POWERSYSTEMS™
HIGH VOLTAGE SPECIALISTS
An Employee Owned Business

CASE STUDY 16149

Crimscote Solar Farm

45 MW renewable-energy development exporting clean electricity to the National Grid

PROJECT VALUE MILLIONS 3.5 | TOTAL CAPACITY 45 MW | RENEWABLE ENERGY | 59.4 HECTARE SITE

Metlen Energy & Metals

REGENER8 POWER

Crimscote Solar Farm

Powersystems delivered the complete 66 kV high voltage (HV) electrical infrastructure for the Crimscote Solar Farm, a 45 MW renewable energy development built across 59.4 hectares of former arable land. The installation exports clean electricity to National Grid Electricity Distribution (NGED) via a 66 kV cable connection network.

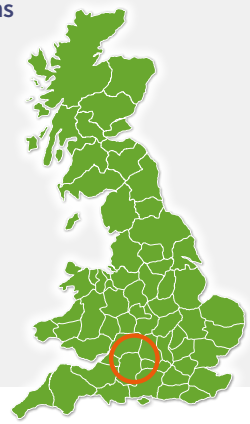
Project Scope

Crimscote Solar Farm is a 66 kV connected, 45 MW solar farm located near Stratford upon Avon in the National Grid Electricity Distribution (NGED) DNO area. As a NERS accredited ICP with more than 40 years of high voltage engineering expertise, Powersystems was responsible for the full design, installation, testing, and commissioning of the customers 66 kV and DNO HV 66 kV electrical Balance of Plant (BoP). The scope included civil and electrical design, build and commissioning of the NGED grid connection, including 66 kV cable route, 66 kV outdoor AIS substation, control and protection equipment as well as the customer 66 kV AIS substation, grid transformer, earthing transformer and associated cabling and integration with 33 kV customer substation.

The 66 kV connection is a single circuit, 750 m 66 kV underground cable connection between the existing NGED OHL network and the new 66 kV substation with the cable, 66 kV disconnectors & earth switches, 66 kV VTs, 66 kV metering circuit breaker, protection and control equipment and auxiliaries (the contestable works) being adopted by NGED post-construction.

Project Facts and Figures

- Totalled Installed capacity: 45 MW
- Connection Voltage: 66 kV
- Length of onsite 66 kV cabling: 750 m
- Low-carbon technology producing 60% less CO_2 emissions than coal or oil
- Powersystems are a Lloyds registered (NERS) approved independent connection provider (ICP)



66 kV

Powering the Transition to a Sustainable Future

Crimscote - 66 kV Solar Farm with a total installed capacity of 45 MW

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

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Project Scope (continued)

The customer side of the substation consists of a 66 kV Disconnector and earth switch, 66 kV CVTs, 66/33 kV 50 MVA Grid transformer, and 200 kVA auxiliary earthing transformer (ET1), and is integrated with the customer main 33kV switchboard via 33kV power cables.

NGED 66 kV Infrastructure

- Design, procurement, installation and commissioning of the 750 m 66 kV cable connection
- Civil design and construction of NGED 66 kV compound and control building
- Design, procurement, installation and commissioning of AIS substation equipment:
  - 66 kV cable termination and surge arrestor
  - 66 kV earth switch (1L1)
  - 66 kV disconnectors (IL3 & 1H3A)
  - 66 kV voltage transformers
  - 66 kV dead tank circuit breaker (CB1H0)
  - 66 kV busbars and clamps
- Design, supply, installation and commissioning of NGED protection and control equipment, including generator constraint panel, circuit breaker protection, LV AC and DC system, and comms equipment, and the integration between DNO and customer equipment
- Earthing installation works
- Design and installation of the LV infrastructure
- Design and installation of the compound lighting and control panels
- Installation of low voltage, control, signal and communications cabling works

Customer 66 kV Compound

- Civil design and construction of Customer 66 kV compound and transformer bay
- Design, supply, installation and commissioning of customer 66 kV AIS substation equipment:
  - 66 kV disconnector (1H3B) and associated earth switch
  - 66 kV capacitive voltage transformer
  - 66 kV surge arrestor
  - 66 kV busbars and clamps
  - 33 kV auxiliary earthing transformer (ET1)
- Earthing Installation Work
- Installation of low voltage, control, signal, and communications cabling works

Outcome

The completed system delivers a robust, responsive, and fully compliant HV network connection, enabling Crimscote Solar Farm to supply reliable renewable power while supporting NGED's requirements. Powersystems' fully integrated approach ensured seamless progression from design through to commissioning, strengthening our reputation as a trusted delivery partner in the UK renewable energy sector.

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Powersystems partnerships

Delivered on behalf of Regner8 SPV1 Limited in partnership with the Metlen Group, the 45 MW solar scheme lies 6 km south of Stratford upon Avon, 660 m north of Crimscote, and 2.8 km north of Illmington. The site connects directly into NGED's 66 kV distribution network.

This extensive experience enables us to support the delivery of solar farms exporting at 11 kV, 33 kV, 66 kV and 132 kV.

Project development

Solar energy has become an increasingly important part of the UK's energy landscape, contributing around 4.9% of national generation. Crimscote Solar Farm forms part of this transition, generating 45 MW of clean electricity, enough to power approximately 14,000 homes and helping drive progress toward the UK's 2050 Net Zero target.

Environmental enhancement was a central design commitment. The client have introduced 3.5 acres of woodland, 7.4 acres of wild bird crop, a 0.65 acre wildlife orchard, and sixteen bird and bat boxes. Together, these initiatives delivered a biodiversity net gain of 110%, significantly improving the site's ecological value.

What were the top five environmental risks and mitigation measures associated with this construction development?

- **Construction Waste Management**
  - **Risk:** Construction activities generate a range of waste materials that, if unmanaged, can lead to pollution, site contamination, and inefficient use of resources.
  - **Mitigation:** Powersystems maintained a clean and orderly site, using designated waste disposal points across Crimscote. Waste was segregated, stored safely, and removed regularly to ensure compliance with environmental standards.
- **Fuel Consumption and Emissions**
  - **Risk:** Excessive fuel use from plant, machinery, and transport can increase carbon emissions and contribute to local air quality impacts.
  - **Mitigation:** Materials were ordered in bulk and sourced from local suppliers wherever possible, significantly reducing transport miles and associated fuel consumption. Efficient scheduling of machinery uses further minimised emissions.
- **Impacts on Local Wildlife and Habitats**
  - **Risk:** Construction can disturb existing habitats, displace wildlife, and reduce biodiversity if not carefully managed.
  - **Mitigation:** The project delivered substantial ecological enhancements, including 0.65 acres of new wildlife orchard, 3.5 acres of woodland planting, 7.4 acres of wild bird crop, and the installation of 16 bird and bat boxes. These measures collectively achieved a biodiversity net gain of 110%.
- **Resource Use and Material Sourcing**
  - **Risk:** High demand for construction materials can increase environmental footprint, especially when materials are transported long distances or sourced unsustainably.
  - **Mitigation:** Wherever feasible, materials were procured from local suppliers, reducing transport emissions and supporting responsible sourcing practices.
- **Long Term Land Use and Energy Output**
  - **Risk:** Large scale solar developments can alter land use and raise concerns about long term environmental value if the benefits are unclear.
  - **Mitigation:** The Crimscote Solar development provides enough clean energy to power approximately 14,000 homes, significantly reducing reliance on fossil fuels. This long term renewable output offsets the land use change and contributes directly to national Net Zero goals.

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Project timings

Civil works began in October 2024 with site mobilisation and preparatory works. Installation of the 66 kV cable followed and was completed in December 2024. Delivery of the 66 kV equipment in January 2025 enabled installation of the main HV infrastructure. Work on the DNO substation started in March 2025 and continued in parallel with the wider site works. Energisation took place in August 2025, with final commissioning and full handover completed in September 2025.

What the client wanted

The client's primary objective was to deliver a fully operational solar farm in a manner that was both time efficient and cost effective, while also creating meaningful benefits for the local environment and surrounding community. The success of this approach is reflected in the project being completed within a two year period, demonstrating strong programme control and effective budget management.

Powersystems played a central role in achieving these outcomes, undertaking the full construction scope for both the grid connection and customer 66 kV compound. Acting as the key interface between the client and NGED, Powersystems coordinated the design approval process for the substation and connection works, ensuring compliance with all technical and regulatory requirements. This included securing NGED sign off for the build, enabling a smooth and timely transition from construction to energisation and final handover

How Powersystems have helped

Powersystems drew on its extensive high voltage expertise to procure, install, and commission the specialist equipment required for the Crimscote Solar Farm. This included designing a cable route that was both technically feasible and cost efficient, ensuring the installation could be delivered without unnecessary civil works or excessive cabling expenditure.

By maintaining high quality standards and delivering works to programme, Powersystems supported NGED in progressing and completing their own substation infrastructure, helping to keep the overall project on schedule.

Powersystems engineers were involved with the following below:

- Electrical design
- NGED Design Management
- Interface with National Grid Electricity Distribution for status & constraint signals
- Transformer integration and commissioning
- Cables & containment design, supply & installation
- HV testing
- SAP provision

Design works

Design works involved:

- Earthing Design & Study
- Hot Zone Contour Drawing
- Electrical Losses Study
- Protection Settings & Coordination Study
- Cable Sizing
- Along with all required drawings

Installation works

Civil construction began in October 2024 with work on the external compound, followed by the NGED control room in March 2025. By April 2025, the building structure was complete, including the roof, brickwork, doors, and internal finishes.

Electrical infrastructure works ran alongside the civil programme from January 2025, beginning with the delivery of the 66 kV transformer and associated high-voltage equipment. By March 2025, installation of the HV equipment structures and overhead busbars was underway. Earthing installation followed as part of the wider electrical construction effort, ensuring full compliance with safety and performance requirements.

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Commissioning Works

The Powersystems commissioning began in May 2025, with the team delivering an extensive programme of testing and verification to confirm the safe and reliable operation of the high voltage infrastructure at Crimscote Solar Farm. Work covered the preparation and functional testing of all circuit breakers, disconnectors, and earth switches, along with full proving of multicore wiring across the system to validate correct operation and integration.

Comprehensive testing was undertaken on the 66 kV outdoor equipment, including CT and VT analyser tests covering ratio, polarity, and magnetisation curves across all windings. Primary current injection was completed on both the 66 kV and 33 kV CTs to verify the integrity of all secondary circuits.

Secondary injection testing was performed on external CT and VT loops where required, confirming correct operation of COP meters, P14D protection relays, transducers, and the DUOBIAS relay. Functional testing of the NGED protection panel was also completed, including checks on external interfaces, EMPBs and full trip circuit verification.

Further commissioning work covered a full suite of protection and system integration checks. Secondary injection tests were completed for key protection functions, including OCEF, NVD, and TCS, confirming correct operation under simulated fault conditions. The team also prepared and tested all interfaces for the Generator Constraint Panel, ensuring reliable communication and control. Battery chargers underwent functional checks, battery discharge tests were performed to verify capacity and resilience, and earthing transformer tests were completed to demonstrate compliance with all required safety and performance standards

The commissioning phase concluded with the close out of all documentation and the preparation of site general reports, ensuring a complete and auditable record of all works.

Energisation works

Powersystems supported and facilitated the successful energisation of the Crimscote Solar Farm in August 2025. The process was coordinated closely with NGED, with a Powersystems Senior Authorised Person (SAP) working alongside NGED's operational teams to ensure all safety, switching, and commissioning procedures were completed efficiently and in full compliance with network requirements.

This collaborative approach enabled a smooth transition from construction to live operation, marking a key milestone in the project's delivery.

Environmental Impact

The project has delivered several environmental sustainability benefits

- Clean energy generation: The 45 MW installation provides enough renewable electricity to power approximately 14,000 homes, reducing reliance on fossil fuels and supporting the UK's Net Zero 2050 target
- Biodiversity net gain of 110%: Through woodland planting, wildlife habitats, bird and bat boxes, and ecological land management, the project enhances local biodiversity far beyond its pre construction baseline
- Efficient land use: Transforming arable land into a solar plus habitat site creates dual value: renewable energy generation and improved ecological richness
- Reduced carbon footprint during construction: Local procurement, efficient logistics, and reduced fuel use helped lower the carbon intensity of the build phase

Together, these outcomes demonstrate that the project not only generates clean energy but also actively improves the environmental quality of the surrounding landscape.

The Results

Despite the tight delivery timeline, Crimscote Solar Farm successfully delivers 45 MW of renewable electricity to the grid, helping move the UK closer to its Net Zero targets. The site now provides enough power for 14,000 homes while offering additional environmental benefits such as enhanced habitat value and improved ecological diversity. Economically, the project supports local employment and contributes indirectly to regional industry through reinforced grid capacity.

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Environmental benefits

Crimscote Solar Farm delivers a range of environmental benefits that support both local and national sustainability goals. The development provides a low carbon power platform that contributes directly to reducing greenhouse gas emissions. Its flexible peak generation capability ensures it can support the grid during periods of high demand, improving overall system resilience. In total, the solar farm produces more than 45 MW of renewable electricity, supplying clean energy to approximately 14,000 homes across the UK.

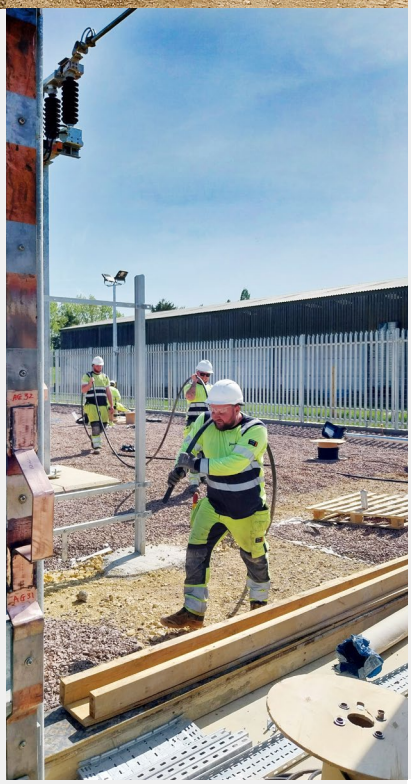
Economic benefits

Alongside its environmental advantages, the project also delivers meaningful economic benefits. By reinforcing the wider National Grid network, the solar farm indirectly supports industry and commercial activity across the region. The development also creates a variety of local employment opportunities, including roles in management, maintenance, and site security, with recruitment focused on sourcing staff from the surrounding area wherever possible.

Challenges and Lessons Learned

The project encountered several challenges throughout its lifecycle. Adverse weather conditions during the rainy season created difficulties for civil engineering activities, particularly groundworks and construction sequencing. In addition, long lead procurement items required careful planning to ensure equipment was delivered in line with the project programme.

Key lessons learned from Crimscote emphasise the importance of consistent and proactive communication between all stakeholders throughout the construction process. Maintaining clear coordination helps to mitigate delays, manage expectations, and ensure alignment across design, procurement, construction, commissioning, and grid connection activities.



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