



66kV 275kV 33kV 11kV 132kV 400kV

CASE STUDY  
**16192**

# South Fambridge Hall Solar Farm

## 43.3 MW ground-mounted photovoltaic development spanning 70 hectares



### Introduction

BayWa r.e. strengthened its UK renewable energy portfolio with the acquisition of the fully consented South Fambridge Hall Solar Farm in May 2022, purchasing the project from its original developer, British Solar Renewables (BSR). The scheme is being delivered through a dedicated special purpose vehicle (SPV) wholly owned by Octopus Energy, reflecting the strong long term investment confidence behind the development.

South Fambridge Hall sits alongside several other BayWa r.e. sites totalling 222 MWp that have been successfully delivered or sold in partnership with Octopus Energy Generation. This positions the project as a key contributor within a nationally significant clean energy portfolio.

Powersystems were appointed to deliver the full design, installation, testing and commissioning of the electrical infrastructure for the South Fambridge Hall Solar Substation - supporting the successful construction and energisation of this major renewable energy project.

South Fambridge Hall Solar is a 43.3 MW ground mounted photovoltaic development spanning 70 hectares of low grade agricultural land, located approximately 3 km northeast of Hockley. The project connects clean energy directly into the UK Power Networks (UKPN) 132 kV distribution system via an existing overhead line positioned around 400 metres southeast of the new substation entrance.

As part of the contestable works for UKPN, Powersystems delivered the full substation build, including compound civil engineering, steelwork structures, 132 kV CTs and CVTs, HAM units, disconnectors, earth switches, and a 132 kV live tank circuit breaker. These assets are operated and protected through auxiliary systems housed within a purpose built DNO control room.

Grid connection is achieved via a 330 metre 132 kV underground cable route linking the overhead line to the new substation's outdoor cable sealing end.

In addition to the contestable scope, Powersystems delivered extensive private side infrastructure, including a new access road, substation compound, and integrated drainage systems. The private works incorporated 132 kV combined CT/VT units, surge arrestors, a 132/33 kV grid transformer, a 33 kV/400 V auxiliary earthing transformer, a 33 kV switchroom, control room and essential ancillary equipment.

Power from the photovoltaic outstations is routed into the substation via three dedicated 33 kV feeders connected to the new 33 kV switchgear, completing the electrical pathway from generation to grid.

### Project Facts and Figures

- ▶ 132 kV substation: 1
- ▶ Grid transformers: 1 (60 mVA)
- ▶ Auxiliary/Earthing transformers: 1
- ▶ Installed capacity: 43.3 MW
- ▶ Connection voltage: 132 kV
- ▶ 132 kV cabling installed: 330 m
- ▶ NERS accredited ICP



132  
kV

# South Fambridge Hall - Solar Farm capable of delivering 43.3 MW

CASE STUDY 16192



## Powersystems Partnerships

The South Fambridge site in Essex was successfully delivered through a strong collaborative partnership between Ground Utilities Limited, EHV Structures, and Powersystems, working on behalf of BayWa r.e. The project benefits from a direct connection to the UK Power Networks (UKPN) 132 kV electricity network.

Our engineering teams brought extensive national experience to the scheme, having worked with every Distribution Network Operator across the UK on high voltage solar connections. This expertise enables us to support clients in delivering reliable grid connections for renewable energy projects nationwide, with export capabilities reaching up to 275 kV.

## Scope of Works and Major Design Considerations

Powersystems designed, supplied, installed and commissioned all major electrical infrastructure, including:

- ▶ 132 kV Air Insulated Switchgear (AIS) substation works
- ▶ 60 MVA 33/132 kV grid transformer
- ▶ Transformer protection panel - by Powersystems
- ▶ 145 kV clean air live tank circuit breaker
- ▶ Circuit breaker protection panel
- ▶ 132 kV busbars and steel support structures
- ▶ 132 kV disconnectors and earthing switches
- ▶ 33/0.415 kV auxiliary/earthing transformer

## 33 kV and Balance of Plant Systems

- ▶ 5 panel Schneider CBGS-0 33 kV switchboard
- ▶ LV, control, communication and signal cabling
- ▶ LV distribution systems
- ▶ Compound lighting
- ▶ SCADA system interfacing with client networks
- ▶ 132/33 kV protection scheme design and deployment



## Design Studies

- ▶ Protection Coordination
- ▶ Load Flow Analysis
- ▶ Fault Level Calculations
- ▶ Harmonic Studies
- ▶ Lightning Risk
- ▶ Voltage and Frequency Studies
- ▶ Short Circuit Studies
- ▶ Earthing Studies
- ▶ Cable Reports
- ▶ Geotechnical Reports
- ▶ Transformer Bund Calculations
- ▶ Multiple Regulatory and Safety Compliance Checks

# South Fambridge Hall - Solar Farm capable of delivering 43.3 MW

CASE STUDY 16192

66kV 275kV 33kV 11kV 132kV 400kV

## Project Timings

Civil engineering activities began in late 2024, with Powersystems mobilising on site in October to progress access road construction and site levelling works.

Although progress was briefly slowed by archaeological monitoring requirements and a short temporary pause, the project continued to advance steadily and achieved its major programme milestones, including:

- ▶ Delivery of the 60MW grid transformer in April
- ▶ Full site energisation in October 2025

These achievements were made possible through proactive planning, rigorous health and safety management, and clear, consistent communication - ensuring the project remained firmly on schedule.

## What the Client Wanted

BayWa r.e. sought a delivery partner who could support their mission to accelerate the transition to a sustainable, low carbon energy system. Their ambition goes beyond simply constructing renewable assets - they aim to develop intelligent, high performing energy projects that make a meaningful contribution to the UK's net zero goals.

As a global renewable energy leader, BayWa r.e. is committed to driving sustainability through innovative, future proof solutions across three key technologies:

- ▶ **Wind** - Developing efficient, high yield wind projects that deliver long term clean power and strengthen the resilience of the UK's energy mix.
- ▶ **Solar** - Creating optimised solar installations that maximise energy output, minimise environmental impact, and support biodiversity and land enhancement.
- ▶ **Energy Storage** - Integrating advanced storage solutions to stabilise the grid, unlock greater renewable penetration, and ensure energy is available when it's needed most.

For the South Fambridge Hall project, they wanted a trusted engineering partner capable of turning these principles into reality - delivering a safe, reliable, and cost effective grid connection while upholding the highest environmental, engineering, and quality standards.

Powersystems' role was to provide the technical expertise, collaborative working, and problem solving ability needed to bring BayWa r.e.'s sustainability vision to life on this flagship solar development.

## How Powersystems Helped?

As the Independent Connection Provider and Principal Contractor for the substation works, Powersystems played a central role in delivering a robust, compliant, and high performance grid connection for the South Fambridge Hall Solar Farm. Our team oversaw every stage of the civil and electrical infrastructure, ensuring the project was delivered safely, efficiently, and to the highest engineering standards.

Our support included:

- ▶ Delivering precise and reliable engineering outputs, ensuring all designs, calculations and installation activities met stringent technical and regulatory requirements.
- ▶ Providing resilient, cost effective high voltage solutions tailored to the project's operational needs and long term performance.
- ▶ Maintaining an uncompromising "Safety First" culture throughout construction, commissioning and energisation.
- ▶ Resolving technical challenges quickly and effectively, drawing on the expertise of our experienced HV specialists to keep the project moving without delay.
- ▶ Coordinating closely with UK Power Networks (UKPN) to meet all key programme milestones and secure energisation on schedule.
- ▶ Prioritising critical work fronts to enable early generation wherever possible and to mitigate the risk of costly delays for the client.

## Our Responsibilities Included:

- ▶ Full electrical and civil design and studies
- ▶ Technical support to BayWa r.e.
- ▶ Civil construction
- ▶ Horizontal Directional Drilling (HDD) works were completed in coordination with Essex Highways. 4 x Service ducts were installed underneath Fambridge Road from the solar site, to the substation to route the Solar feeders and control
- ▶ HV/LV installation and commissioning
- ▶ Protection and control panel installation
- ▶ SCADA integration
- ▶ Cable installation, design and containment
- ▶ SAP provision for energisation



# South Fambridge Hall - Solar Farm capable of delivering 43.3 MW

CASE STUDY 16192

66kV 275kV 33kV 11kV 132kV 400kV



## Design Works

Design remained a vital stage in ensuring the project met all safety, regulatory and performance standards.

This included:

- ▶ 132 kV substation compound and building design
- ▶ 132/33 kV protection scheme development
- ▶ Battery charger and LV system design
- ▶ Detailed civil design and structural design report
- ▶ HV and LV network modelling
- ▶ Cable sizing and loss calculations
- ▶ Review of client technical documents
- ▶ Full control and signal wiring design
- ▶ Geotechnical design report

## Installation Works

- ▶ Substation and compound earthing
- ▶ All 132 kV substation equipment
- ▶ 330 m of 132 kV cabling
- ▶ LV and control cables
- ▶ Five-panel Schneider CBGS-0 switchboard
- ▶ All protection and control panels
- ▶ 110V DC and 48V DC battery chargers
- ▶ Compound lighting and custom control panel
- ▶ All 33 kV terminations

## Commissioning Works

- ▶ Hot and cold commissioning of 33 kV switchboard
- ▶ Hot and cold commissioning of transformers
- ▶ VLF testing of HV cabling
- ▶ Testing of 132 kV and 33 kV protection schemes
- ▶ Interface testing with UKPN
- ▶ LV installation certification
- ▶ Insulation and functional testing of all circuits

## Energisation Works

- ▶ 132/33 kV SAP for substation energisation
- ▶ 33 kV SAP for pre energisation checks and photovoltaic energisation
- ▶ Safety documentation issuance and supervision

## Environmental Benefits

Clean, renewable power generation: - The South Fambridge Hall Solar Farm generates 43.3 MW of clean electricity, producing enough energy to power approximately 15,000 homes, significantly contributing to decarbonisation in the South East.

Supporting national climate targets: - By displacing fossil fuel generation, the project directly supports the UK's long term climate goals and strengthens renewable energy capacity across the region.

Enhanced landscape and nature recovery: - The scheme incorporates extensive ecological improvements - including wildflower meadows, new hedgerows, tree planting and dedicated habitats for bats, birds, newts, and pollinators - delivering a verified 142% biodiversity net gain once complete. This uplift is confirmed across BayWa r.e.'s project communications and site newsletters.

Alignment with ecological best practice: - Wider ecological assessments carried out for adjacent Fambridge developments demonstrated early diligence in surveying and protecting species such as great crested newts, wintering birds and water voles, reinforcing a strong culture of environmental stewardship in the area

## Economic and Social Value

Direct community investment: - BayWa r.e. committed a £50,000 community benefit contribution, allocated locally to support community projects and deliver lasting value for residents.

Minimised construction disruption: - Construction activities were planned around restricted delivery times to avoid school drop off and pick up periods, reducing traffic impacts on the community.

Open engagement with residents: - Community drop in sessions were offered throughout the construction phase, ensuring transparency and providing residents with opportunities to speak directly with the project team and stay informed.

Local authority support for sustainable land use: - Local councillors publicly endorsed the project as an effective and responsible use of low grade agricultural land, highlighting its reversibility and potential to coexist with agricultural activities such as grazing and innovative vertical farming systems.

Long term regional economic benefit: - By boosting local renewable energy infrastructure and creating work opportunities through engineering, construction and ongoing operations, the project adds to the economic resilience of the South Essex region.

## The Results

South Fambridge Hall Solar was energised in October 2025, completed on time and within budget.

This project marks a significant collaboration between Powersystems and BayWa r.e., helping advance the UK's renewable energy landscape.

