HyLine Gogledd

Building the pipeline to net zero in North Wales

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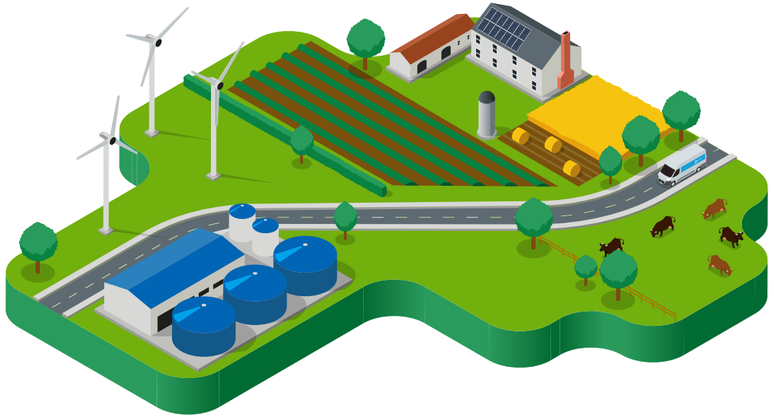
HyLine Gogledd

This ground breaking project will transport a homegrown, low-carbon energy solution by doing what Wales & West Utilities (WWU) do best – expertly connecting our customers with energy whilst investing wisely to create a sustainable, greener future.



We support the commitment to delivering a cleaner greener and fairer Wales. This means changing the way we produce and use energy at home, in industry and for travel. One of the largest and most challenging sectors to decarbonise is heavy industry.

North Wales has a very rich industrial landscape; it is home to industries such as paper mills, food processing, insulation manufacture, aerospace, and more. It also has a diverse range of energy supply – including power stations, hydroelectric, and offshore wind – and is adjacent to one of the UK's most developed hydrogen networks.

We recognise the need to invest for the future to decarbonise industry whist protecting communities, jobs and the economy in Wales and beyond. As such, we are looking at what infrastructure we need to maintain existing supplies of energy whilst transitioning towards the ability to deliver low-carbon hydrogen at scale.

The HyLine Gogledd proposal is to build a new 32km pipeline through North Wales from Deeside to Wrexham. This pipeline will allow local industries on a path to net zero to access hydrogen, at scale, to decarbonise their processes.

HyLine Gogledd will also help local authorities to deliver the Local Area Energy Plan, allowing North Wales to achieve its net zero vision for the future.

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Delivery lead

apollo

Delivery partners

ERM

HyLine Gogledd

This report summarises the work undertaken as part of the North Wales Conceptual Plan (NWCP) work, completed to understand the demand and need for a hydrogen distribution network for North Wales, replacing the use of natural gas (methane) with hydrogen. The project could enable a reduction of up to almost 2 million tonnes of CO_2 equivalent per annum while retaining and creating 1000s of jobs through the construction and operational phases.

In addition to the above, HyLine Gogledd will be an enabling project that will allow for the creation of additional jobs with new industrial plants accessing clean energy in the region. Along with a positive decision from the UK government on the use of hydrogen for non-industrial heating, the HyLine Gogledd local transmission network could enable a further rollout of hydrogen for commercial and domestic use in the region.

Wales and West Utilities expect that HyLine Gogledd will be another pillar in achieving UK and Welsh decarbonisation targets. Hydrogen production and transmission projects in the region are at the forefront of a rapidly developing industry in the UK. HyLine Gogledd will enable large scale hydrogen transportation to both existing and new customers in the region, assuring Wales of its greener net zero future.

Supporting organisations for NWCP:

Public

Sero Net Diwydiant Cymru / Net Zero Industry Wales

UKRI Innovate UK

Department for Energy Security & Net Zero

Private

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SP Energy Networks

Prifysgol Bangor University

uniper

NET ZERO ENERGY SYSTEMS

Note: CO_2e stands for carbon dioxide equivalent and is a measure used to compare the emissions from different greenhouse gases on the basis of their global-warming potential (GWP), by converting amounts of these gases to the equivalent amount of carbon dioxide with the same GWP.


Liverpool Bay
Anglesey
H2
Bangor
H2
Deeside Industrial Estate
Chester
HyLine Gogledd
KEY
HyLine Gogledd
HyNet
EXISTING INFRASTRUCTURE
National Transmission (NTS) Feeder 4
H2 Hydrogen production
Industial gas customers
National Transmission System (NTS) offtake
Wrexham
Wrexham Industrial Estate
H2
Maelor
HyLine Gogledd

The HyLine Gogledd project will help unlock a number of cross-sector benefits across North Wales by connecting hydrogen production with industrial customers. These benefits are detailed below and serve to demonstrate the scale of the opportunity presented by hydrogen pipeline infrastructure.

People

Support the development of a green industry and energy hub within Wales.

Fast & Secure

Providing decarbonisation at pace whilst ensuring a resilient gas network which recognises the importance of the British Energy Security Strategy.

Support **1000s** of jobs.

Planet

HyLine Gogledd supports cluster partners in achieving savings of up to

2 million

tonnes of CO_2e per year at the point of use by replacing natural gas with low-carbon hydrogen.

It has the potential to

Unlock

green energy for industries facing decarbonisation challenges that need access to hydrogen for their processes. It also the potential to allow hydrogen transmission from potential hydrogen hubs such as Holyhead.

Pounds

HyLine Gogledd has the potential to add

2 billion

of GVA alongside cluster partners by acting as an enabler to both the development of H2 production and decarbonisation of industry over the operational lifetime.

Project background

WWU is part of the North East Wales Industrial Decarbonisation (NEWID) cluster, building on the work of the Deeside Decarbonisation Forum (DDF). NEWID's goal is to significantly reduce interim emissions between 2030 and 2035 and to achieve net zero industrial emissions by 2040.

Collaborating with the Local Energy Action Plans of Flintshire and Wrexham Councils, NEWID is actively working to make North East Wales a greener and cleaner place. Together, they are driving the region's transition to a more sustainable future.

As part of the NEWID project, HyLine Gogledd supports ambitious hydrogen plans, including:

- Creating up to 4.68 TWh annually by 2050
- Creating over 20,000 green jobs
- Creating up to £2 billion GVA

WWU are a core NEWID partner and will utilise their North Wales Conceptual Plan as an evidence base for their next phase of work in the cluster to explore how hydrogen can be deployed. HyLine Gogledd is a critical first-mover project to deliver benefits for local industry.

National & regional context

HyLine Gogledd will connect hydrogen production to energy intensive industrial customers, allowing them to decarbonise their processes. Depending on government policy, it also has the potential to allow the conversion of both commercial and domestic heating to hydrogen, further enabling net zero targets.

The graphic below demonstrates how HyLine Gogledd may integrate with existing gas network infrastructure, and new infrastructure such as HyNet.

What have we done to date?

Our conceptual work set out to determine a deliverable, and cost effective pipeline project and potential route to demonstrate the opportunity presented by hydrogen infrastructure. Some of the key elements of the study were:

Clear scenario base to understand the complex supply/demand relationship and use case of the pipeline

Clear and appropriate stakeholder engagement for the current phase of the project

Holistic picture of the project ensuring key barriers, risks and showstoppers are understood/mitigated

A path of least resistance adopted as one of the preferred options for the pipeline route

A pipeline that follows an unconstrained or minimum constraint philosophy

A pipeline that makes use of existing easements where possible and appropriate

To highlight and limit potential difficulties in pipeline routing

To highlight and avoid environmental and ecological areas of concern

To highlight and avoid existing major utilities and infrastructure

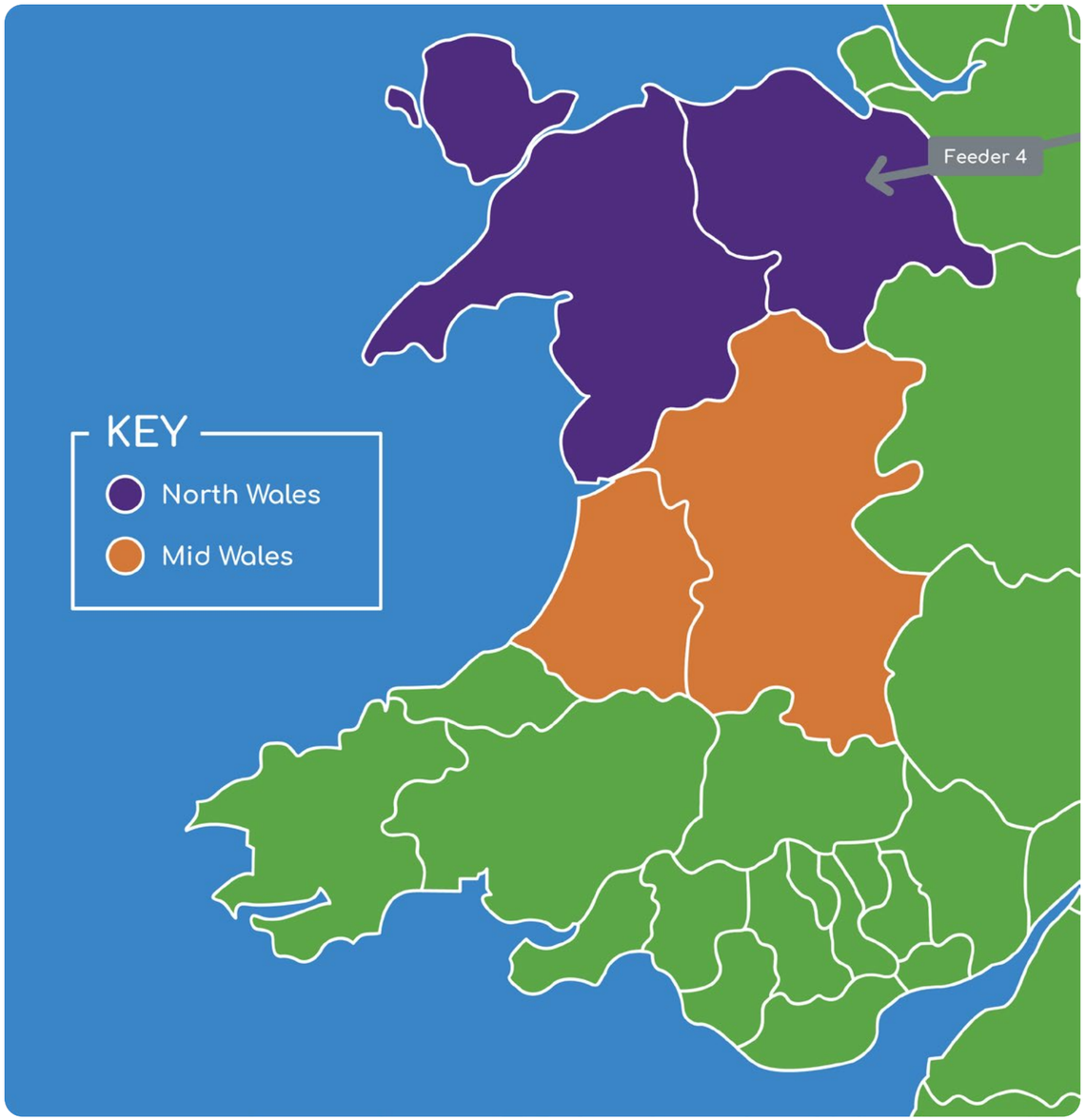
Current gas network

The current North Wales gas network consists of one major National Transmission System (NTS) pipeline, which is an extension of Feeder 4 from Audley in Cheshire to Maelor in Wrexham which is owned and operated by National Gas Transmission.

Feeder 4 runs from the Bacton Terminal east to west which primarily supplied Cadent's Local Transmission System (LTS) pipelines until 1969 when an extension from Audley to Maelor was constructed to supply WWU's LTS pipelines via the Maelor offtake.

This offtake site and the downstream LTS network serve all industrial, commercial, and domestic gas customers in North Wales and Mid Wales which aren't connected directly to the NTS.

The long-term development of these assets is therefore critical to the decarbonisation landscape of North East Wales, and to the delivery of the NEWID Cluster Plan.



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national gas

Regional Decarbonisation

Our Regional Decarbonisation Pathways analysis (2023), published alongside analysis from Energy Systems Catapult and Costain, demonstrates the role of the gas network across a number of future scenarios.

Throughout these scenarios, a clear opportunity is presented whereby new strategic hydrogen pipeline infrastructure could help to unlock existing parts of our network for repurposing – presenting a possible future regional rollout methodology.

By building the 32km HyLine Gogledd pipeline.

We could unlock a further 300km of existing network for hydrogen

Scan here to read our Regional Decarbonisation Pathways analysis

Demand development

The Conceptual Plan, built from the Regional Decarbonisation Pathways analysis and developed alongside NEWID Cluster Plan partners, designed credible demand scenarios through use of NESO's Future Energy Scenarios (FES).

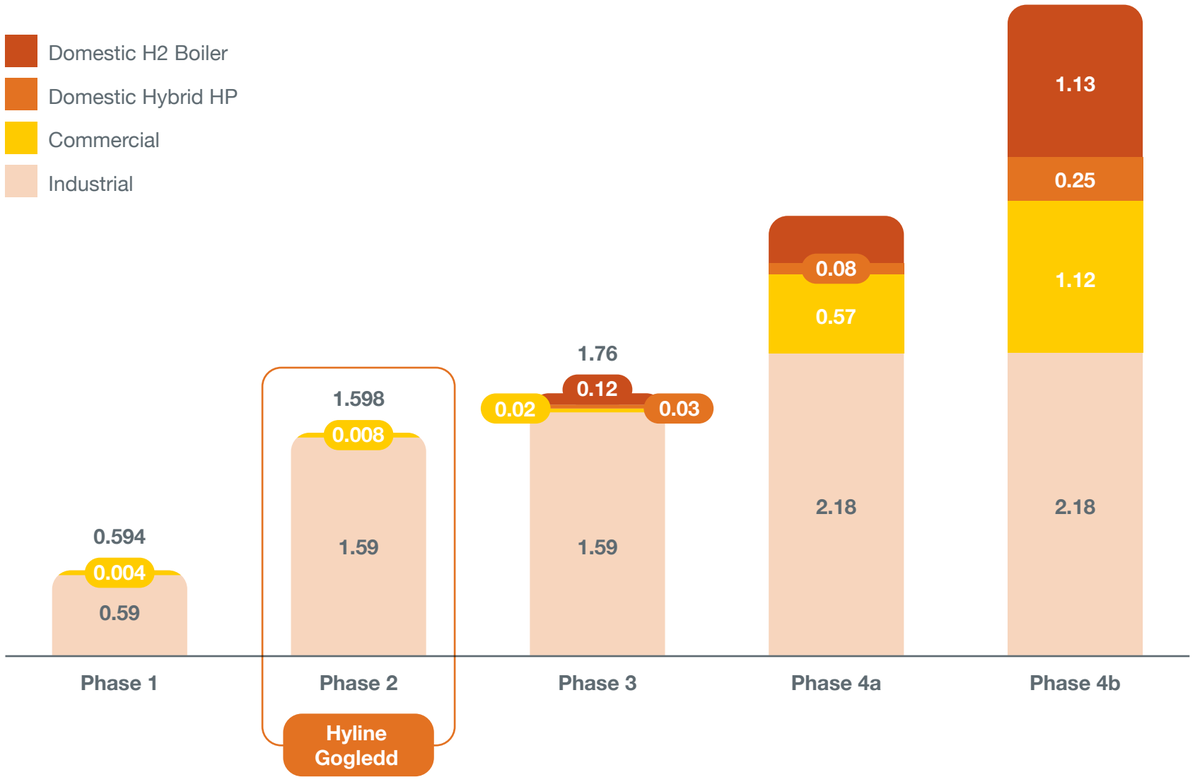
These sources provide distinct decarbonisation pathways to achieve net zero, with each pathway based on varying levels of customer engagement, energy efficiency, fuel switching, and the availability of carbon removal technologies.

The developed scenarios were applied to four Phases of potential rollout as detailed in the table below.

Summary of the assumptions applied for the proportion of natural gas demand that converts to hydrogen in each Phase

Phase	Domestic	Commercial	Industrial	Description
1	–	High (50%)	High (75%)	Local industry in Deeside
2	–	High (50%)	High (75%)	Industry in Deeside and Wrexham, which could be supplied by HyLine Gogledd
3	High (30% hybrid ASHP, 50% H2 boiler)	High (50%)	High (75%)	Localised expansion of Phase 2 in and around Wrexham
4a	Medium (10% hybrid ASHP, 15% H2 boiler)	Medium (25%) + As in 1–3 for industrial estate locations	Medium (45%) + As in 1–3 for industrial estate locations	Wider expansion into the existing North Wales network
4b	High (30% hybrid ASHP, 50% H2 boiler)	High (50%) + As in 1–3 for industrial estate locations	Medium (45%) + As in 1–3 for industrial estate locations	

North Wales Conceptual Plan scenarios



Project key considerations

There are a number of key considerations that need to be addressed with regards to progressing the project.

Considerations	Description
Supply of hydrogen to the pipeline	Significant work has been undertaken at concept to identify supply and demand requirements, but it is clear that there are many variables and further work needed to match supply and demand to finalise the pipeline design.
Commercial agreements	Reaching a Final Investment Decision (FID) will require commercial agreements to be made between producers and customers, as well as the entire supply chain. These are likely to need significant external funding, with no agreements or funding mechanisms currently in place.
Managing variation in demand and supply	Initial estimates for above ground storage to manage variation in demand are large. The project will investigate if this can be controlled via a large flexible producer or customer, or through a connection to HyNet or Project Union.
Planning approval	Consent will be needed to authorise the construction of any proposed pipeline route, including rights over land to enable the installation and future retention of the pipeline. The proposals would also need to be assessed to understand their likely significant effects on the environment. In addition, national and local policies would need to be considered and, where relevant, applied in presenting the case for a proposed route. The specific pathway to seeking authorisation for the construction of hydrogen pipelines in Wales is subject to ongoing consideration.
Regulatory approval	The project is actively engaged with Ofgem and DESNZ. Progression of the project beyond Feasibility will be subject to the developing Hydrogen Transport Business Model (HTBM).
Supply chain	With potentially multiple infrastructure projects in the UK the project will need to ensure sufficient skilled labour is available for delivery beyond pre-FEED..
FID approval	The pipeline will need to meet FID alongside developing producer and customer projects. Project Stage Gates, including FID will therefore require close coordination with key stakeholders and developing business models.

Next steps

The development of a hydrogen pipeline system in North East Wales will need close coordination with producers and customers who lie upstream and downstream of each other and the pipeline respectively. The next phase of HyLine Gogledd will explore the sufficient support needed and its availability for each of these parties to make a coordinated investment decision.

A clear and coordinated pan-UK strategy for hydrogen and CCS needs to be established, to facilitate commercial-scale hydrogen transportation and storage for industry. This should build on nationally significant projects such as HyNet and Project Union.

Appraisal of the route options will take place during the Feasibility stage of the project. This will align closely with the strategy and next steps regarding the consenting position for pipelines in Wales. The FEED phase will then include public consultation on potential/preferred routes, engagement with key stakeholders (including industrial customers, local and national decision makers) and early environmental survey work.

Technical areas will be carefully considered, including matters such as economic benefits, sustainability and the strategic communications and consultation processes as part of any consenting route.

Timelines

The key considerations and next steps have fed into a delivery timeline which considers how HyLine Gogledd will need to be delivered alongside major production, and customer-led projects in order to maximise the regional and national benefits.

Feasibility and Offtaker Agreements
2025–2026

Planning, Public Consultation and Consenting
2027

Front End Engineering Design (FEED)
2026–2028

Detailed Design
2028–2030

Construction
2030–2033

HyLine Gogledd

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