

North-West

Brief overview of the region energy supply mix and demand

The North-West UK has a diverse energy system with approximately 7.5 GW of generation capacity, split between fossil (~4 GW) and low-carbon sources (~3.6 GW; 1.23 renewable generation), alongside ~1 GW of storage. The region shows strong industrial energy demand (181 major industry), with the highest share of non-domestic gas use in the UK, reflecting energy-intensive industries. Electricity demand is expected to grow significantly due to electrification of transport (EVs) and heating (heat pumps). At the same time, renewable generation and storage are expanding rapidly (total new capacity ~2.8 GW pipeline by 2031 including 919MW solar, 484MW onshore wind, and 1,389 MW storage).



Challenges

- High industrial energy demand and emissions
- HyNet's focus on blue hydrogen presents a challenge, as it is not fully zero-emission
- Heat pump deployment remains low (~0.5%), with barriers including housing stock, cost and installer availability.

Opportunities

- Concentration of industry enables efficient hydrogen integration and economies of scale.
- Strong policy support, with HyNet acting as a key anchor for hydrogen deployment
- Stable industrial demand supports the use of blue hydrogen as a reliable and continuous supply option compared to green H₂.

Research Questions

- What is the optimal integration of blue and green hydrogen to balance reliability, cost, and emissions for industry and major consumers in the North-West energy system?
- Feasibility of green hydrogen production from curtailed renewable power sources.
- How can hydrogen infrastructure (production, pipelines, storage) be optimally integrated with electricity networks to support regional energy system flexibility and resilience?

Stakeholders

North-West Hydrogen Alliance (NWhA); HyNet North-West and their partners (hynet.co.uk/partners/), including EET and Progressive Energy; Cadent Gas; SSE; DNO

HI-ACT research plan

- Develop integrated energy system models to assess hydrogen production scenarios and locations that enable reliable and low-carbon energy supply for industrial and major consumers in the North-West.
- Techno-economic and environmental analysis of different hydrogen pathways (blue vs green), including storage and flexibility requirements.
- Engage with regional stakeholders and collect spatial data to support place-based analysis and validation of modelling results
- Analyse infrastructure and supply chain constraints, including hydrogen production, transport, storage.