

# Battery storage engineering, procurement and construction (EPC) to enable optimisation of battery assets

Process road map

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## Scoping



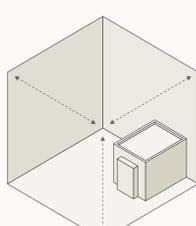
**1 Business case discussion and information gathering**  
Market monetisation opportunities, technology options, desktop high-level revenue forecast modelling, identification of most suitable technology solution for cycling regime and business cases.

### Options assessment

Revenue forecasts, walkthrough high-level battery system design and configuration, and develop best fit project around site requirements/limitations, expected operating cycling regime and system augmentation and energy expansion.

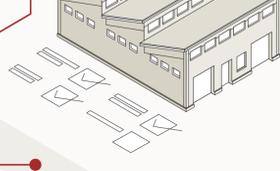
### 2 Site specs assessment and initial battery sizing

Assessment of site layout, planning conditions and limitations, and grid connection capacity and limitations for initial high-level front-end engineering design and battery system sizing.



### 4 Top level proposal

Build and offer a high-level proposal outlining the site/customer-specific developed project with the expected revenues and project's delivery costs (engineering design, construction, commissioning, operation and maintenance, and optimisation).



## Front-end engineering design and development

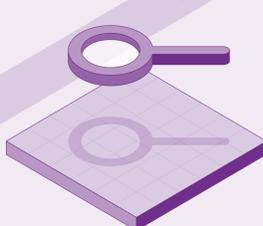


### 6 Front-end civils design proposal

Site layout detailing plan view of equipment (i.e. site substation, transformers, battery containers, PCSs, etc.) showing connection points, cabling routes and trenches (if required), and required ground, landscaping and site access works.

### 5 Site survey

Site restrictions, obstructions and general terrain issues are identified. Physical site measurements are taken for use in detailed design stage. Electrical point of connection is verified.



### 7 Front-end BESS, BoP and PoC electrical design proposal

Conceptual design and drawings detailing battery energy storage system (BESS), balancing of plant (BoP) and grid point of connection (PoC), single line diagram entailing connection of the system electrical components and bill of quantities for all plant components.

### 8 Binding proposal

Build and offer a fixed-price binding proposal outlining the site/customer specific civils, electrical and grid connection works subject to assumptions and exclusions.



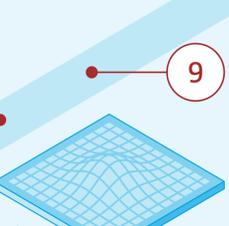
## Implementation

### 10 Detailed civils design

Site layout detailing plan view of equipment (i.e. site substation, transformers, battery containers, PCSs, etc.) showing connection points, cabling routes and trenches (if required), and required civil (e.g. plinths, oil bunds, etc.), ground, landscaping and site-access routes works.

### 9 Site studies

Soil investigation (e.g. archaeological, topographic, soil contamination, etc.), grid-connection and electrical (e.g. ENA G99, ENA P28, ENA G5/5, earthing, etc.) studies to confirm site suitability and any potential additional costs are undertaken.



### 11 Detailed BESS, BoP and grid PoC electrical design

Fully detailed electrical BESS, BoP and grid PoC design and drawings (power and comms), single line diagram entailing connection of the system electrical components, calculations required to ensure correct cable and electrical protection sizes, grid connection interface design and contestable/non-contestable works design.

### 12 Design modifications

To reflect new measurements taken from the additional site studies. Final construction drawings are issued.

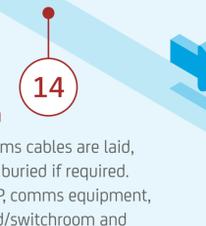


### 13 Civil works

Clearing of site, erecting safety fences, set up access and welfare facilities. Foundations are prepared, cable trenches dug out (if required) and permanent site security measures are installed.

### 14 Electrical installation

LV/HV and comms cables are laid, connected and buried if required. All relevant BoP, comms equipment, HV switchboard/switchroom and protections are installed. Isolation and grid transformers are installed as necessary to match AC PCS output to relevant HV voltages. BESS containerised solution is offloaded, positioned and connected to BoP.



### 15 Site acceptance tests

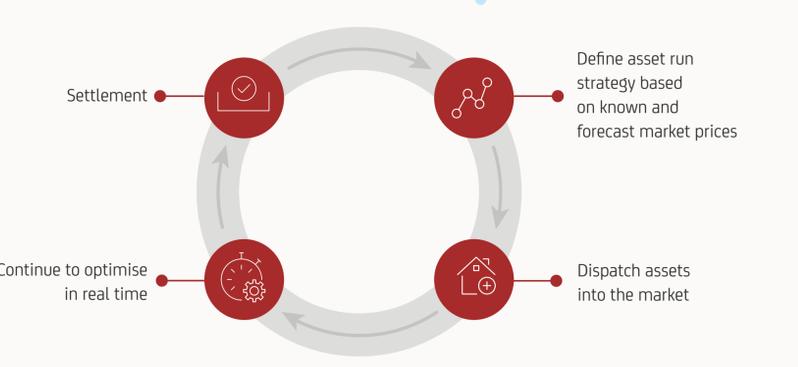
Performance tests to measure energy capacity, power, round trip efficiency and basic equipment function tests involving start stop cycles and operating cycle tests for the whole plant. Electrical, comms and fire suppression system tests to check system protections and safety are executed.

### 16 Electrical and storage plant commissioning tests

Commissioning process includes, testing system to BS7671 requirements, inspection and tests to comply with DNO G99 Engineering recommendations, commissioning tests to conform with energy and grid support services requirements.



## Optimisation and management



Centrica Business Solutions can help you maximise value from your batteries and unlock the best returns from market opportunities. We have market-leading experience delivering full-integrated and comprehensive battery storage solutions that deliver profitable investments.

By interfacing with a single company for your battery requirements, you enjoy a streamlined process for EPC (engineering, procurement and construction), route-to-market optimisation in grid support and energy markets, and O&M (operation and maintenance).

Learn more about how Centrica Business Solutions can help you eliminate the complexity from investing in a battery energy storage system with our end-to-end solution.

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