System	One-axis tracker	Vertical system	Elevated system	Conventional ground-mounted system
Axis height [m]	2,3	0,7	3	0,7
Max. tilt angle [degree]	60	90	30	30
Row pitch/spacing [m]	6, 8, 10, 12	6, 8, 10, 12	6, 8, 10, 12	5
Capacity [kWp/ha]	600, 450, 380, 300	600, 450, 380, 300	600, 450, 380, 300	760

## Latest literature: *Zidane et al. (2025): Economic evaluation of one-axis, vertical, and elevated agrivoltaic systems across Europe: a Monte Carlo Analysis. Applied Energy*

### More input parameters:

- Area under consideration: 1ha
- Albedo: 0,2
- PV-module: Jolywood 380Wp monocrystalline with bifaciality factor (0,85)



QR-Code Zidane et al. (2025),  
[researchgate.net](https://www.researchgate.net)

## Latest literature: *Zidane et al. (2025): Economic evaluation of one-axis, vertical, and elevated agrivoltaic systems across Europe: a Monte Carlo Analysis. Applied Energy*

- Countries considered (places): Sweden (2), Denmark (1), Germany (2) and Italy (2)
- Different yield depending on location: 968 – 2007 kWh/kWp/year
- Observed duration: 30 years
- Loss of land due to agrivoltaics mounting system: 10%
- Calculated with a fixed and consistent electricity price



Latest literature: *Zidane et al. (2025): Economic evaluation of one-axis, vertical, and elevated agrivoltaic systems across Europe: a Monte Carlo Analysis. Applied Energy*

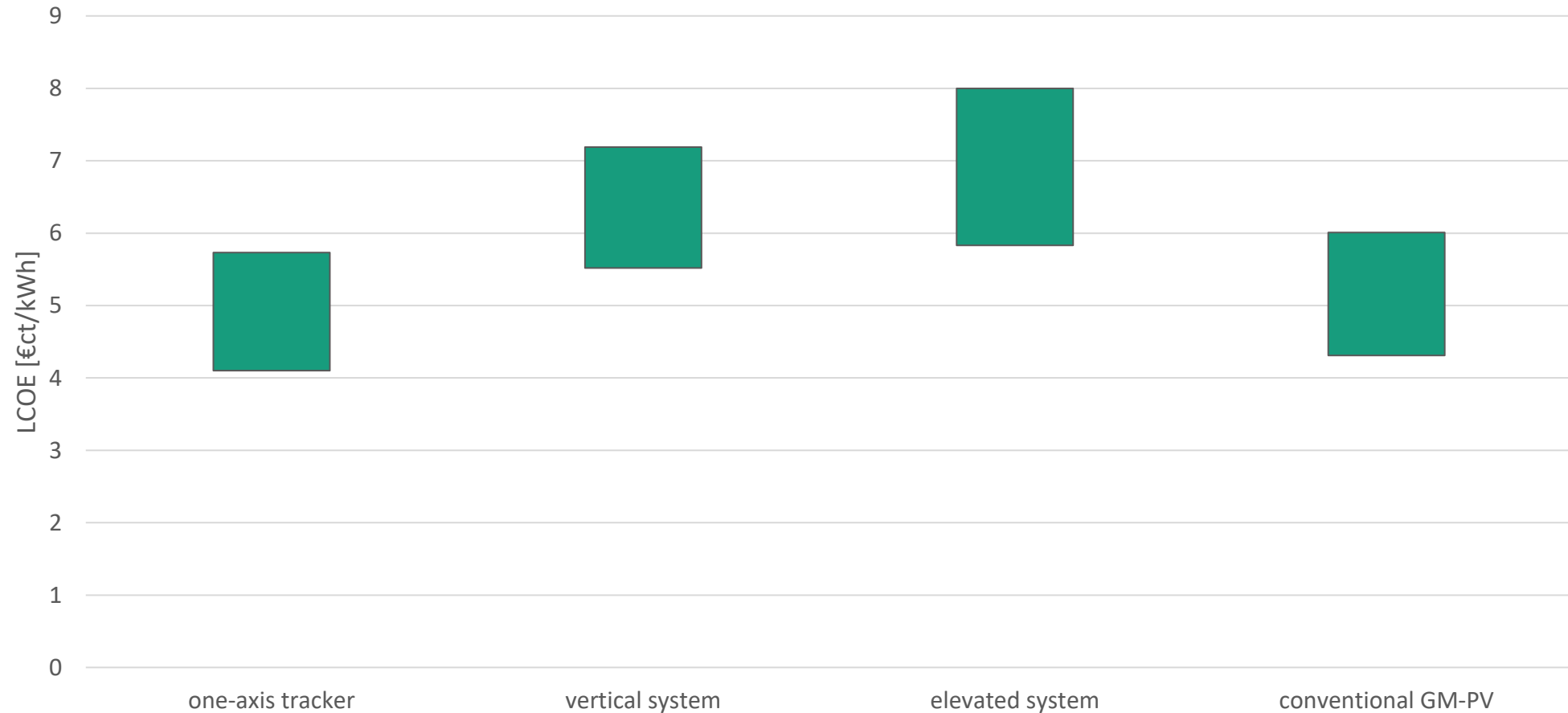
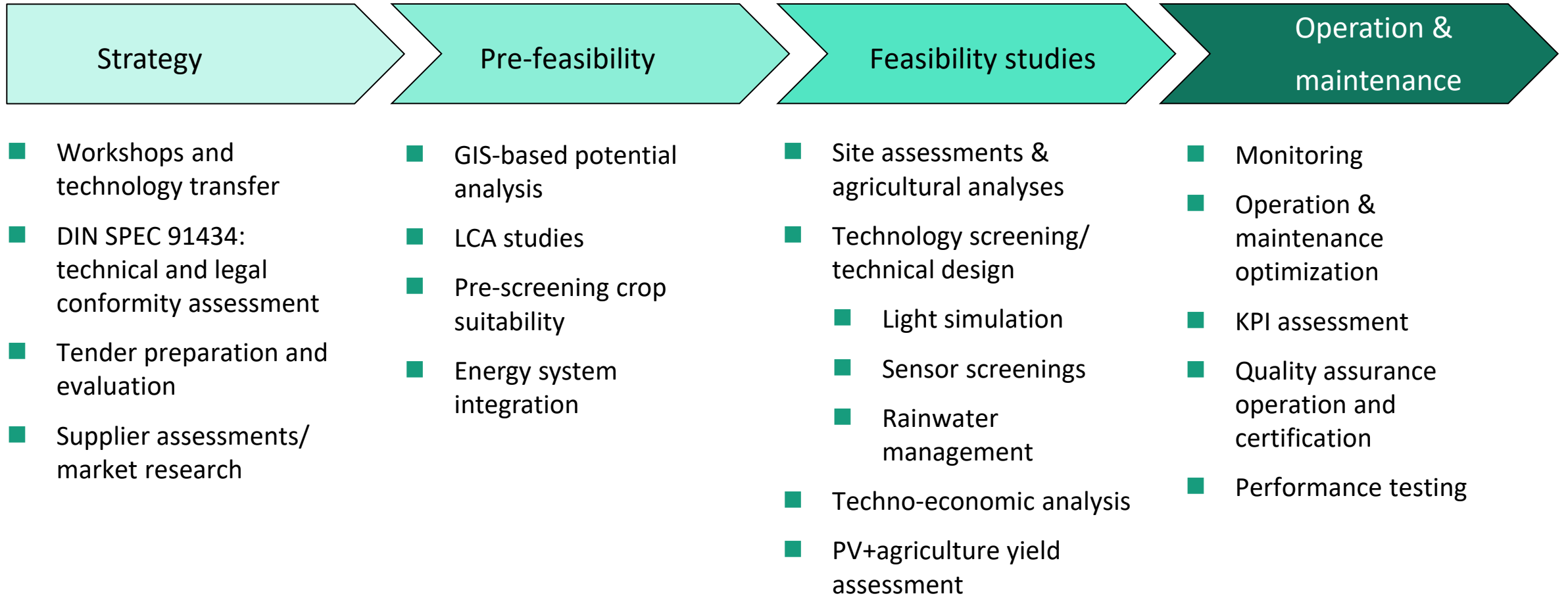


Fig. 1: mean values from the Monte Carlo Simulation of LCOE in comparison; own figure based on Zidane et al. (2025)

# Agrivoltaics at Fraunhofer ISE



# Contact

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