

# Ground-breaking technologies: carbon capture, utilisation and storage



Some CO<sub>2</sub> emissions during the cement production process are inevitable and cannot be tackled with established techniques, for example using alternative fuels or electricity. New approaches are needed to deal with CO<sub>2</sub> in production related flue gas to achieve our vision of supplying carbon-neutral concrete by 2050.

## What is carbon capture, utilisation and storage (CCUS)?

This is a group of technologies that aim to 'catch' carbon emissions to use or store so they are not released into the atmosphere.

### 1. Capture

The three main ways are: post-combustion capture using solvents; direct separation; and Oxyfuel. These technologies are at different stages of development ranging from pilot demonstration to industrial application.

At our Padeswood plant, we intend to use a solvent to scrub the CO<sub>2</sub> from flue gas created during production. The captured CO<sub>2</sub> is separated, purified and compressed for transport by pipeline for geological storage. Some CO<sub>2</sub> can also be liquified for transport by road for use in other industries.

Our carbon capture aims to capture up to 800,000 tonnes being emitted every year and our goal is to achieve net zero cement production at this plant by 2027.

### 2. Utilisation

There are several ways captured CO<sub>2</sub> can be re-used in different sectors:

**Concrete storage:** Concrete 're-carbonisation' is a technology under development and involves putting CO<sub>2</sub> into concrete. This can be through converting it into solid calcium carbonate or by using CO<sub>2</sub> instead of water to aid concrete curing.

**Synthetic liquid fuels:** These can be created by mixing hydrogen, CO<sub>2</sub> and energy and have the potential to create carbon-neutral fuels in the future.

**Algae production:** CO<sub>2</sub> can nourish and accelerate the growth of algae, which is then also able to absorb more CO<sub>2</sub>. The algae has many uses, from animal feed and biofuels to plastics.

### 3. Storage

CO<sub>2</sub> can be safely and permanently stored in on-shore or off-shore facilities. In north Wales, CO<sub>2</sub> from our Padeswood cement plant is set to be stored in the depleted Liverpool Bay gas reservoirs. Carbon storage and transport facilities in the north west are provided by Eni UK as part of the HyNet North West decarbonisation project.

### HyNet

To achieve our goal of carbon neutral cement production at Padeswood, we are partners in the HyNet North West consortium. The project aims to generate a network of hydrogen production for fuel, alongside carbon capture and storage technology to unlock a net zero carbon future for north west England and north Wales.