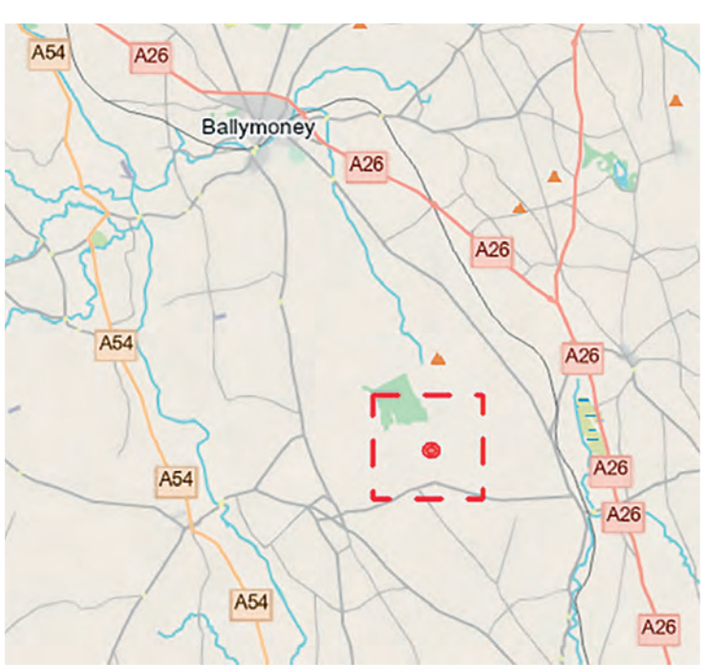
First wind farm in UK & Ireland to produce green hydrogen

Long Mountain Wind Farm, Co. Antrim



Positive energy for zero-emission transport: green hydrogen production

Energia Group has begun producing renewable hydrogen from wind energy at Long Mountain Wind Farm in County Antrim - the first commercial wind farm in the UK and Ireland to enter into green hydrogen production.

Wind energy is converted into hydrogen using an on-site electrolyser. The hydrogen is compressed on site and used to power double-decker fuel cell buses, which produce zero emissions - just water.

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Green hydrogen production
Positive energy for zero-emission transport

When wind energy supply exceeds demand on the electricity grid, the System Operator for Northern Ireland (SONI) asks wind farms to curtail – or shut down – renewable electricity generation because there isn't enough demand from consumers.

Now, our turbines at the Long Mountain Wind Farm can continue to spin so that the renewable energy they produce is converted into green hydrogen, using an electrolyser. This process, known as electrolysis, uses electricity to split water, which is sourced from an on-site borehole, into hydrogen and oxygen.

The hydrogen is compressed on site and transported to Belfast, where Energia Group owns and operates the first Hydrogen Refuelling Station (HRS) on the island of Ireland at Translink's Milewater bus service station.

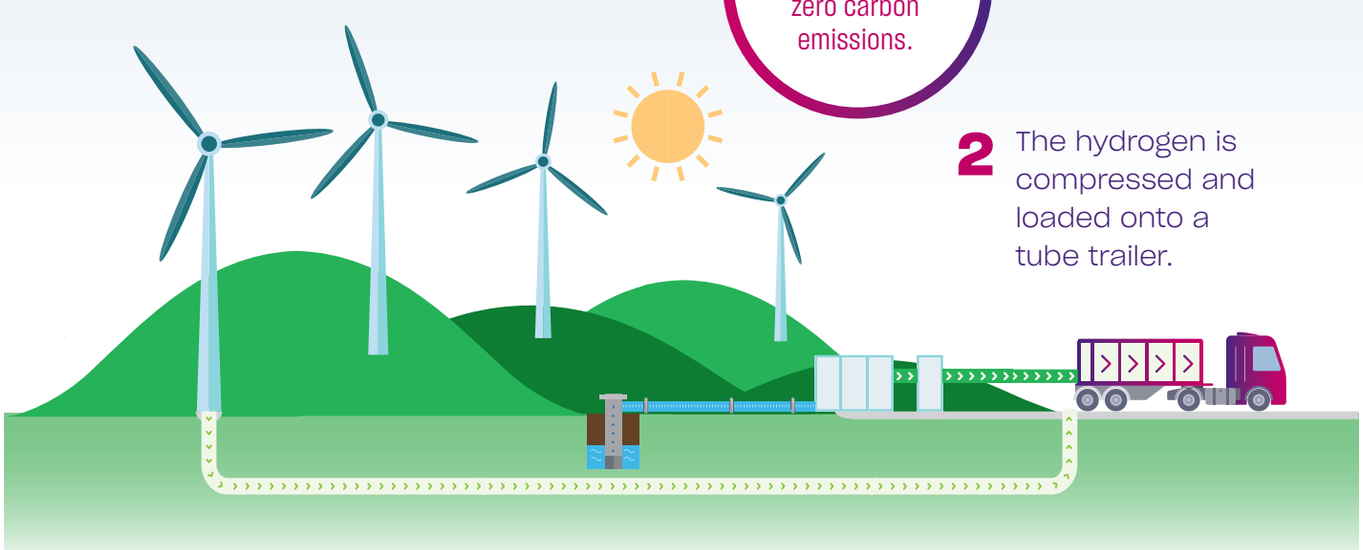
In 2020, Energia Group signed a deal with Translink to supply green hydrogen to power three hydrogen fuel cell double-decker buses, which produce zero emissions.

It only takes 15 minutes to refuel a hydrogen fuel cell bus, which can complete a full day's service in Belfast before having to return to the HRS for refuelling. The only exhaust product from the buses is water vapour.

1 Hydrogen production is powered by renewable energy from wind turbines.

The electrolyser produces zero carbon emissions.

2 The hydrogen is compressed and loaded onto a tube trailer.



3 Hydrogen is transferred from the trailer to the refuelling station in Belfast and used to power hydrogen fuel cell buses.

The only exhaust product of hydrogen fuelled vehicles is water vapour.

Green hydrogen production
Investing in a sustainable future

Transformer
The compound is connected to the wind farm substation via an underground cable. The transformer converts the voltage from 33,000V down to 415V.

Dry Cooler
The dry cooler, utility skid and electrolyser thermal regulators are continuously monitored to ensure optimum performance.

Site Office

Compressor
Hydrogen is produced at a low pressure of 30bar and is compressed to 300bar prior to transportation.

Safety
Compound safety measures include hydrogen, oxygen, smoke and hydrogen flame detectors. Hydrogen and oxygen are released into the atmosphere during emergency venting to inert, or purge and ventilate, the system.

Water
The water is sourced on site from a borehole. It is filtered to remove any sediment, natural occurring minerals and bacteria prior to entering the stacks.

Utility Skid
The utility skid houses essential systems, such as water purification and the control systems.

1MW PEM Electrolyser
The Proton Exchange Membrane electrolyser contains four cell stacks with negative and positive electrodes. When an electrical current is passed through water, hydrogen protons cross the membrane to form hydrogen at the cathode, whilst positively-charged oxygen ions form at the anode.

Hydrogen Trailer Location
Two 6-metre Multiple Element Gas Container (MEGC) trailers are connected to the compressor. Each trailer holds approx. 320kg of hydrogen in vertical cylinders.

Nitrogen Compound
Nitrogen is used to control valves and purge the system of hydrogen and oxygen during shutdowns and maintenance.

FAQs

What makes hydrogen green?

Green hydrogen, or renewable hydrogen, is produced through electrolysis of water, using electricity produced by wind turbines or other renewable energy sources to split water into hydrogen and oxygen.

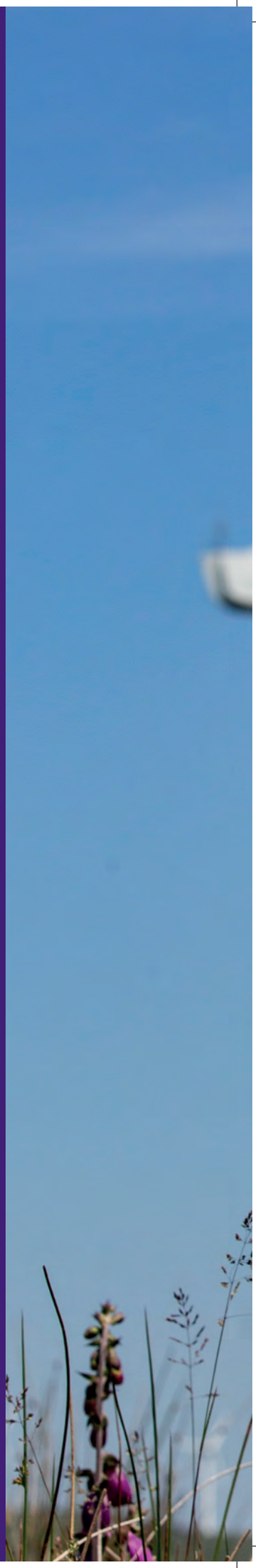
Why is this project important?

One of our biggest climate challenges is the decarbonisation of industrial sectors which are difficult to electrify, such as public transport, road haulage, shipping and aviation. The electrification of long-haul heavy transport would require enormous batteries, adding to weight and refuelling times.

Hydrogen can offer refuelling practices similar to diesel - with similar range and performance. Centralised refuelling for buses, for instance, can replace existing practices, as Energia's Hydrogen Refuelling Station at Translink's Milewater bus depot in Belfast has shown.

How safe is the production, transport, refuelling and use of hydrogen in fuel cell vehicles?

Hydrogen is already used extensively in the chemical sector and so industry is familiar with H2 production, handling and distribution. However, as a highly compressed gas, hydrogen requires clear rules of usage. It is highly flammable but some of its key properties make hydrogen safer to handle and use than other fuels commonly used today. For example, because hydrogen is much lighter than air, it dissipates rapidly when it is released in the open air.



What is a zero-emission hydrogen fuel cell?

A fuel cell is a device that generates electricity through an electrochemical reaction, rather than combustion. In a hydrogen fuel cell, hydrogen and oxygen are combined to generate electricity, heat, and water.

Emissions from petrol and diesel vehicles – such as nitrogen oxides, hydrocarbons and particulate matter – are a major source of air pollution. Hydrogen-powered fuel cell electric vehicles emit none of these harmful substances – only water and warm air.

How has this project been funded?

The Long Mountain pilot H2 project was part-funded by Interreg North West Europe as part of GenComm, an EU programme generating energy secure communities through smart renewable hydrogen.

Energia Group has also partnered with Translink to power three double-decker hydrogen fuel cell buses, built by Wrightbus in Ballymena. Our Hydrogen Refuelling Station (HRS) at Milewater Bus Station in Belfast was part-funded by the UK Office of Zero Emission Vehicles (OZEV) and the NI Department for Infrastructure.

What are the next steps?

Energia Group has secured planning consent for a second green hydrogen production compound with a larger 4MW electrolyser on our County Antrimwind farms.

About Energia Group

Experts in renewable energy

We are a modern, customer-centric utility focusing on renewable technology. Operating as Power NI and Energia across the island of Ireland, we are committed to our customers and trusted by thousands of homes and businesses to meet their needs in an evolving energy environment.

We are a leading developer and operator of 16 onshore wind farm sites across the island of Ireland, generating over 350MW of green electricity.

Innovation
Innovation is critically important to us. The Group's ongoing €3bn 'Positive Energy' investment programme is developing onshore and offshore wind, solar, battery storage and green hydrogen production. It is anticipated that this renewable energy programme will add 1.5 GW of additional renewable capacity to the system by 2030, facilitating the achievement of Climate Action targets.

Sustainability
We have aligned our responsible business activities with the UN's Sustainable Development Goals and are a Business Supporter of the All-Ireland Pollinator Plan, protecting wildflower and bogland habitats and promoting pollinator-friendly land management methods on our wind farms.

Community focus
We are a responsible developer and good neighbour in the communities where we operate. We work with local community groups and projects through our wind farm benefit funds and are happy to facilitate school visits.

To find out more about Energia Group, our renewable energy projects and community benefit funds, visit our website: www.energiagroup.com/renewables.

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