

SECTOR CASE STUDY

Energy



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Battery Energy Storage Facility

SCOTLAND, UNITED KINGDOM

CLIENT: CONFIDENTIAL ELECTRICAL CONTRACTOR

The United Kingdom (UK) Government has set a target to decarbonise the power grid and ensure all cars are zero emissions capable by 2035. The initiative aims to replace fossil fuels with renewable energy and improve the energy security of the UK - ensuring supply, reducing costs, and avoiding future price spikes caused by geopolitical events.

The development of the Battery Energy Storage System (BESS) is an essential component in achieving this objective - managing the flow and optimising the use of electricity generation throughout the network.

The BESS is a 10,932kW energy storage facility located in Scotland, UK that comprises 27 battery storage units, 14 transformers, a switchgear modular building, and a DNO building.

BG&E was responsible for carrying out the civil and structural design of the project site and foundations, including:

- Structural design of foundation systems (reinforced in situ concrete) for the battery storage units, transformer bunds, DNO building, and customer switchgear building.
- Civil works that involved a full cut and fill analysis of the site, developing a stormwater drainage strategy, and carrying out a swept path analysis across the site.

We also provided ongoing construction support - which included assisting with site queries, RFI's (Requests for Information), and MAR's (Material Approval Requests).

Construction of the site is ongoing, and works are expected to be completed by 2024.



Blackhillock Battery Energy Storage Facility

SCOTLAND, UNITED KINGDOM

CLIENT: CONFIDENTIAL ELECTRICAL CONTRACTOR



The BESS is a 300MW/600MWh energy storage facility located in Scotland, UK. The BESS comprises 49 battery storage units, an HV transformer compound, up to two HV transformer units and two MV switch rooms, two synchronous compensators compound, four LV switch rooms and aux transformer, a control room, modular buildings, and a DNO building.

BG&E was responsible for carrying out the geotechnical review and assessment for the following areas within the project:

- Review of existing geotechnical information and specifications designed by others.
- Review of current civil and structural information.

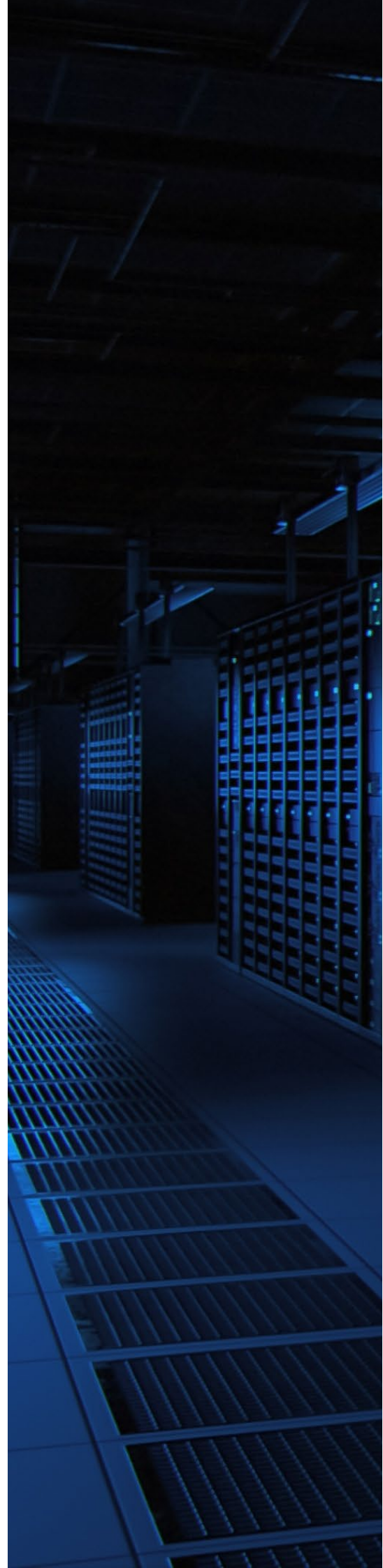
Once the review of these items was completed, BG&E proceeded with assessing and estimating the short-term and long-term settlements, establishing whether these were within the allowable tolerances for the units and BESS plant on the compound.

Once the initial assessment was provided to the Client, additional ground investigation works, and soil testing were proposed by BG&E. These tests helped with obtaining more refined parameters and analysis, which further enhanced our support and assistance on the project.

A final technical report was provided to the Client which also included the predicted ground settlement assessment results, proposed mitigation measures, risk assessment, and any additional tests.

The analysis considered the short-term - during the construction stage, and long-term - throughout the 20 year design life of the project. Ground properties and parameters were determined from existing and specified ground investigation and testing results. The analysis was conducted using advanced computer modelling and analysis software.

Construction of the site is ongoing and works for Phase 1 are expected to be completed by summer 2024, with Phase 2 of the project to be completed and go live in 2026.





FKQ Data Centre Substation

FRANKFURT, GERMANY

CLIENT: CONFIDENTIAL ELECTRICAL CONTRACTOR

The FKQ Data Centre (DC) Substation is a substation development as part of a large DC Campus, located in Frankfurt, Germany, that is made up of nine transformers and two modular buildings.

BG&E was responsible for carrying out the civil and structural design of the project site and foundations. Structural works included the design of foundation systems (reinforced in situ concrete) for the modular buildings, transformer bunds and firewalls, and lightning mast bases. Civil works involved surface and foul water drainage design, site grading of the site, routing and coordination of the 100kV electrical ducting, and designing pavement plan and pavement build-up details.

BG&E also provided ongoing construction support which included assisting with site queries, RFI's, and MAR's.

Construction of the site is ongoing, and works are expected to be completed by 2024.

Substation Switchgear Upgrade

ACT, AUSTRALIA

CLIENT: CONFIDENTIAL ELECTRICAL CONTRACTOR

The Substation Switchgear Upgrade consisted of the design of two new modular buildings and the associated cable basement to service three HV transformers. The design of the modular buildings was to allow for the offsite fit-out of the switchroom to minimise disruption during the installation of the structure.

BG&E was responsible for carrying out the civil and structural tender design of the proposed modular structures, basement, and foundations and lifting for the modular buildings. This included the design of foundation systems (reinforced in situ concrete) for the modular buildings, cable trenches, and cable support.

Civil works involved surface and foul water drainage design, site grading of the site, designing hardstands for maintenance of the transformer routing and the coordination of the 100kV electrical ducting, and designing the pavement plan and pavement build-up details.

Construction of the site is ongoing, and works are expected to be completed by 2025.

At BG&E, we are united by a common purpose – we believe that truly great engineering takes curiosity, bravery and trust, and is the key to creating extraordinary built environments.

Our team of more than 1100 highly skilled people, in offices across Australia, New Zealand, Singapore, the United Kingdom and Middle East, design and deliver engineering solutions for Clients in the Property, Transport, Ports and Marine, Water, Defence, Energy and Resources sectors.

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