



# UK Hydrogen

09.11.2023



# Agenda

- 1. Trial(s) within cement**
- 2. Asphalt Feasibility Study**
- 3. Asphalt Demonstration**
- 4. Hydrogen Future**



# Hydrogen within Cement Manufacturing



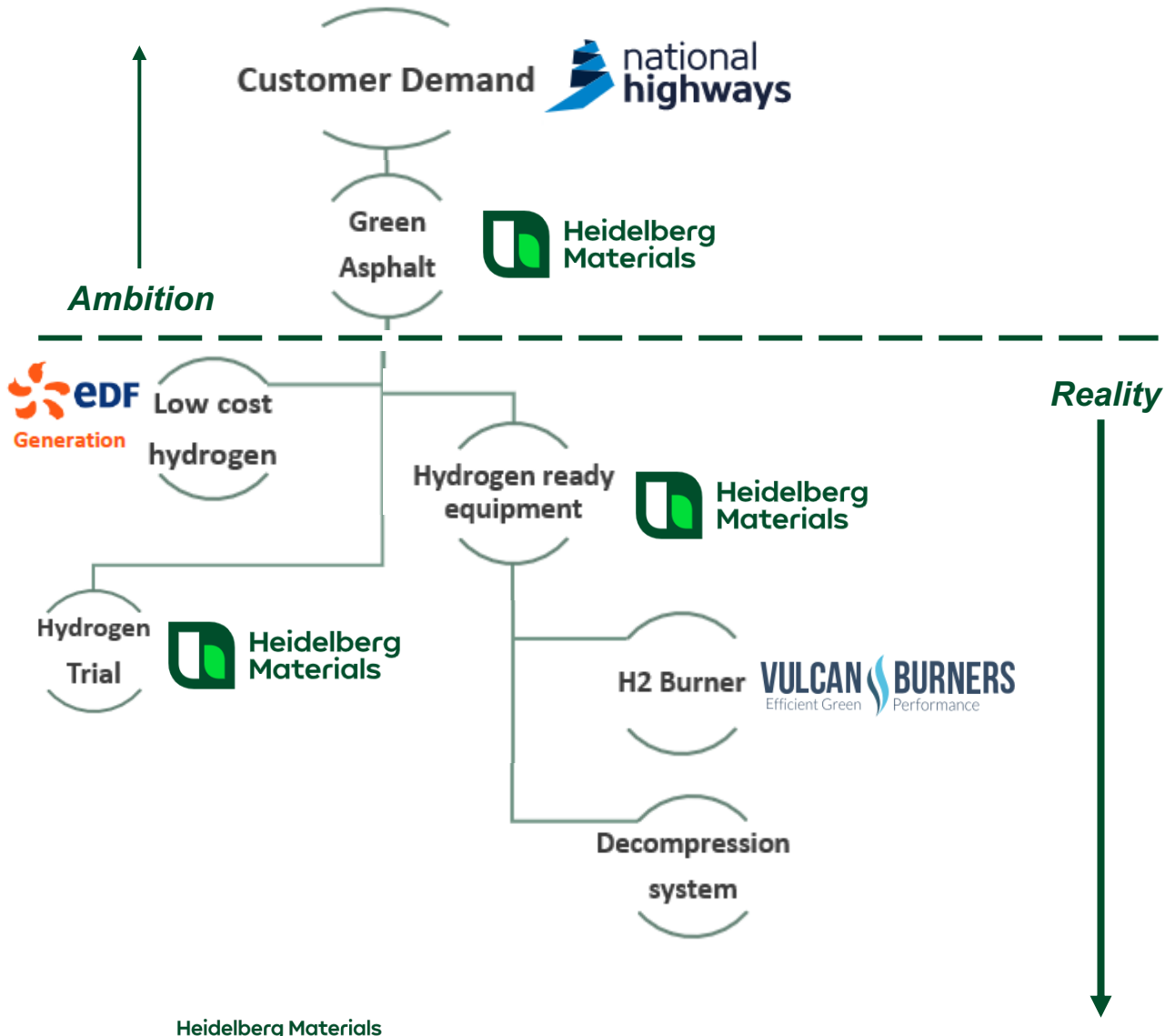
Hydrogen is a low/zero carbon fuel offering potential for big reductions in carbon emissions.

Hydrogen projects carried out include:

- **2019-2021: World's first** for Ribblesdale cement kiln that was run on a net zero fuel mix, including 30% hydrogen, for a trial period
- **2022:** Small scale hydrogen trial at Ribblesdale and Ketton with UTIS – ***fuel enhancement***
- **2019-2023:** Green hydrogen production at Port Talbot GGBS with Swansea University
- **These projects were the catalyst to further & future**



# Hydrogen Project Vision - Asphalt



## Opportunities

Relevant to a multitude of commercial frameworks

UK or World first -> Keep UK industry at the forefront of sustainable innovation

Commercial links to hydrogen supply -> Future supply unlocked from demonstration(s)

Eligibility for a Hydrogen Business Model

Hydrogen ready for supply boom 2030+

Own 'standard' hydrogen equipment -> transferable to other asphalt sites and even other business lines



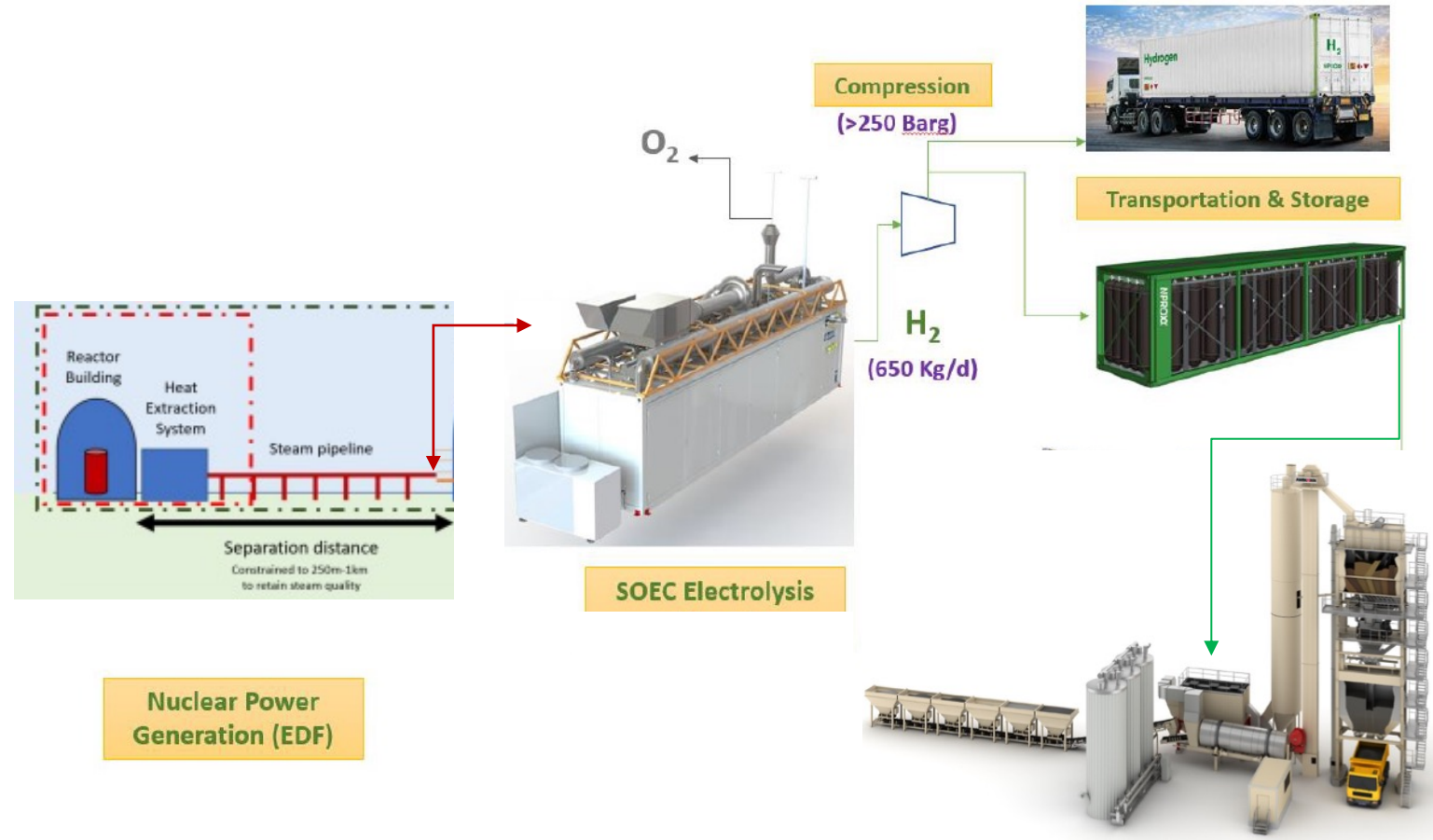
# Bay Hydrogen Hub – Feasibility - Stream 2A

## Project Overview

- Hydrogen generation at EDF's Heysham site – SOEC electrolyser
- Compression of hydrogen up to 380 bar
- On site storage of hydrogen will be via 2-3 tankers (road transport)
- Requirements for 1 trailer per day (700kg)
- Injection of hydrogen at 330kg/h into the Asphalt process via a re-designed burner
- Additional planning requirements needed: Hazardous substance consent & COMAH

## Key Findings

- Pink hydrogen could reach a price point which makes a commercial case to decarbonise
- ***Another world's first within the UK's mineral products sector***



# Bay Hydrogen Hub- Demonstration - Stream 2B

## Project Outline

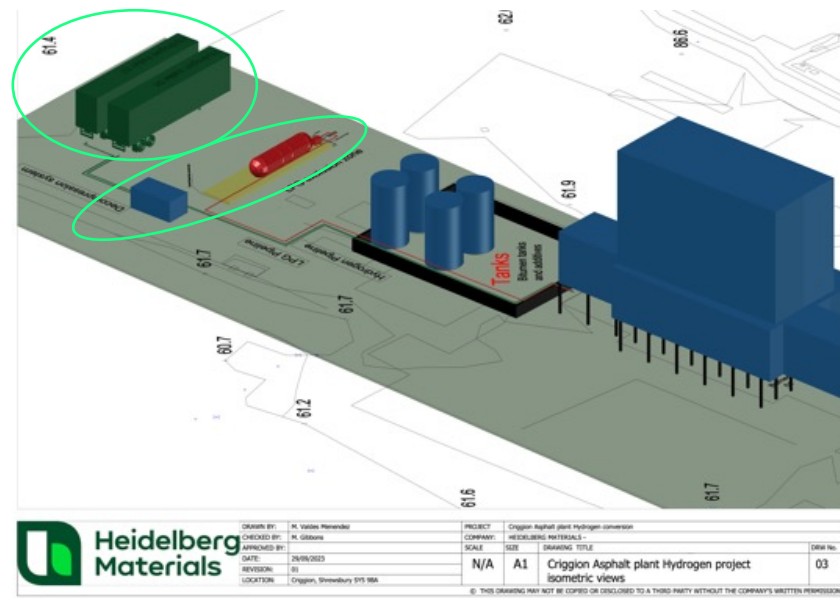
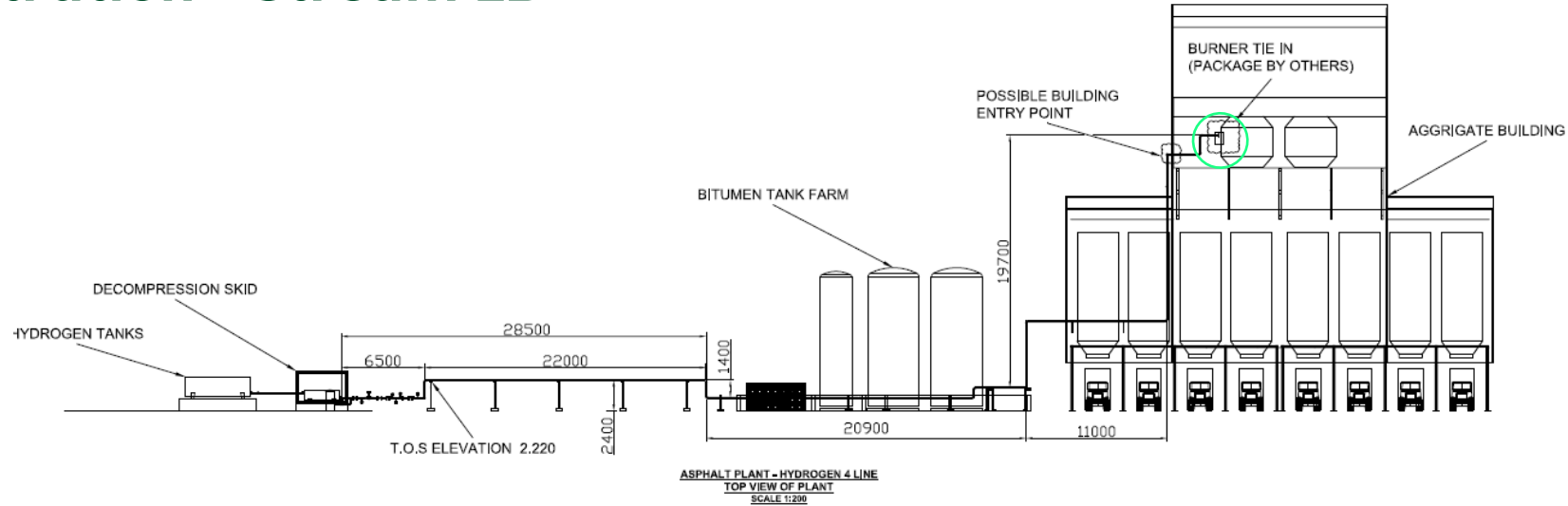
- Heidelberg Material's cost: £2.1m, of which is 50% funded by the business
- Plan to carry out a 4-8 week demonstration in 2025

## Scope of work

- Hydrogen reception area construction
- Bespoke hydrogen decompression equipment
- Multi fuel asphalt burner
- Revised control & safety system
- Safety & permitting (HAZID, HAZOP & Hazardous substance consent)

## Wider scope

- Future commercialisation of lower CO2 pavement products
- Future hydrogen supply in the UK



# Media outreach

## Industrial Hydrogen Accelerator Programme: Stream 2B successful projects

### Bay Hydrogen Hub – Hydrogen4Hanson

- **Project owner:** EDF Energy Nuclear Generation Ltd
- **Partners:** Hanson UK, National Nuclear Laboratory Limited, EDF ENERGY R&D UK CENTRE LIMITED, Asphalt Burner Services Ltd
- **Location:** Lancashire
- **Amount being awarded:** £6,119,361.49

## Quarry



LATEST NEWS ▾ PRODUCTS OPERATIONS ▾ IN DEPTH ▾ MARKETPLACE DIRECTOR

Industry News, International News

## Hanson reveals details of hydrogen asphalt plant

ADAM DAUNT  
20/09/2023, 11:41 am



Energy & Environment | New Nuclear | Regulation & Safety | Nuclear Policies | **Corporate** | Uranium & Fuel

### More funding to progress UK nuclear-generated hydrogen project

14 September 2023



An EDF-led consortium has been awarded UK government funding to further develop plans to use heat and electricity from Heysham 2 to create hydrogen for use in the production of asphalt and cement. Earlier this year, a feasibility study demonstrated the significant benefit the project would bring in proving how nuclear could power hydrogen electrolysis.

Hanson UK  
22,696 followers  
2w · Edited ·

Plans for hydrogen-fuelled net zero asphalt production at scale at our Criggion asphalt plant in mid-Wales have taken a major step forward following announcement of a £6.1m funding commitment by the Department for Energy Security and Net Zero to support the Bay Hydrogen Hub.

The ground-breaking project aims to demonstrate zero-emission asphalt production using nuclear power derived hydrogen for the first time anywhere in the world.

We are part of a consortium made up of EDF, National Nuclear Laboratory (NNL), and Vulcan Burners, which will match the Government's funding and aims to have the trail up and running by early 2024.

Exciting times [Simon Willis](#) [Marian Garfield](#) [Elliot Wellbelove](#)

Find out more at [#climate #collaboration](http://spkl.io/60494IU5I)



### Cement and asphalt

Bay Hydrogen Hub - Hydrogen4Hanson

Hanson UK – part of the global Heidelberg Materials group – is a leading supplier of heavy building materials to the construction industry. It is split into five business lines – aggregates (crushed rock, sand and gravel), concrete, asphalt & contracting, cement and recycling – which together operate around 280 UK manufacturing sites and employ more than 3,500 people.

With these industries requiring high levels of energy, Hanson is working on low-carbon building materials and solutions for the future. Hydrogen is seen as a near-term solution for reducing carbon emissions while maintaining productivity – but scale, cost and integration with the wider production plants are all key considerations.

In partnership with EDF and NNL, as part of the UK government's Industrial Hydrogen Accelerator (IHA) programme, Hanson has been looking at the feasibility of using hydrogen produced via electrolysis from nuclear heat and electricity as a fuel source for cement and asphalt production at its dispersed production facilities.

This work has now shown that not only is the process feasible, it could also eliminate significant emissions in Hanson's manufacturing processes.

Patrick Dupeyrat · 2nd  
R&D and Innovation Director at EDF (UK)  
2w ·

Very Exciting News!

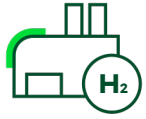
Today, the UK government officially announced that **EDF (UK)** will receive £6.1M of funding for the groundbreaking Bay Hydrogen Hub project, as part of the "Industrial Hydrogen Accelerator Programme".

In partnership with EDF (Nuclear Operations and R&D), **Hanson Cement**, Vulcan Burners, and the **National Nuclear Laboratory**, this project will demonstrate the use of solid oxide electrolysis (**#SOEC**) at an operational nuclear station, specifically **#Heysham**, on the northwest coast of England near Lancaster. What's truly remarkable is that, using nuclear heat and electricity, SOEC could be more efficient than established electrolysis technologies!



# Hydrogen Future

## Single Use applications



Cement as a fuel enhancer



Asphalt as a fuel replacement



Aggregates for HME



HGV fleet conversion

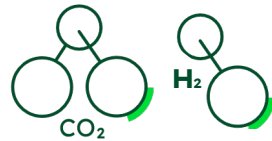
## Wider opportunities



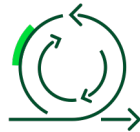
Onsite generation & renewables



Develop hydrogen hubs for fleet



Explore options for CCU & e-fuels



Connection to the UK NG network

## Hydrogen Vision

Integrated sites

- Renewables & water harvesting
- On-site electrolyser
- Asphalt production
- Aggregate mobile plant
- HGV re-fuelling





# Future Demand.....

## Annual Demand by division

### Cement (as a 10% fuel enhancer)

- Up to 2,540t -> 100 GW (HHV)
- 50,000 tCO<sub>2</sub>

### REGEN Cement (as a fuel replacement)

- Up to 4,800t -> 190 GW (HHV)
- 22,850 tCO<sub>2</sub>

### Asphalt

- Up to 7,200t -> 280 GW (HHV)
- 64,000 tCO<sub>2</sub>

### Aggregate Mobile plant

- Up to 7,450t -> 295 GW (HHV)
- 62,000 tCO<sub>2</sub>

## HM UK total

22,000t of H<sub>2</sub>  
~ 865 GW

200,000t CO<sub>2</sub>

## Heidelberg Material UK Hydrogen Map





Heidelberg  
Materials