

**JH Solar**

# Harbour cement energy storage



## Overview

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Why should you invest in Harbour Energy?

Harbour Energy has a leading CO<sub>2</sub> storage position in Europe and the UK with net storage resources of over 650 million tonnes of CO<sub>2</sub>. It offers the potential for long-term and stable cash flows which are complementary to Harbour's business and provide a diversity of revenue that is not linked to oil and gas prices.

Does harbour have an interest in greenstore CCS in Denmark?

Harbour also has an interest in the cost-advantaged, onshore Greenstore CCS project in Denmark, which is being progressed through the appraisal work programme. Harbour has a 40% operator interest, with Ineos as our non-operated partner alongside the Danish state.

Could carbon black cement store 10 kilowatt-hours of energy?

If carbon black cement was used to make a 45-cubic-meter volume of concrete—roughly the amount used in the foundation of a standard home—it could store 10 kilowatt-hours of energy, enough to power an average household for a day, the team reports today in the Proceedings of the National Academy of Sciences.

Can concrete-like supercapacitors be used for bulk energy storage?

These properties point to the opportunity for employing these structural concrete-like supercapacitors for bulk energy storage in both residential and industrial applications ranging from energy autarkic shelters and self-charging roads for electric vehicles, to intermittent energy storage for wind turbines.

Are carbon-doped cement composites suitable for bulk energy storage?

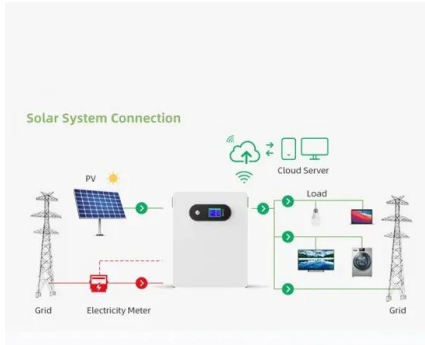
Herein, we argue that carbon-doped cement composites naturally combine these three attributes by leveraging the synergy between the hydration of hydrophilic cement in the presence of hydrophobic carbon black. This synergy

makes our materials good candidates for bulk energy storage for residential and industrial applications.

Could this dark lump of concrete represent the future of energy storage?

This innocuous, dark lump of concrete could represent the future of energy storage. The promise of most renewable energy sources is that of endless clean power, bestowed on us by the Sun, wind and sea. Yet the Sun isn't always shining, the wind isn't always blowing, and still waters do not, in megawatt terms, run deep.

## Harbour cement energy storage



### Conductive Concrete - MIT Concrete Sustainability Hub

The CSHub has long investigated multifunctional concrete, and has uncovered a way to store energy in a mixture of carbon black, cement, and water. The technology has potential ...

### Advanced energy storage systems in construction materials: A

This paper reviews the recent advancements in cement-based energy storage systems, focusing on cement-based batteries and supercapacitors, to provide a ...



### What are the cement energy storage technologies?

Cement energy storage technologies encompass innovative methods that leverage cement-based materials and systems for energy storage, thus addressing the growing demand for renewable energy ...

### Treasury issues guidance implementing Executive Order 14315

5 ???· Analysis of new guidance from the US Department of the Treasury regarding the

beginning of construction for wind and solar energy projects.



## Cement Energy Storage - Two Ways

Cement is the world's most widely utilized construction material. New research reveals cement energy storage is viable and will play a big role in construction.



## **An innovative structural energy storage solution using fly ash-cement**

**Abstract** The rapid advancement of renewable energy highlights the urgent need for safe, cost-effective, and scalable energy storage solutions, particularly for net-zero energy ...



## **Who we are**

What makes us different Harbour Energy has built a unique position as one of the world's largest and most geographically diverse independent oil and gas companies, with operations spread ...

## Constructing solutions using cement-based materials for energy

This involves showcasing successful case studies like rechargeable concrete batteries, cement-based thermal energy storage systems for concentrated solar plants, energy ...

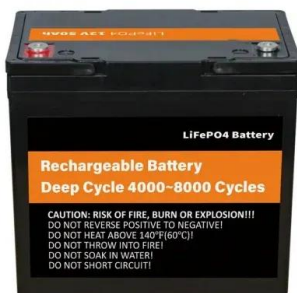
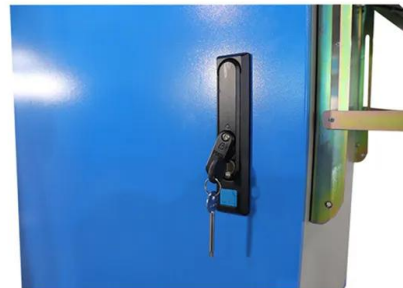


## Harbour Energy awarded four carbon storage licences

Harbour Energy is pleased to announce it has been awarded four carbon storage licenses by the North Sea Transition Authority as part of the UK's recent CO2 storage ...

## Development of rechargeable cement-based batteries with ...

This paper presents the development of novel rechargeable cement-based batteries with carbon fiber mesh for energy storage applications. With the increasing demand ...



## Carbon-cement supercapacitors as a scalable bulk ...

With our overall focus on scaling the energy storage capacity, we were interested in experimentally assessing the maximum energy storage capacity of our electrodes, by combining CV test results with GCD test results.

## What are the cement energy storage technologies?

By stabilizing energy availability and optimizing the use of renewable resources, cement energy storage technologies can play a critical role in the transition to a low-carbon energy future.



## Electrified cement could turn houses and roads ...

If scaled up, the cement could hold enough energy in a home's concrete foundation to fulfill its daily power needs. Scaled up further, electrified roadways could power electric cars as they drive.

## Towards a Net Zero Cement: Strategic Policies and Systems

By replacing fossil fuel-based thermal energy with electricity from renewable sources the cement industry can significantly reduce its carbon footprint while energy efficiency ...



## INEOS-Led Greesand to become the first full scale ...

INEOS, the day to day operator, with its partners Harbour Energy and Nordsøfonden, has made a Final Investment Decision (FID) into the first commercial phase 'Greesand Future' with storage operations set ...



## Integration of zinc anode and cement: unlocking scalable energy ...

Herein, we propose an innovative approach for developing structural and scalable energy-storage systems by integrating safe and cost-effective zinc-ion hybrid supercapacitors ...



## Advanced industrial-grade carbon-fiber-reinforced geopolymers cement

The integration of energy storage capabilities into building materials represents a revolutionary advancement in sustainable energy solutions. This study introduces and explores a carbon ...

## The science behind concrete cladding and energy efficiency in ...

Discover how modern concrete cladding enhances energy efficiency in green buildings with thermal mass, insulation, and sustainable innovations for architecture.



## What are the cement energy storage technologies? , NenPower

Cement energy storage technologies encompass innovative methods that leverage cement-based materials and systems for energy storage, thus addressing the ...



## Viking CCS Project , Harbour Energy

Viking CCS Carbon capture and storage (CCS) is an essential technology for the UK Government to achieve its net zero goals. The UK Climate Change Committee has noted that there is no route to net zero in 2050 without ...



## **Advanced industrial-grade carbon-fiber-reinforced geopolymer cement**

The integration of energy storage capabilities into building materials represents a revolutionary advancement in sustainable energy solutions. This study introduces and explores ...

## **Carbon-cement supercapacitors as a scalable bulk ...**

The extent and pace of the transition from our current fossil fuel-based economy to one based on renewable energy will strongly depend on the availability of bulk energy storage solutions. Herein, we investigate one ...



## **Advancing energy solutions: Carbon-based cementitious ...**

The thermoelectric and piezoelectric properties of carbon-based cementitious composites hold significant potential for fulfilling energy storage and harvesting functions in ...

## Incorporating carbon capture and storage in decarbonizing ...

There are four main types of emissions mitigation options for cement sector: (1) improving energy efficiency (including thermal efficiency and electrical efficiency), (2) switching ...



## MIT engineers create an energy-storing ...

MIT engineers created a carbon-cement supercapacitor that can store large amounts of energy. Made of just cement, water, and carbon black, the device could form the basis for inexpensive systems that ...

## Enhancing energy storage capability for renewable energy ...

Recently, cement-based supercapacitors have attracted significant attention due to their low energy consumption and multifunctionality, offering a promising solution for large ...



## Energy-Storing Cement: Revolutionary Material to Transform ...

Consider for a brief moment: a standard residential foundation poured using this enhanced formula could store approximately 10 kilowatt-hours of energy in around 45 cubic ...

## Harbour Energy plc (LSE:HBR)

Today, Harbour Energy is active in 11 countries. This includes significant production in well-established oil and gas producing regions in Europe, Southeast Asia, Latin America and North ...



**LFP12V100**



## **Zhangjiagang Conch Cement Energy Storage ...**

Zhangjiagang Conch Cement Energy Storage ProjectContemporary Amperex Technology Co., Limited (CATL) is a global leader in new energy innovative technologies, committed to providing premier solutions and services for ...

## **Thermo-mechanical stability of supplementary cementitious ...**

Alongside the effect of SCMs in Portland cement binders and calcium aluminate cement within thermal energy storage systems devoted to the use of cementitious materials, ...



## **Exploring the potential of construction-compatible materials in**

This review paper delves into the pioneering concept of structural supercapacitors (SSCs), which seamlessly embed energy storage capabilities directly into construction ...



## Experimental characterization of a lab-scale cement based ...

The methodology can be scaled and applied to multi-unit storage systems. In this study, a new modular cement based solid-liquid heat storage concept is presented. ...



## Cement-based batteries for renewable and sustainable energy storage

The cement-based battery introduced in this paper has potential to fundamentally change this paradigm by enabling the storage of electrical energy wit...

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