

Gigastack Project one step closer to renewable hydrogen at industrial scale as Phase 2 concludes

The consortium behind flagship renewable hydrogen project [Gigastack](#) - ITM Power, Ørsted, Phillips 66 and Element Energy - has published [a major report](#), highlighting the progress made to date and describing the pathway to a final investment decision and commercial operation of a 100MW scale electrolyser system powered by offshore wind in 2025.

Funded to date as part of the Department for Business, Energy and Industrial Strategy (BEIS) Hydrogen Supply Competition, Gigastack is an ambitious multi-phase programme aimed at proving renewable hydrogen at industrial scale and demonstrating the full decarbonisation potential of offshore wind in the UK's largest industrial cluster – the Humber.

Gigastack Phase 2 has focused on accelerating the expansion of the UK's renewable hydrogen sector by taking feasibility stage concepts through Front End Engineering Design for a 100MW electrolyser system, using renewable power from Hornsea Two – the world's largest offshore windfarm – to provide renewable hydrogen to the Phillips 66 Humber Refinery to replace hydrocarbon-based fuels within industrial-scale fired heaters.

The two central tracks of work for Gigastack Phase 2 have seen:

- ITM Power progress its next generation of electrolyser technology and move into their new Gigafactory in Bessemer Park, Sheffield, now the world's largest electrolyser production facility - representing a step-change in ambition and capacity, enabling a 40% reduction in costs for electrolyser stacks over the next three years.
- Ørsted and Phillips 66 develop the technical design for an industry-scale renewable hydrogen facility near Immingham, exploring the current policy and regulatory landscape, identifying barriers to developing large-scale renewable hydrogen production facilities, with potential solutions identified and building a business case to map a pathway to an investable proposition. The study suggests an opportunity to significantly reduce the Levelized Cost of Hydrogen (LCOH) by around 47% by 2030.

Once built, Gigastack will support the decarbonisation of the Humber region, the UK's largest industrial cluster, and support the UK's offshore wind and electrolyser supply chain competitiveness. Gigastack will also lay the groundwork for future expansion in the Humber region and will catalyse the renewable hydrogen sector by providing a blueprint for scalable electrolyser technology in the UK.

The project has already helped create more than 100 jobs at ITM Power's Gigafactory and the initial 100MW is projected to create an additional 180 jobs, whilst an expansion to 1GW by 2030 could contribute up to £2.5bn Gross Value Added and 1,700 permanent jobs to Immingham's local economy.

The Gigastack consortium's main goal is to now reach a final investment decision in the next 18-months and work towards a commercial operating date in 2025, subject to a supportive policy environment. The consortium will seek to work with UK Government over the next twelve-months to secure revenue support, agree specific deployment targets for renewable hydrogen and ensure the Gigastack deployment target of 2025 is achieved.

Duncan Clark, Head of Region UK at Ørsted, said:

"The findings from the Gigastack project provide an important step for renewable hydrogen in the UK and highlight the decarbonisation opportunities achievable with the right support framework in place. Offshore wind provides enormous potential with the installed capacity we already have in the UK and with huge amounts more to come. There is a genuine opportunity to support the pathway to net-zero for energy-intensive industry through truly green hydrogen and for the UK to be at the global forefront of renewable hydrogen development and deployment."

Philip Gothard, Gigastack Project Manager at Phillips 66, said:

"The launch of the Gigastack public report represents an important milestone for renewable hydrogen in the UK and demonstrates its key role within industrial decarbonisation. The work is testament to the close collaboration between consortium members and we are proud to have contributed with our skills and experience of operating large scale hydrogen production units for over 50 years. The Phillips 66 Humber Refinery is a UK leader in the production of lower carbon fuels and the only European producer of graphite coke for electric vehicle batteries. Gigastack is an exciting part of the Refinery's decarbonisation journey and we look forward to progressing the project through to deployment."

Dr Graham Cooley, CEO of ITM Power, commented:

"Gigastack is exactly the kind of project that will help to make the UK a world leader in technologies that can help the whole world address climate change issues. Backing green hydrogen now will deliver investment, skilled jobs and leadership in an energy transition sector that is set to grow exponentially over the coming decade. We need to be ready for that growth."

Ben Madden, Partner at Element Energy, said:

"The consortium has demonstrated to the UK Government and the wider hydrogen sector the benefits of renewable hydrogen alongside a pathway to commercialisation and deployment of a GW-scale electrolyser facility by the end of 2025, subject to government support. The Gigastack project has the potential to catalyse the large-scale production and supply of renewable hydrogen in the UK, an important step in our wider decarbonisation journey to net zero."

Read the [full report here](#)

Full media pack with [images and video available here](#)

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For media enquiries please contact:

ITM Power

Sharon Poulter, Head of Marketing

Tel: +44 7999 031880

Email: SPoulter@itm-power.com

Ørsted

Mike Day, Deputy Head of UK Media Relations

Tel: + 44 7767 008893

Email: miday@orsted.co.uk

Phillips 66 Limited

Nina Stobart, External Communications & Public Affairs Lead

Tel: +44 770 252 8612

Email: Nina.Stobart@p66.com

Element Energy

Matthew Wilson, Senior Consultant

Tel: +44 203 813 3900

E-mail: matthew.wilson@element-energy.co.uk

About ITM Power plc

ITM Power plc manufactures integrated hydrogen energy solutions for grid balancing, energy storage and the production of renewable hydrogen for transport, renewable heat and chemicals. ITM Power plc was admitted to the AIM market of the London Stock Exchange in 2004. In October 2019, the Company announced the completion of a £58.8 million fundraising, including an investment by Linde of £38 million, together with the formation of a joint venture with Linde to focus on delivering renewable hydrogen to large-scale industrial projects worldwide. ITM Power signed a deal to deploy a 100MW electrolyser at Shell's Rhineland refinery announced in October 2021. In November 2020, ITM Power completed a £172m fundraising, including a £30m investment by Snam, one of the world's leading energy infrastructure operators. ITM Power operates from the world's largest electrolyser factory in Sheffield with a capacity of 1GW (1,000MW) pa. Intention to build a second UK Gigafactory in collaboration with University of Sheffield with a capacity of 1.5GW expected to be fully operational by the end of 2023. The Group's first international facility expected to have a capacity of 2.5GW pa, will bring the total Group electrolyser capacity to 5GW pa by the end of 2024. ITM Power received an order for the world's largest PEM electrolyser of 24MW from Linde in January 2021. Other customers and partners include Sumitomo, Ørsted, Phillips 66, Scottish Power, Siemens Gamesa, Cadent,



Northern Gas Networks, Gasunie, RWE, Engie, GNVert, National Express, Toyota, Hyundai and Anglo American among others.

About Ørsted

The Ørsted vision is a world that runs entirely on green energy. Ørsted develops, constructs and operates offshore and onshore wind farms, solar farms, energy storage facilities, and bioenergy plants, and provides energy products to its customers. Globally, Ørsted is the market leader in offshore wind and it is constructing the world's biggest offshore wind farms off the East Coast of the UK. Its UK offshore wind farms generate enough clean electricity for over 4.4 million UK homes. Ørsted ranks #1 energy company in Corporate Knights' 2021 index of the Global 100 most sustainable corporations in the world. Headquartered in Denmark, Ørsted employs 6,500 people, including over 1000 in the UK. For more information, please visit orsted.co.uk or follow us on [Facebook](#), [LinkedIn](#), [Instagram](#) and [Twitter](#).

About Phillips 66

Phillips 66 Limited is a subsidiary of Phillips 66, a diversified energy manufacturing and logistics company. The Phillips 66 Limited Humber Refinery is one of the most complex refineries in Europe. It produces not only fuels, but also critical components for electric vehicle batteries and feedstocks for a vast range of products including toiletries and cosmetics. Phillips 66 is working with the UK Government and strategic partners to develop a range of decarbonisation pathways, including both Carbon Capture (Humber Zero) and Renewable Hydrogen (Gigastack), as well as advanced biofuels from sustainable wastes. Some 20 per cent of all UK road fuels (14 million litres per day) come from the Humber Refinery, some of which is sold at Phillips 66 Limited's JET branded petrol stations. With a portfolio of Midstream, Chemicals, Refining, and Marketing and Specialties businesses, Phillips 66 processes, transports, stores and markets fuels and products globally. Headquartered in Houston, the company has 14,100 employees committed to safety and operating excellence. Phillips 66 had \$56 billion of assets as of Sept. 30, 2021. For more information, visit www.phillips66.co.uk or follow us on [Twitter @Phillips66UK](#)

About Element Energy

Element Energy is a dynamic and growing strategic energy consultancy. We specialise in the intelligent analysis of zero-carbon energy and help our clients (in the sectors of transport, power generation and buildings) to understand zero-carbon energy. Over the past decade we have gathered a team of experts based in Cambridge, London, York and Lille who provide robust technical insights into zero-carbon energy markets. www.element-energy.co.uk

Element Energy was recently acquired by ERM, a global sustainability consultancy practice with over 5,500 employees in 40 countries. ERM is the world's largest pure-play sustainability advisory firm, a specialist energy consultancy that works with organizations to implement integrated low-carbon technology solutions that help solve their net zero and decarbonization challenges. www.erm.com

