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SPITTAL- BATTERY ENERGY STORAGE SYSTEM
49.9 MW
SPITTAL QUARRY, SPITTAL, KW1 5XR

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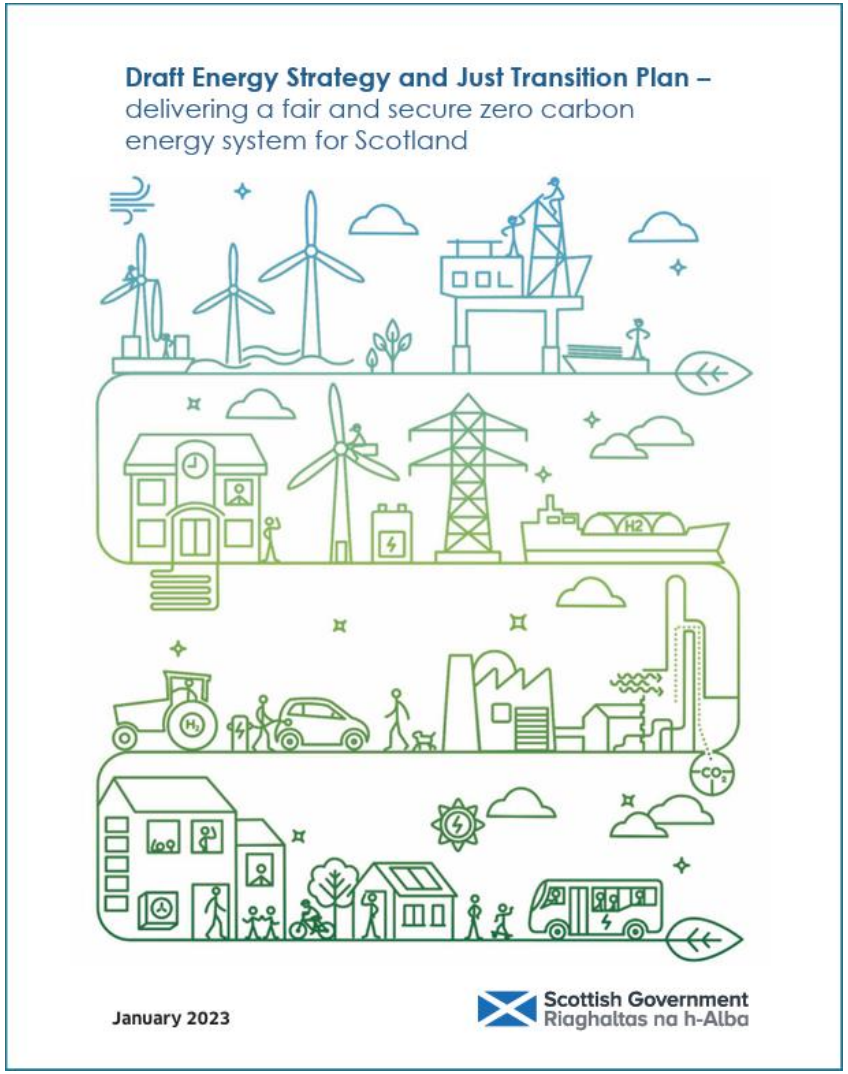
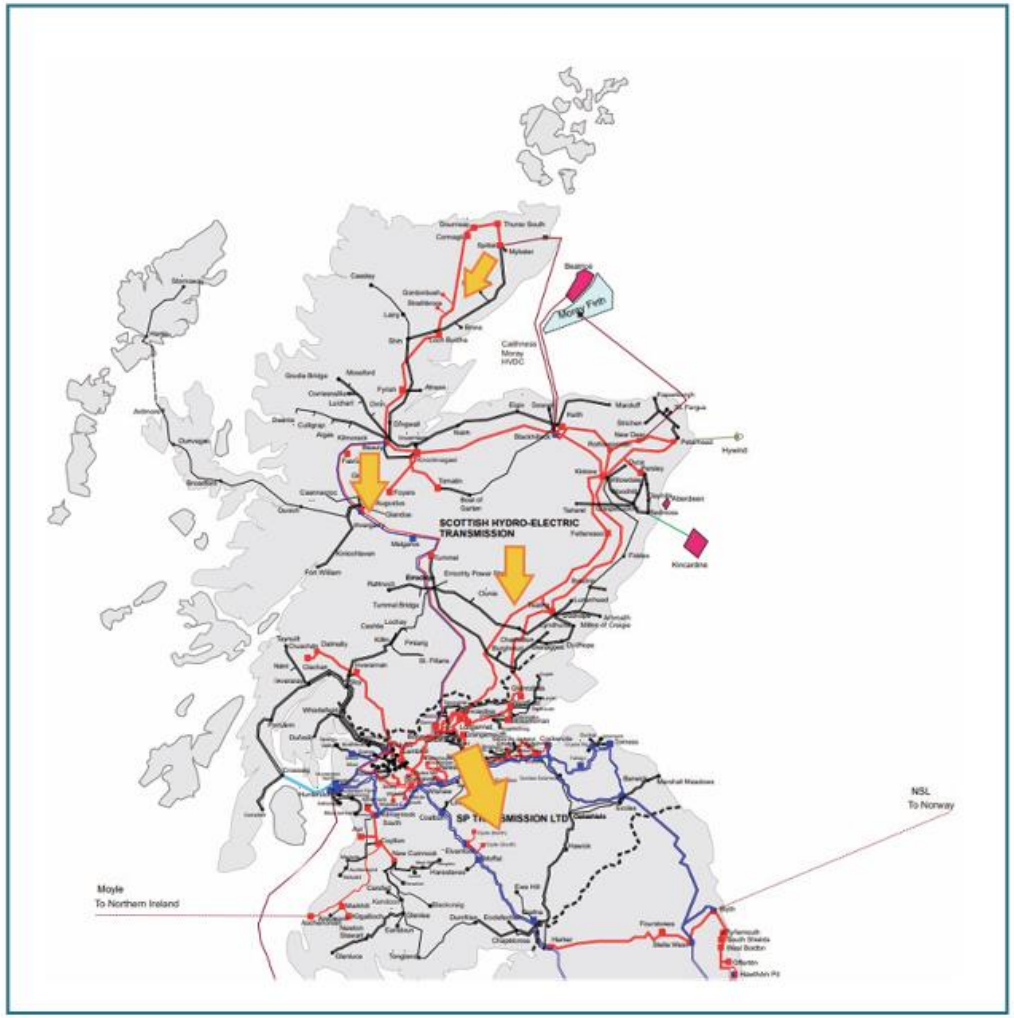
Benefits of Battery Storage

- Battery storage is a key component of our future energy mix
- There are multiple ways that battery storage can help to balance the national grid. This includes maintaining grid frequency and being a fast-acting reserve to provide energy during periods of low supply.
- Batteries also allow us to minimise payments for switching off wind turbines, which last year was significant across the UK.
- Battery storage will help to meet local and national Net Zero targets.
- Without them, renewable energy sources cannot be used to their full potential and there is an ongoing negative impact on the grid.



Local and National Context

- Scotland has a national goal to reduce carbon emissions by 75% by 2030 and be carbon neutral by 2040.
- To achieve this goal there are various pathways focused on different sectors including power, heat and industry and one solution is the adoption of new technologies such as energy storage.
- By adopting battery energy storage and other cutting technologies we can help future-proof long-term energy supply and help reduce residential and industrial energy costs, also ensuring that we can become more energy efficient in energy production and storage.
- Scotland has a lot of wind turbines and a further commitment to another 27GW of offshore wind. Scotland is much further ahead in its “Green” program with a substantial amount of renewable power already deployed.
- Pockets of storage across Scotland and the rest of the UK ensure that this generation can be maximised, and every drop of renewable energy consumed at some point.
- It also plays a key part in helping ensure the long-term security of energy supply



The Site

- The site is close to the point of connection provided by the distribution network operator.
- The nature, size and scale of the development means the effects on the environment are minimal.
- The site will be suitably screened to protect and enhance the local visual amenity providing much-needed tree planting to help address our local climate challenges.
- The topography of the site means there will be minimum engineering and will provide visual enhancements to a disused operational site

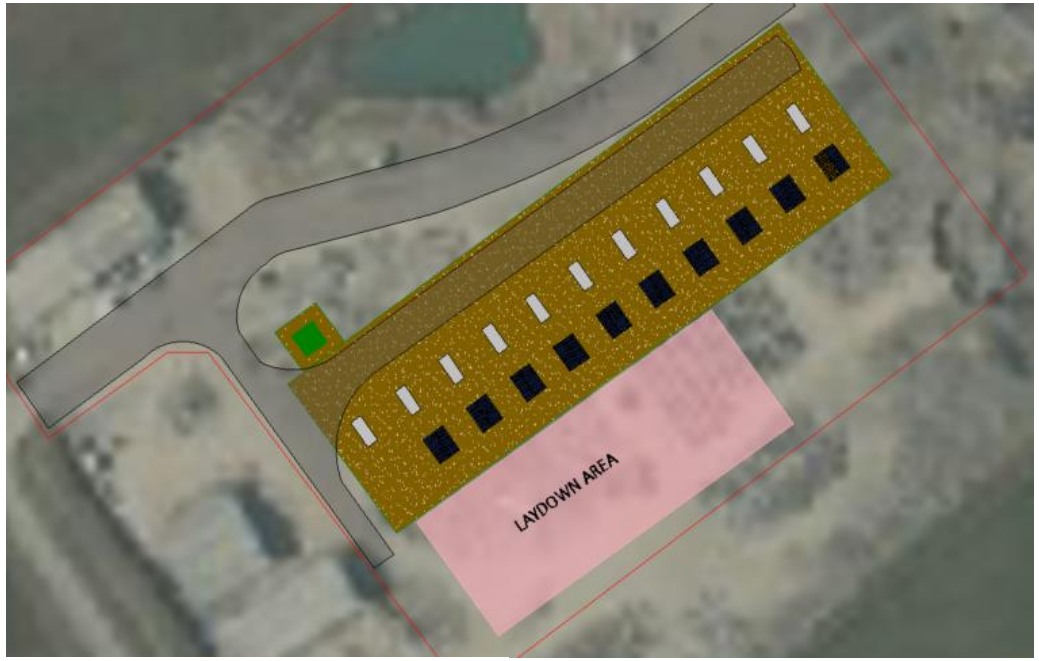
Our Site Proposal

- The whole battery facility will have an area of 1.20 acres.
- This shall house 33 kV substation,20 battery units and 11 Units of PCS and Transformers with a total capacity of 49.9 MW.

Dimensions	PCS Units	Batteries
W x D X H (mm)	6058 x 2896 x 2438	6058 x 2438 x 2896
Weight (tonnes)	< 18	< 49

- The facility will also include a 3 m high palisade fence for security and visual screening around the compound
- Access will utilise the existing entrance into the field and will have self-regulating access to the BESS compounds.

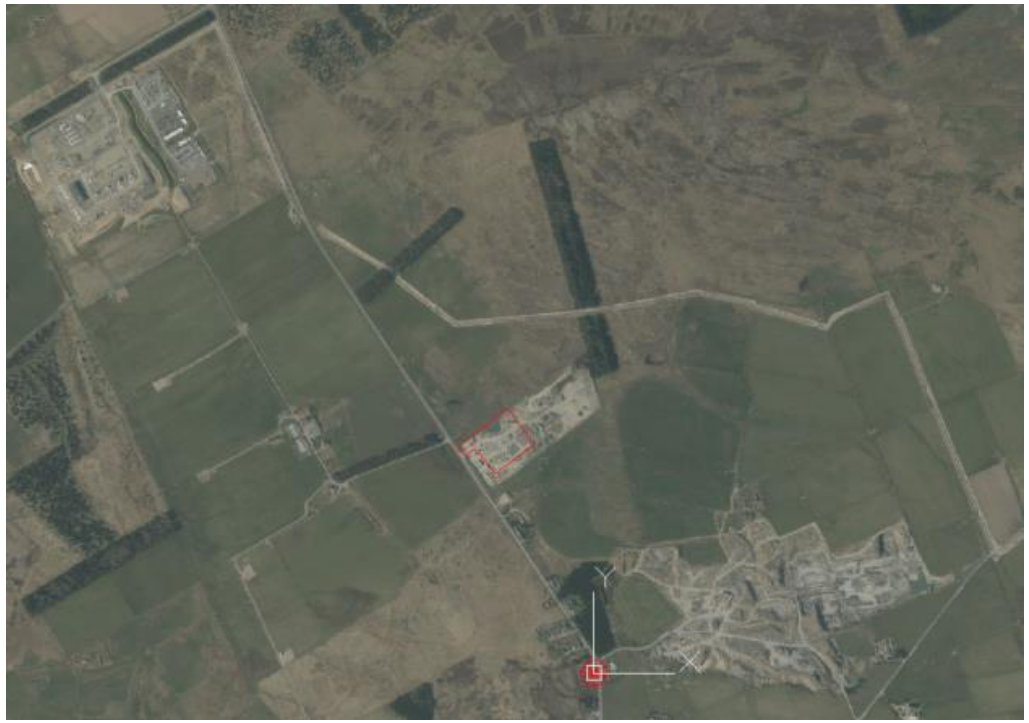
Up to a maximum of 9 -12 months of a site assembly period with a temporary laydown area later used for parking places.



Red Line Boundary
MV Skid
Battery
Gravel/ Crushed stones
PCS
Access Road
On site substation
Laydown Area

Why this site ?

- The topography of this site supports our principle approach of minimum site visibility and detriment to the local landscape and surrounding areas.
- Close to the road for easy access during site assembly and operations.
- A large laydown area is available for site assembly with no impact on third parties.
- Flat ground for the BESS area for ease of site assembly.
- Little noise impact ensuring we fully meet council noise policy.
- The project was easily screened both naturally by land layout and geography.
- Flood-free zone.
- Preferred cable route via public highways
- A committed landowner who is fully supportive of the battery storage project.



Building in Safety from Design to Operations

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As a minimum we will make sure we include

- ✓ At least 2 separate access points to the site (account for opposite wind conditions/direction).
- ✓ At least 6 metres between BESS units and access between units
- ✓ Minimum distance of 25 metres from occupied buildings.
- ✓ Areas within 10 metres of BESS units will be clear of combustible vegetation. Any other vegetation on site will be kept in condition to not increase the risk of fire on site.
- ✓ Hydrant supplies for boundary cooling purposes will be located close to BESS containers and be capable of delivering no less than 1,900 litres per minute for 2 hours.
- ✓ Any static water storage tanks designed to be used for firefighting will be located at least 10 metres away from BESS containers, location should be determined as part of a risk assessment approach.

Overview of Storage

- Most important aspect of any battery storage is that it simply stores excess energy and allows the overall energy system to be more efficient
- Batteries are not energy generators, they only react to the needs of the grid storing energy not producing energy.
- The battery at Spittal if operated to its maximum would be a 2-hour duration for exporting and importing from the grid
- Most of the time, the battery is in 'sleep mode'.
- Lithium-ion technology comes in many forms and it is important to understand what technology we are proposing for the Spittal installation.
- The highest energy density battery in the market originally was a technology called NMC. This was composed mainly of Lithium, Nickel, Manganese and Cobalt oxide. The last one was the challenging part and is prone to overheating.

We are not using NMC. Our technology is LFP, Lithium-ion Phosphate, without Cobalt.

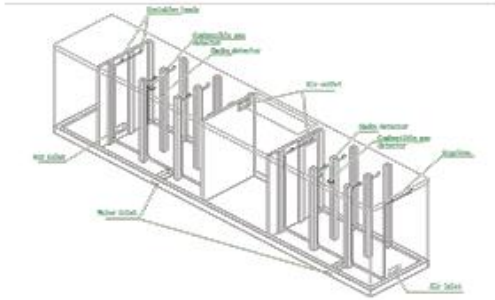
- This is regarded as the safest solution adopted by all reputable suppliers.
- This has the highest proven chemical stability in the market.
- Designed with a built in safety fuse ensuring full electric protection.
- In all cases, it is also worth noting that the total lithium content represents between 10-12% of the battery unit.
- Each cell is individually fused and monitored.
- Each cell is housed in a rack also fused and monitored.
- Each rack is housed in a single cabinet, also fused and monitored.
- Each cabinet is housed in a container, fused, monitored, air conditioned and with a full fire suppression system.

Each container is supported with a secondary layer ensuring each unit is completely sealed with no fluid or gas leakage into the environment.

All supported by edge computing monitored 24hr/7.

Ensuring the safety of our development

- There are multiple protection and safety devices within the battery energy storage system (BESS). These include fire detection in each container and several electric protections.
- The battery cells are certified under UL 9540A, UN38.3 and IEC62619.
  - UL 9540A: the standard test method for evaluating thermal runaway fire propagation in BESS.
  - UN 38.3: Certification for lithium batteries. The prevailing United Nations standard that lithium cells and batteries must meet to receive certification for safe transport.
  - IEC 62619:2022: Safety requirements for secondary lithium cells and batteries, for use in industrial applications.



Other safety features include:

- Fire suppression system in each single container.
- There are three systems to monitor the battery 24/7 (cell, rack, container). These ensure the site is safe and the required conditions operating conditions are being met at all times.
- The battery cells are in containers with space at the side for air circulation.
- Each energy storage container has a heating, ventilation and air conditioning (HVAC) system which keeps the battery within the appropriate regulatory temperature range for safe operation.
- All developed to meet the latest safety regulations, best practice industry guidance and local land use planning and building control policy.
- A site specific operational management plan including health and safety and risk register will be in place.

Site assembly

- The total construction period for a site of this size is 6 months, including preparation of the site, assembly, deliveries and installation.
- The first 6 weeks of the assembly phase would see the site preparation
- The main stage of the assembly phase would last for 4 months
- Materials will be delivered via the proposed site access through Spittal
- During the first 6 weeks of pre-assembly approximately 100 two-way movements would occur, which equates to some 3 two-way movements per day. Not all vehicle movements would be by heavy vehicles, with some deliveries undertaken by smaller delivery vehicles and vans.
- Following pre-assembly, the main assembly phase is anticipated to last up to 1 month. Other vehicles movements would be typically be in the region of 2 two-way movements per day during this phase, the bulk of which would be related to the delivery of the battery modules. The level of traffic during the main construction phase is not material and would not affect traffic or safety conditions in the local area.
- Following commissioning, 1 visit per month would be made to the site by small van. Lighting will only be triggered by site visit, no light pollution.
- A detailed Construction and Traffic Management Plan will be provided with the planning application.

Recycling using a circular economy approach

- At the end of the battery life we will seek to reuse this in another safe environment.
- Lithium Ion Phosphate is the most recyclable of all Lithium technologies in the market place
- Where possible re engineer the batteries extending their on site life
- Any disposal is of a last resort, we aim to recycle and prolong the life of the battery technologies
- At the end of the natural life of the site we will restore to its natural environment recycling and re using all the infrastructure where possible

Using local Specialist we will develop a habit management plan forthe site ensuring...

- Local habitat enhancements
- Proactive management of habitats
- Ensuring known protected species at all times
- Where possible having net biodiversity gain (extra planting)

By having

- Local site habitat management plan
- Working methods statement and local supply chain
- Monitoring and evaluation plan

Reflecting on our approach to noise conditions

- Our solution will comply with the Council noise policy
- We are using state of the art technologies
- No traffic noise
- A typical overhead cable noise emission is more than our system
- Given this is storage major output noise is only when the battery is operational and therefore not 24/7

Working with the local energy company

- By using underground cable infrastructure we will connect at the local substation as directed by the local energy company
- We are guided by energy companies on local network capacity and connections
- We are working with specialists to determine the most appropriate route to connection ensuring minimum short-term disruption
- We do so in full recognition of the local energy supply and connection standards
- The connection is the responsibility of the local energy company
- All connection works by the local energy company must be approved by Highland Council

Thank you

Any questions?

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