The site today (Hyde BESS)

Reclaiming brownfield sites through the deployment of battery energy storage systems

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Brownfield sites, once home to industry, transport hubs or commercial developments, offer a powerful yet underutilised solution for the UK's energy transition. By deploying battery energy storage systems on these sites, we can enhance grid stability, accelerate renewable energy adoption and breathe new life into neglected land.

In the race to decarbonise our energy system, we're often so focused on the technology that we overlook something equally crucial: where to put it. As the demand for clean energy storage solutions intensifies, the question of land use becomes increasingly pressing.

In 2022, charity CPRE identified 23,002 brownfield sites covering 27,342 hectares of land in England. This vast resource sits largely untapped at a time when battery energy storage systems (BESS) are rapidly becoming the backbone of our renewable energy transition.

BESS stores excess energy generated by renewable energy sources like wind and solar, and then releases it back into the grid when demand is high or supply is low. This capability helps stabilise the energy grid, improve energy reliability and support the integration of intermittent renewable energy sources, all while reducing reliance on fossil fuels.

The International Energy Agency projects that global energy storage capacity must increase sixfold to 1,500 GW by 2030, with batteries accounting for 90% of this growth.

These brownfield sites represent not just available land but a strategic opportunity to deploy battery storage in a way that maximises environmental and community benefits while minimising new land development; it's regeneration in the truest sense. But to realise this potential, we must first understand what brownfields truly are, beyond their common misconceptions.

The untapped potential beneath our feet

There's a common misconception that brownfields are exclusively toxic and contaminated, former chemical plants or sprawling landfills that pose insurmountable challenges to redevelopment. The reality is far more nuanced and, frankly, more promising.

In England, brownfield is officially defined as 'any land that has been previously developed, including derelict and vacant land, which may or may not be contaminated.' This encompasses a diverse range of sites, from abandoned car parks to former warehouses, outdated office complexes to decommissioned power stations, many of which are ideal candidates for battery storage facilities due to their existing infrastructure connections.

At Pulse Clean Energy, our 42 MW/100 MWh Hyde BESS project, based in west Manchester, sits on a brownfield site. The history of the site dates back to before the M67 motorway was built, pre 1950s, which now runs adjacent to the land. We believe it was once used as a housing estate for local workers in the nearby factories and by the 1990s, had transformed into a scrap yard and storage facility.

By reclaiming and bringing new purpose to this corner of Manchester, we are not only addressing a crucial need for renewable energy infrastructure but also breathing new life into a neglected piece of land that was ultimately lying idle.

The project will now provide enough energy to power approximately 227,000 homes for two hours during peak demand, reducing the need for fossil fuel plants and supporting the integration of more renewable energy into the grid.

The reality versus perception

The diversity of brownfield sites means that not all are plagued with high risk contaminants or present barriers to redevelopment. Many brownfields actually present relatively low environmental risk, making them ideal candidates for repurposing.

What's more, these sites often come with existing infrastructure advantages, proximity to electrical grids, road access and sometimes even beneficial existing structures. For battery energy storage systems, which require connection to the grid, brownfields represent an opportunity too valuable to ignore.

Whilst brownfield development is not without its challenges, navigating regulatory hurdles and specific requirements at local, regional and national levels, the return on investment far outweighs these.

In fact, a report by the Environmental Protection Agency found that brownfield redevelopment projects can increase nearby property values by 5% to 15% and create jobs through both remediation and redevelopment activities. These economic benefits extend beyond the project boundaries and contribute to broader community revitalisation.

By repurposing underutilised or contaminated sites, we can deliver multiple benefits simultaneously.

Environmental remediation

Through the redevelopment process, contaminated sites can be cleaned up to restore ecological balance. This remediation typically involves a thorough site assessment, the removal of hazardous materials and implementation of strategies to prevent future contamination. The process not only addresses historical pollution but also prevents further environmental degradation that might occur if these sites remain untreated.

Many brownfield sites have remained contaminated for decades, posing ongoing risks to groundwater, soil quality and surrounding ecosystems. By incorporating remediation into BESS projects, developers can transform environmental liabilities into assets.

Efficient land use

Rather than encroaching on undisturbed areas, brownfield development maximises the use of existing resources and minimises the strain on natural habitats. This approach represents a fundamental shift in how we think about development in the context of sustainability.

The pressure on land resources is intensifying globally. In the UK in particular, with its high population density and limited land availability, every hectare matters.

A typical 50 MW / 100 MWh BESS facility might require just 1/2 hectare, a scale that matches well with many available brownfield sites. This compatibility allows for strategic placement throughout the grid network.

Infrastructure accessibility

Proximity to existing infrastructure reduces the need for extensive new investments, creating both economic and environmental advantages. Utilising existing grid connections provides not just financial savings but also reduced environmental impact. Every metre of new infrastructure requires materials and construction work. By leveraging existing connections, BESS projects on brownfield sites minimise these impacts while still delivering essential grid stability.

As we look ahead, the importance of brownfield sites in energy storage development will only grow as the pressure to use land wisely becomes more acute.

Beyond electrical connections, brownfields often offer established road access, water supply and sometimes even usable buildings or foundations. These features can significantly reduce construction timelines and costs. The reduced need for new infrastructure development also means fewer disruptions to local communities during the construction phase.

Economic revitalisation

Transforming idle areas into productive energy assets contributes to local economic revival in multiple ways. The initial remediation and construction phases create immediate employment opportunities. These projects inject activity into areas that may have experienced economic decline following the closure of previous industrial operations.

Once operational, battery storage facilities continue to provide employment for maintenance, security and technical operations.

For communities that have experienced the economic and psychological impact of industrial decline, seeing new clean energy infrastructure rise from abandoned sites offers tangible evidence of economic transition and renewal, helping to rebuild community confidence.

The site pre 1950s

Community benefits

Remediating any existing contamination while providing communities with access to low cost, reliable electricity can transform the narrative around clean energy projects. Unlike some renewable energy developments that can face local opposition, brownfield BESS projects typically enjoy stronger community support due to their remediation component and often limited visual impact.

The initial site visit

Over the long term battery storage facilities could also provide tangible energy benefits to nearby communities. Through innovative models like community energy schemes or partnerships with local suppliers, these projects can contribute to energy resilience and lower costs for local residents and businesses. This is particularly valuable in areas that may have suffered from unreliable power or high energy prices.

The future of energy storage development

As we look ahead, the importance of brownfield sites in energy storage development will only grow as the pressure to use land wisely becomes more acute.

At Pulse Clean Energy, we recognise that this isn't just an environmental stance; it's a practical effort to reclaim the environment of our industrial past, addressing real land constraints while delivering genuine benefits at the same time.

The energy transition cannot afford to be careless with land use. By strategically deploying energy storage on brownfield sites, we can accelerate the clean energy revolution while reinvigorating local economies and creating a resilient energy system that serves generations to come.

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