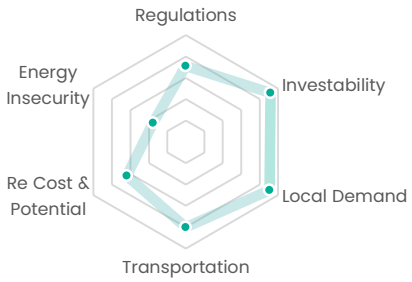
United Kingdom

Index rank # 8

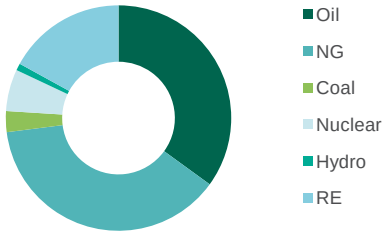
Aggregate score (out of 5) 3.9

GDP - USD (trn):	2.71
GDP per capita - USD:	40,285
Land area (km2):	242
Population density (per km²):	275
Grid emissions factor (gCO²/kWh):	277

Hydrogen Drivers Matrix



Primary Energy Mix



3.6 Regulatory commitment
- Net zero 2050
- Strong UK ETS pricing
- Diverse instruments providing funding across H2 value chain

4.0 Transportation
- Access to North Sea pipelines & depleted gas fields
- Co-sited clusters & offshore wind
- 9PWh salt cavern storage

4.6 "Investability"
- Rated AA by S&P
- 8th in WB Ease of Doing Business

3.2 RE cost and potential
- Excellent onshore/offshore wind
- Offshore wind higher cost but achieves higher electrolyser load factor

4.5 Local demand potential
- Sizable oil refining (15th largest) and ammonia sectors (23rd)
- 3rd highest aviation traffic globally
- Substantial port traffic

1.8 Energy insecurity
- 35% net importer

Strong offshore cluster developments and push into home heating

Under its Hydrogen Strategy published in August 2021, the UK is targeting 5GW of low carbon hydrogen production capacity by 2030 with a dual blue-green focus. To achieve its targets, the Government has made available a number of targeted funding instruments totalling more than GBP400m[1]. Hydrogen as a key priority under the UK Ten Point Plan will also have access to the Net Zero Innovation Portfolio, a GBP1bn fund to accelerate commercialisation of low-carbon technologies, and downstream industrial conversion has access to a GBP315m Industrial Energy Transformation Fund.

UK has sizable oil refining and ammonia industries to anchor early offtake and the third highest aviation traffic globally. Its Ten Point Plan for industrial transformation further envisions up to 20% hydrogen blending into the gas grid for residential use by 2023 and the government is strongly pushing pilots. Carbon prices are robust under the UK ETS[2], which launched at GBP50/ton (USD71) in May and has moved broadly within the GBP40-60/ton band. The UK's green hydrogen strategy will be powered by excellent wind resources onshore and offshore—UK is the largest offshore wind market in Europe and some of the cheapest offshore wind in the world today, and there is more than 500GW of fixed bottom potential. The country also has the advantage of homegrown technology players such as ITM's electrolyser gigafactory and Johnson Matthey, a key player in the supply chain, as well as sizeable CCS sites around industrial "clusters".

HyNET and other clusters

HyNet is perhaps the leading UK cluster, bringing together a diverse range of industrial partners across glass, petrochemicals, transportation and manufacturing. From 2025, it will produce, store and distribute hydrogen as well as capturing and storing up to 10mtpa of carbon from industry in the Northwest of England and North Wales, through the development of new and repurposing of existing infrastructure. It is one of a range of similar clusters focused on repurposing existing carbon-intensive industrial areas.

Gigastack

Orsted, ITM and Phillips66 is developing a co-sited 100MW PEM electrolyser powered by the Hornsea 2 offshore wind farm that would deliver green hydrogen to replace 30% of current grey hydrogen use at Humber Refinery. Currently in FEED study.

Home heating pilots

A 16-month project HyDeploy delivering "up to"20% hydrogen blend to 100 homes and 30 university buildings in Staffordshire was successfully completed in September 2021 and a larger Phase 2 launched. A 1% hydrogen blend into biogas has been approved in Swindon. Many other pilots are underway.

2,000km hydrogen network

National Grid's Project Union is exploring a hydrogen 'backbone' to connect industrial clusters, potentially creating a 2,000km hydrogen network and repurposing 25% of current gas transmission pipelines.

hydrogen investability index

Cranmore Partners energy estate.

1 Including: GBP240m of co-investment funding under the Net Zero Hydrogen Fund for hydrogen production, a GBP167m R&D funding package to develop technologies across the value chain, a GBP20 million Industrial Fuel Switching Competition; 2 Which replaced the UK's participation in the EU ETS starting January 2021