



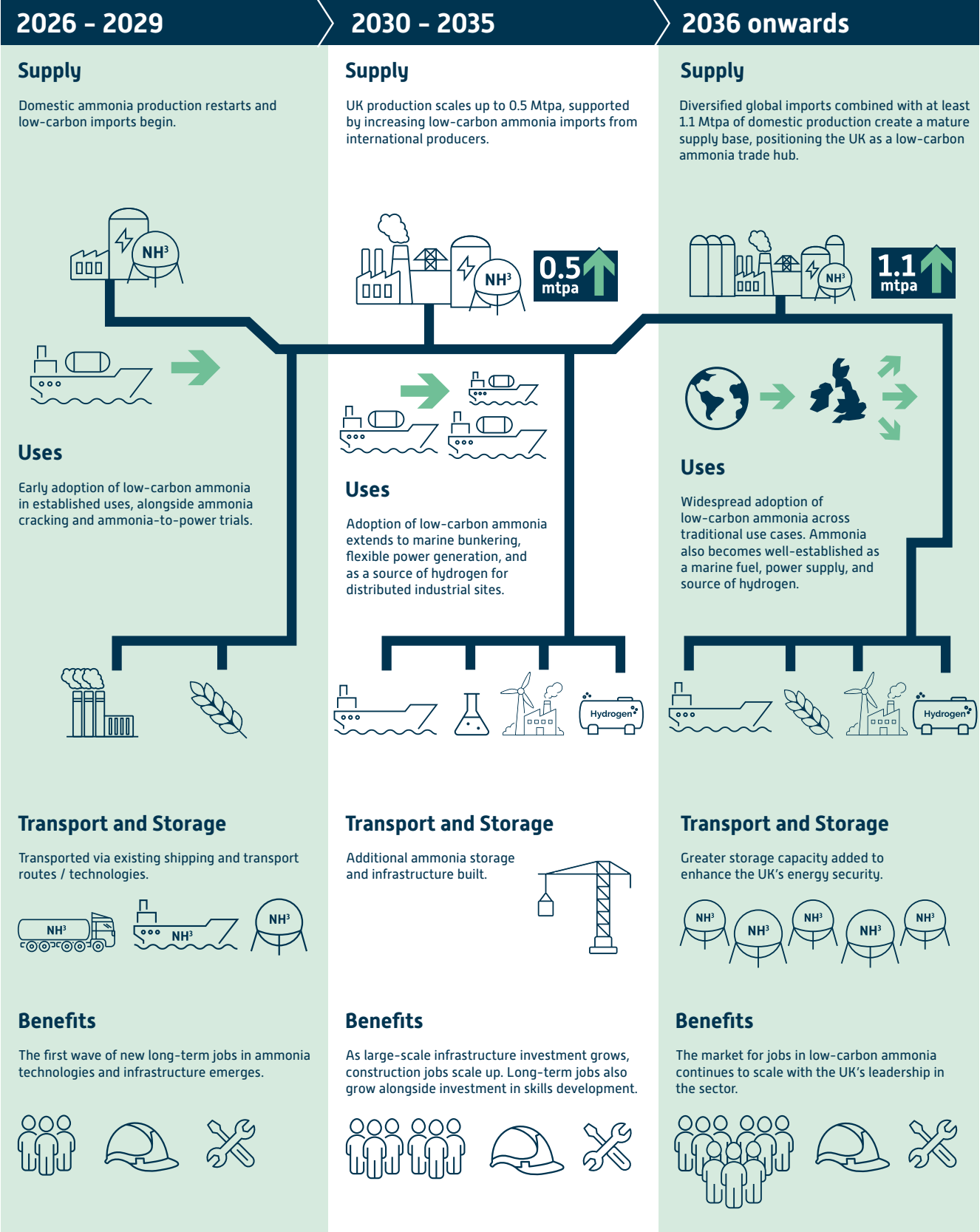
Low-carbon Ammonia Roadmap

Expected milestones in the development
of the UK market for low-carbon ammonia

OCTOBER 2026

Low-carbon ammonia roadmap

UK market development at a glance



Expected milestones and socio-economic benefits

2026 - 2029	2030 - 2035	2036 onwards
Supply • Small-scale domestic low-carbon ammonia production begins with first facility commissioned. • Low-carbon ammonia imports from abroad start displacing grey ammonia demand.	Supply • Larger scale domestic production projects are commissioned. Scale up of domestic production to 0.5 Mtpa. • Imports of low-carbon ammonia from other global regions expand.	Supply • At least 1.1 Mtpa domestic production. • Increased global imports from diverse trading partners. • UK established as an import / export hub for low-carbon ammonia.
Uses • Trials of low-carbon alternatives to traditional fertilisers. • First small-scale ammonia-to-power projects and other novel use cases. • Existing facilities protected from closure. • Early adoption of ammonia as a maritime fuel. • Ammonia cracking trials at dispersed industrial sites that are hard-to-abate.	Uses • Low-carbon ammonia begins to displace grey ammonia in some existing applications, including fertiliser and chemicals. • Increased volumes of ammonia required to meet scale up of ammonia-to-power. First ammonia-to-power plants begin to provide flexible power generation. • UK starts to offer marine bunkering. • Ammonia used as energy / hydrogen storage and for balancing hydrogen networks. • Expanded use of hydrogen (cracked from ammonia) in hard-to-abate sectors.	Uses • Existing ammonia demand in the UK met by low-carbon ammonia. • Demand continues to grow in new ammonia use cases and is met with low-carbon ammonia. • Demand continues to grow for hydrogen (cracked from ammonia) in hard-to-abate sectors.
Transport and Storage • Transported via existing shipping and transport routes/technologies. • Existing ammonia storage infrastructure utilised.	Transport and Storage • Additional ammonia storage and infrastructure built to meet increased use of ammonia-to-power, and to aid hydrogen adoption in regions where there will be no hydrogen network in the medium term. • Ammonia infrastructure built in locations where geological storage is not available to balance regional hydrogen networks.	Transport and Storage • Greater storage capacity added to enhance the UK's energy security.
Demand (average annual demand in the period) • Existing uses: 361 ktpa • Existing indirect fertilisers: 697 ktpa • Marine: 270 ktpa • Power: 0 • Indirect hydrogen: 95 ktpa	Demand • Existing uses: 361 ktpa • Existing indirect fertilisers: 750 ktpa • Marine: 660 ktpa • Power: min 50MW, max 1100MW • Indirect hydrogen: 1015 ktpa	Demand • Existing uses: 361 ktpa • Existing indirect fertilisers: 750 ktpa • Marine: 1700 ktpa • Power: min 600MW, max 2100MW • Indirect hydrogen: 2251 ktpa
Socio-economic benefits • 450-1332 long-term jobs • 630-1208 construction jobs	Socio-economic benefits • 1000-2125 long-term jobs • 1420-2869 construction jobs	Socio-economic benefits • 1540-2718 long-term jobs • 2320-2864 construction jobs
• Up to £1.52 billion private investment by 2036 • New jobs created in Scotland, industrial heartlands in the North of England, and South of England including London		

Introduction

As the second-most widely produced chemical globally,¹ ammonia is vital to the UK economy and underpins sectors including agriculture, manufacturing, defence, and foundation industries. However, conventional ammonia production is emissions-intensive, and ultimately responsible for around 2% of worldwide CO₂ emissions. Conventional production using fossil fuel feedstocks is also highly exposed to fluctuations in gas prices and global supply chain shocks, as evidenced by the increase in the cost of fertiliser following Russia's invasion of Ukraine in 2022 and the US-Israel war with Iran in 2026.²

At the same time, the International Energy Agency (IEA) forecasts that global demand for ammonia is expected to rise by 40% by 2050,³ which is also the date by which several major global economies have legislated for net zero. This presents a clear need to decarbonise ammonia production and adopt low-carbon ammonia widely across sectors. Low-carbon ammonia, which can be produced using technologies such as renewable energy, carbon capture and storage (CCS), and nuclear power, offers a strategic opportunity for the UK to gain international market share, while strengthening its domestic energy resilience, national security, and industrial decarbonisation. It also offers a means of addressing the wider economic challenges which are a primary focus of this Government. These include the potential to reduce cost-of-living pressures linked to volatile fossil fuel-based energy and fertiliser markets and supporting “good growth in every postcode” through the reindustrialisation of the UK's manufacturing and industrial regions, such as ports.

In the UK Ammonia Alliance's (UKAA) foundational policy report, ‘**The UK's low-carbon ammonia opportunity**,’ the industry Alliance demonstrated how the UK is well-placed to lead in the emerging market for low-carbon ammonia. That report set out eight steps that the UK Government and industry can take to unlock this opportunity.

As one of these eight steps, UK industry made a commitment to develop a low-carbon ammonia roadmap, covering the full ammonia supply chain, to demonstrate how the UK market will grow in the coming years. This roadmap is the result of that commitment and is intended to support UK Government policy making on the supply, use, and trade of ammonia.

This roadmap outlines expected milestones in the development of the UK market for low-carbon ammonia, covering four time periods – the present day, 2026–2029, 2030–2035, and 2036 onwards. It presents evidence in four sections:

1. Supply
2. Usage
3. Transport and Storage
4. Socio-economic benefits

There are several key policy and funding assumptions underpinning the market development trajectory presented in this roadmap. These include:

- The UK Government Hydrogen Allocation Rounds proceed as stated.
- The UK Emissions Trading Scheme (UK ETS) expands to include emissions from offshore vessels from January 2027.
- The UK Carbon Border Adjustment Mechanism (CBAM) comes into effect on 1 January 2027.
- The UK Government takes the necessary action to meet its legally binding Sixth Carbon Budget.
- FuelEU Maritime remains in place and rises as forecast.
- The International Maritime Organisation (IMO) continues to develop interim guidelines for the safety of ships using ammonia as a fuel.



These assumptions have been used to calculate demand in each sector, and cover relevant policy development and regulatory milestones in the UK, the European Union, and the rest of the world where relevant. Details on the assumptions used in producing this Roadmap are available in the Annex.

It should be noted that this is the first edition of the UK Low-carbon Ammonia Roadmap, and that this represents the first such attempt to set out the pace and scale of the anticipated growth of the sector in the UK as a complement to the wider clean energy sector.

The UKAA recognises that electrification will remain the default and cheapest option for those industries that can do so. There are, however, several sectors where electrification is either unsuitable or challenging at scale, or which require considerable capital investment to achieve conversion. Therefore, they are likely to rely instead on low-carbon molecules.⁴ Many of these sectors are reflected in this Roadmap, such as chemicals and maritime transport.

In others, such as power, low-carbon ammonia offers a complementary technology which can support the development of a resilient and competitive decarbonised energy system. The UKAA has reviewed available literature and price forecasts for the supply of low-carbon ammonia to reach the conclusions presented here.

Given the current lack of dedicated policy and funding support for low-carbon ammonia, there is an inherent uncertainty in the trajectory presented in this document. However, the UKAA believes that the supporting evidence (presented in the Annex) justifies the conclusions. The independent UK Ammonia Alliance Academic Forum has reviewed the Roadmap, as have industry peers.

The UKAA intends to update the Roadmap periodically to account for changes in policy, funding, and market developments. In the meantime, we hope that it can form a useful tool for industry, analysts, and policymakers as they develop enabling regulation.

1. Supply

Securing adequate, reliable supplies of low-carbon ammonia will be necessary to sustain key sectors of the UK economy, ensure national security, and achieve decarbonisation targets. While at present the UK does not have any remaining domestic ammonia production capability, ammonia remains indispensable for modern life because of its role in critical industries such as fertiliser production and chemical applications.

This section presents a framework for securing the supply of low-carbon ammonia required to meet growing demand. Growth in demand is expected as the UK moves closer to its legally binding net zero target, particularly as new technologies using ammonia as a clean fuel or hydrogen carrier mature, and as global trade increases.

The UK will secure its supply of low-carbon ammonia by balancing imports to drive near-term investment and market creation and, over the longer term, a renewal of domestic production using the UK's abundant wind capacity. This approach aligns with the Government's ambition to rebuild domestic industrial capacity, reduce dependence on fossil fuel derived molecules, and ensure that the economic benefits of the energy transition are felt across the UK. Industry will work with regulators to ensure that data from early activities, including the domestic production of ammonia, is used to formulate clear standards for low-carbon ammonia production and handling.

With the anticipated development of Small Modular Reactors (SMRs), in the future there may also be the possibility for additional distributed low-carbon ammonia production from nuclear power.

Present day

- At present, the UK imports vast quantities of anhydrous ammonia – this is the gas form of ammonia which contains no water and is therefore more logistically manageable to transport over long distances. This ammonia travels long distances to reach the UK and is almost exclusively produced using fossil fuels.
- In 2025, the UK imported nearly 350,000 tonnes of anhydrous ammonia.⁵ This is a 26% increase from 2024, and 71% higher than average ammonia import volumes over the past five years.⁶ Over 30% of the total value of

ammonia imported into the UK originated in the United States, c.16% from Algeria, and c.14% from Trinidad and Tobago, with Libya, Turkey, Saudi Arabia, and the UAE forming the remainder of the 'bulk' origin countries.⁷

- In 2025, 89% of the UK's imported anhydrous ammonia arrived into a single port – the Port of Middlesbrough. Approximately 5.5% arrived to Hull, 3.5% to Swansea, with the remaining 2% arriving at a range of other ports across the UK.⁸
- Once at port, most ammonia is initially transported by short, dedicated pipelines to nearby plants and industrial facilities, which utilise the ammonia for industrial processes such as refrigeration or convert the anhydrous ammonia into derived products such as fertilisers. These products are further distributed by road and rail.

2026–2029

- Small-scale domestic production restarts as Hydrogen Allocation Round-supported projects begin to come online. Starting in this period, a strategic supply of c. 50,000 tonnes of low-carbon ammonia is being produced mainly in Scotland, supporting early-stage reindustrialisation and creating new skilled employment opportunities in local areas, as well as demonstrating the capability and early economics of domestic low-carbon ammonia production.
- Significant new private investment is consented to develop projects for dedicated low-carbon ammonia import infrastructure. Major consented terminals, such as Immingham Green Energy Terminal, can be operational within 24 months of final investment decision.
- Through the new terminals, imports of competitively priced low-carbon ammonia begin to arrive in the UK from the first large-scale low-carbon ammonia projects in Saudi Arabia, UAE, India, Paraguay, and the USA.

2030–2035

- By the start of this period, the International Energy Agency (IEA) estimates that the 'near-zero' share of global ammonia production is around 14% to 17%.⁹
- In the UK, larger-scale domestic hydrogen production projects, some of which will produce low-carbon ammonia, are commissioned through Hydrogen Allocation Round (HAR) 3 onwards and enter development.
- With continued support for low-carbon hydrogen production through the HAR scheme, the UK scales up domestic production to 0.5 Mtpa by the end of the period. These projects are located in areas that provide wider system benefits to the electricity grid, reducing renewable constraint costs.
- Low-carbon ammonia produced from natural gas-derived hydrogen with carbon capture (CCS) technology also begins to come to market from overseas, at the same time as several more large-scale renewable-based ammonia projects enter production. The overall availability of low-carbon ammonia increases.
- Handling capacity and the number of potential trading partners increase, creating a competitive market for the UK to source from. The UK begins importing low-carbon ammonia from other global regions including Australia, Europe, and Africa.

2036 onwards

- By 2050, under the IEA's "Sustainable Development Scenario" and "Net Zero Emissions by 2050 Scenario", the supply of 'near-zero' ammonia increases to between 66% and 92% of global market share.¹⁰
- This is driven by increases in renewable energy-based and CCS-enabled ammonia production almost entirely replacing unabated fossil fuel-based production.
- Having worked to establish trading relationships early in the market for low-carbon ammonia, the UK continues to import from a range of producing regions. With its upgraded port terminals and investment in infrastructure, the UK acts as a key import/export hub in the global trade of low-carbon ammonia, which helps to ensure security of supply.
- Within the UK, production is moving towards 1.1 Mtpa of domestic production capacity, supporting the Government's objective of rebuilding vital industrial capabilities and strengthening domestic manufacturing by restoring the UK's past ammonia manufacturing levels, and helping to ensure an ongoing strategic supply of low-carbon ammonia that can support UK food security.





2. Usage

Ammonia is already vital to many modern industries such as agriculture, pharmaceuticals, plastics, and defence. As the UK transition to net zero continues, and schemes such as the Carbon Border Adjustment Mechanism (CBAM) and changes to the Emissions Trading Scheme (ETS) come into force, industries using ammonia to produce commodities will need to transition to low-carbon ammonia or risk increasing costs if continuing to choose higher-carbon imports. In addition, low-carbon ammonia will also become increasingly important for sectors such as shipping, off-grid power, and large-scale power generation as a hydrogen carrier, energy store, and sustainable fuel.

Throughout this period, industry will work with regulators to ensure that data from early demonstrator activities is used to formulate clear standards for the handling and use of ammonia, to enable the rapid rollout as demand for low-carbon ammonia in existing and new applications expands.

The following section demonstrates the expected uptake of low-carbon ammonia across both existing and new use cases through 2035 and beyond.

Present day

Today, the single largest use for ammonia in the UK is to produce fertiliser. Almost all ammonia demand in the UK market is met with unabated fossil fuels (grey ammonia).

Agriculture

- Much of the ammonia consumed in the UK today is used in the manufacture of nitrogen fertilisers.
- Initial small-scale trials are taking place to examine the impact of switching from fossil fuel-based fertilisers to low-carbon fertilisers produced using green ammonia. These trials demonstrate the emerging appetite for low-carbon alternatives.
 - In July 2023, Marks and Spencer announced a collaboration with Bartholomews Agrifood and Fertiheria to trial low-carbon ammonia-based fertiliser across the group's dairy farms.¹¹
 - Premier Foods started a trial of low-carbon fertiliser produced using renewable energy across its flour brands in 2025, beginning with a 165-acre site.¹²

Industrial processes

- The remainder of ammonia consumed in the UK is primarily used in the production of plastics, solvents, pharmaceuticals, dyes, and explosives. This production is concentrated at large-scale sites such as the Saltend Chemicals Park in Hull.
- Ammonia refrigeration systems are also widely used in food processing, brewing and distilling, and the cold storage of food.
- Globally, around 30% of ammonia demand is used in the above examples of industrial applications.¹³
- In addition, while industrial emissions fell in 2025, the Climate Change Committee notes that this was largely due to the closure of the Port Talbot blast furnaces, with limited progress on wider industrial electrification. The commercial case for electrification also remains challenging, with electricity prices for large industrial users approximately four times the price of gas.¹⁴
- Testing of novel ammonia industrial applications has already taken place. For example, in September 2025, the Amburn project – a collaboration between Flogas Britain and Cardiff University, supported by DESNZ funding through the Industrial Fuel Switching Competition – successfully ran a steam boiler at 500 kW thermal power with 100% ammonia. This technology presents a promising alternative to fossil-fuelled burners, to help decarbonise off-grid businesses across the UK.

Transport

- The adoption of ammonia as a maritime fuel in the UK is moving from the research stage to high-profile trials and pilot projects. These include:
 - The Fortescue Green Pioneer, the world's first dual-fuelled ammonia-powered vessel, which docked at the Port of Southampton and London's West India Docks in March 2025.
 - Project ENTICE, led by AFC Energy (now H-Power), MAHLE, Clean Air Power, and the University of Nottingham from March 2024 to 2025, which successfully demonstrated the feasibility of using ammonia as a single fuel in maritime vessels.

- In July 2026, Project FASTMOVE delivered a feasibility study into the use of ammonia engines in offshore support vessels, such as those that move workers and equipment between ports and offshore wind sites. The project, which was led by consultancy Ricardo, Brunel University of London, and the Port of Cromarty Firth, will inform the design of a next-generation ammonia combustion engine.
- In December 2024, the International Maritime Organisation adopted interim guidelines for the safety of ships using ammonia as a fuel, paving the way for ammonia-fuelled vessels to begin sailing.
- In its March 2025 Maritime Decarbonisation Strategy, the UK Government set out its plans to reduce greenhouse gases from the domestic maritime sector. This Strategy recognised the significant role that ammonia will likely play as a maritime fuel, and included policy measures to narrow the price gap between conventional fossil fuels and clean fuels like ammonia.
 - These include the Renewable Transport Fuel Obligation (RTFO), which requires UK transport fuel suppliers to either supply eligible low-carbon fuels or purchase certificates, and applies to ammonia when used as a renewable fuel of non-biological origin.
- Globally, orders for ammonia-fuelled vessels are growing: the Ammonia Energy Association reports that as of September 2026, a total of 116 ammonia-fuelled vessels and 334 ammonia-ready vessels had been ordered, announced, or already operational.¹⁵ This represents an increase of 21% and 100%, respectively, of total orders for each vessel type since September 2024.
 - The 2026 number includes 22 bulk carriers, two of which are operational. Of the ammonia-ready vessels, 99 are operational.

Power

- Small-to-medium scale ‘ammonia-to-power’ technologies are in the early stages of commercialisation.
- Industry and academia are developing ammonia-capable gas turbines, which can be used for low-carbon power generation. For example:
 - Mitsubishi Heavy Industries (MHI) has developed direct ammonia firing capability (without converting to hydrogen) in an industrial-class gas turbine. This technology has been validated in real world conditions during the 2023-2024 period. Further commercialisation efforts will depend on global policy developments, market demand, and the availability of low-carbon, cost-competitive ammonia.

- In 2023, Mitsubishi Power Europe signed a Memorandum of Understanding with Centrica to explore the development, construction, and operation of Europe’s first ammonia-fired power generation facility in Cork, Ireland.
- The Gas Turbine Centre at Cardiff University has modelled and holds patent-pending designs for ammonia burners that minimise the unintended release of ammonia into the air – one of the most significant technical hurdles to widespread adoption of ammonia as a fuel.
- Industry is advocating for the scope of government funding to be expanded to include ammonia-to-power, given it is easier to handle than hydrogen, is suitable for large-scale storage and already compatible with existing infrastructure.
 - The Government Response to the call for evidence on the Capacity Market: Hydrogen to Power and Interconnectors noted that “the majority of respondents argued for expansion of the eligible technology scope within the Capacity Market. Many pointed to ammonia-to-power and ammonia storage as realistic alternatives that should be explicitly included”.¹⁶
- Ammonia is also being used directly and indirectly to power fuel cells.
 - UK companies such as H-Power (formerly AFC Energy) are bringing to market mature technology that cracks ammonia into hydrogen gas, which is then fed into PEM fuel cells to power heavy-duty transport and machinery.
 - R&D is ongoing for solid oxide fuel cells, which crack ammonia internally into hydrogen, to be used for stationary power. The ASPIRE Project at STFC Rutherford Appleton Laboratory in Oxfordshire is currently testing whether this type of fuel cell can use stored green ammonia and put electricity back into the UK grid.
 - Direct ammonia fuel cells remain in the R&D phase.

Hydrogen

- Trials and demonstration projects for cracking ammonia to hydrogen are taking place at increasing scale, demonstrating ammonia’s potential as a transportable and storable hydrogen vector with pre-existing safety protocols and infrastructure.

- Interest in ammonia cracking as a route to hydrogen supply is growing for dispersed sites (those located outside industrial clusters, which are not expected to be able to connect to the first hydrogen transport and storage networks). In total, dispersed sites currently generate 33.6 MtCO₂e – half of the UK’s annual industrial emissions.¹⁷
- Meanwhile, technology developers are bringing to market commercially viable ammonia cracking solutions for use initially at distributed or off-grid sites.
 - In 2024, H-Power announced the establishment of its subsidiary, Hyamtec, to bring to market the Hy5 ammonia cracker. This containerised, portable cracking module operates at TRL 7/8, making it ready for commercial deployment. The cracker can produce up to 500 kg/day of hydrogen and be scaled to meet industrial demand.
 - In February 2026, H-Power was granted a revision to the R&D permit for its pilot ammonia cracking plant in Dunsfold, which for the first time permits the sale of hydrogen cracked from ammonia in the UK. This evidences the progress H-Power has made in demonstrating the safety of hydrogen from cracked ammonia and accelerates revenue generation by several months.

2026-2029

Agriculture

- The UK CBAM comes into force in January 2027 with ammonia in scope within the fertiliser sector, increasing the price of imports of high-carbon finished fertiliser products and fertiliser inputs to the UK.
- This increase is mitigated by a lower CBAM liability for low-carbon ammonia and in-scope low-carbon fertilisers when carbon intensity is verified using actual emissions data.
- During this period, trials of low-carbon fertiliser products continue, led by large producers and premium retailers.
- The first domestically produced low-carbon fertiliser comes to market, likely via UK-based low-carbon hydrogen production projects.

Industrial processes

- As low-carbon ammonia projects begin to come online and the UK CBAM comes into force, chemicals sectors that rely on imports will likely begin to explore low-carbon alternatives to traditional ammonia supplies.



- In this period, trials begin to ensure that low-carbon ammonia can replace fossil fuel based sources in the production of plastics. End users will need to be assured of the quality through tighter feedstock qualification, because ammonia is one element in a multi-feed reaction system in the production of end plastics for use in automotive, electrical, and consumer applications.
- Trials for low-carbon ammonia use in pharmaceutical, dye, and specialty chemicals also take place in this time. These trials are likely to take longer because of the sensitive nature of the end products, and users needing to ensure that purity standards are being met by the new inputs.
- Demonstrations of ammonia boiler technology at 1 MW scale take place at industrial sites. Within this period, this technology is brought to market, and begins to be adopted at select off-grid businesses, helping to decarbonise industrial heat.

Transport

- Ammonia demand for maritime applications starts to scale up, at approximately 270 ktpa, as early movers adopt ammonia as a maritime fuel.
- The UK Emissions Trading Scheme was extended to the domestic maritime sector on 1 July 2026. This sets a limit on the total CO₂, methane, and nitrous oxide emissions from domestic ship voyages (from UK port to UK port), as well as emissions from ships in berth at UK ports. By effectively imposing a carbon tax on traditional maritime fuels, the UK ETS will narrow the price gap between fossil fuels and low-carbon ammonia over time, making ammonia an increasingly attractive option for maritime fuel.



- At the same time, the RTFO acts cumulatively with the UK ETS to create market conditions which further support the switch to low-carbon fuels.
- The UK ETS expands to cover offshore vessels in January 2027, and then to cover 50% of the emissions from international voyages in 2028. This proposed expansion will align with the EU ETS and accelerate uptake of ammonia fuel.
- The UK adopts IMO standards on the use of ammonia as a maritime fuel, as is its stated intention in the 2025 Maritime Decarbonisation Strategy.

Power

- Large-scale ammonia direct firing technology nears commercialisation. As the technology matures, the UK Government broadens the scope of large-scale net zero power technologies to include ammonia-to-power.
- The UK Government introduces a bespoke financial support mechanism for ammonia-to-power or incorporates the technology under an existing scheme, such as the Hydrogen to Power Business Model or the Capacity Market.
- This provides revenue certainty for the construction of two 50 MW pilot-scale plants, alongside ammonia reserves and ammonia bunkering stations, and de-risks adoption of ammonia-to-power technology by early movers.

Hydrogen

- Industrial Energy Transformation Fund (IETF) projects examining hydrogen fuel switching across different industries and processes conclude in this period. These projects, in demonstrating the viability of hydrogen for hard-to-abate industries, also highlight that, at the current pace of UK project development, supply of domestically produced low-carbon hydrogen is unlikely to scale up in time to meet early demand.
- Knauf, a producer of plasterboard and other gypsum-based building materials, is conducting a study on the technical feasibility of using hydrogen combustion as a substitute for natural gas in plasterboard production.
- Holcim is running the Moorcroft Hydrogen Conversion project, whose goal is to decarbonise the asphalt manufacturing process at the Holcim UK Quarry in Plymouth. This project involves retrofitting the existing asphalt plant with a dual-fuel burner system capable of combusting pure hydrogen. The hydrogen will be supplied by a nearby HAR1 project via tube trailers.

- Development of the UK's first regional hydrogen transport and storage network begins. When operational, this will enable the first local production, storage, and transport of low-carbon hydrogen to hard-to-electrify sectors.
- The first allocation rounds for the hydrogen transport and storage business models are due to open in 2026.
- During this period, hard-to-electrify industries begin trials of low-carbon ammonia cracking, enabling them to use hydrogen as a decarbonisation solution, without being constrained by lack of access to a hydrogen transport network. Additionally, ammonia cracking offers a space-efficient alternative to hydrogen delivery by tube trailer, which also increases the cost to the end user.
- Using technology available in 2026, two ISO tanks of ammonia at 26 tonnes can generate the same volume of hydrogen as 15 hydrogen tube trailers carrying 300 kg each.
- By 2029, cracked ammonia-to-hydrogen displaces 2% to 3% of natural gas use in the refining, chemicals, steel, cement, glass, and brick and tile manufacturing sectors.
- At the same time, ammonia cracking units combined with fuel cell generators are deployed at increasing scale, with off-grid power sectors such as construction sites being early adopters.

2030-2035

Agriculture

- As the supply of low-carbon ammonia starts to overtake grey ammonia, UK CBAM, which is applicable to the import of ammonia in anhydrous or aqueous solution and a range of finished fertiliser products, drives uptake of low-carbon alternatives to grey ammonia.
- This occurs as the price of low-carbon ammonia from regions with very low-cost renewable generation increasingly comes to market, mitigating the impact of higher prices.

Industrial processes

- The results of trials to replace grey ammonia with low-carbon ammonia in quality sensitive and multi-input processes conclude with greater knowledge of the properties of low-carbon ammonia and how this can be substituted for grey ammonia in these processes.
- In this period, UK CBAM continues to strengthen the business case for uptake of low-carbon ammonia across industrial applications, which supports the long-term competitiveness of domestic manufacturing. It also

contributes to reindustrialisation by helping businesses to decarbonise and retain manufacturing capacity in the UK.

Transport

- Domestic maritime demand for ammonia grows during this period, up to approximately 660 ktpa.
- The price of low-carbon ammonia decreases as supply chains develop.
- The market materialises for ammonia as a maritime fuel, as the sector transitions from pilot projects to a commercial growth phase. Dry bulkers and gas tankers lead adoption, based on their nearly 80% share of the global order book for ammonia vessels, as of September 2026.¹⁸
- The size of this early market depends on domestic policy levers, as well as whether the IMO's Net Zero Framework is approved and comes into force, after a vote on the framework was postponed for a year in October 2025.
- Should the IMO's Net Zero Framework be approved, it sets a target of 5% to 10% zero emission fuel uptake by 2030. The UK has committed to aligning with policymaking at the IMO.
- The UK sees initial demand for ammonia bunkering at its major ports, as global demand for ammonia as a marine fuel is projected to reach 2.3 Mtpa by 2030.¹⁹ At least two major bunkering hubs develop in the UK – likely Immingham and Teesside. This enables fuelling of international ammonia-powered vessels, unlocking the UK as a major ammonia bunkering destination given our strategic geographic location.
- Plans to develop further bunkering hubs progress. These could include Portland Port, on the south coast of England.

Power

- Multiple ammonia-to-power solutions reach commercialisation, and begin entry into the European market, including the UK. Likely early competitors for this market include MHI, IHI and GE Vernova, Baker Hughes and Hanwa, and Siemens Energy.
- Ammonia-to-power capacity scales up to an average annual capacity of 238 to 370 ktpa during this period, depending on policy support.
- Early adopters place orders for small-to-medium ammonia gas turbines, to be used primarily at industrial sites, ports with existing ammonia infrastructure such as Teesside, and data centres.

Hydrogen

- The UK's first regional hydrogen transport and storage network comes online in 2031. HAR3 and HAR4 hydrogen production projects also come online.
- As hydrogen transport and storage networks expand, imports of low-carbon ammonia help to ensure security of hydrogen supply for local pipeline networks serving sectors that require large volumes of hydrogen, which cannot be immediately met by domestic hydrogen production capacities.
 - The Capital Hydrogen programme, led by Cadent, National Gas, and SGN, has identified up to 1.7 TWh of hydrogen demand by 2033 along the Thames Estuary, but only 800 MW of hydrogen production potential in London by 2030, leaving a significant gap. This potential production capacity does not account for delays to the HAR scheme.
 - UK Energy Storage aims to deliver nationally significant long duration energy storage (LDES) projects in the form of hydrogen-ready storage. Their Dorset site is the largest planned hydrogen storage site in the UK and the sole planned national scale hydrogen storage solution in southern England, close to strategic offtakers such as the Fawley Refinery.
- Low-carbon ammonia also starts to be supplied to sites with high heat or process needs and limited pipeline access, where it is re-converted into hydrogen using ammonia cracking technology. This is likely to include dispersed sites in the refining, glass, chemicals, and ceramics industries.
 - By the end of this period, ammonia cracking is replacing 10% to 18% of annual natural gas demand in these sectors.

2036 onwards

Agriculture

- Major retailers continue to reduce their Scope 3 emissions in pursuit of net zero targets. This drives further uptake of low-carbon ammonia in agriculture.

Industrial processes

- In line with the UK's net zero legislation, industrial processes which used grey ammonia convert to low-carbon ammonia by 2050.

Transport

- As the maritime industry accelerates its transition to low-carbon shipping fuels, UK maritime demand for ammonia grows significantly to approximately 1700 ktpa.
- Under the 'balanced mix' scenario from the UK Government's Maritime Decarbonisation Strategy, by 2040, ammonia represents 24% to 25% of domestic shipping fuel. Similarly, under its 'Balanced Pathway,' the Seventh Carbon Budget projects that ammonia will meet 22% of shipping energy use by 2040.
- Under the Maritime Decarbonisation Strategy's 'more ammonia' scenario, approximately 56% to 61% of domestic shipping fuel will be ammonia by 2040.²⁰

Power

- Overall, ammonia demand for power applications rises sharply to an average of between 1219 and 1643 ktpa of the UK's total ammonia demand.
- The construction and operation of 100% ammonia gas turbines scale up.
- Ammonia-to-power plants act as a strategic reserve, replacing natural gas as a source of backup power.

Hydrogen

- As the HAR scheme matures, it transitions to a price-based competitive allocation model. This increases the domestic production of low-carbon ammonia, and enables the development of a dispersed strategic national ammonia reserve.
- The strategic national ammonia reserve can be called upon to provide back-up power to industry as required.
- Imports of low-carbon ammonia continue, ensuring ongoing security of supply to support the decarbonisation of industries switching to hydrogen.
- By this time, low-carbon ammonia cracking provides up to 10% to 20% of the demand met by natural gas today in hard-to-abate sectors. These include the refining industry, chemicals, steel production, cement plants, glass manufacturing, and brick and tile production industries.

3. Transport and storage

As a globally traded product, the ammonia industry already has a well-established transport and storage network, including long-distance movement by sea, road, and rail. This global trade has led to the development of large-scale storage facilities, as well as well-established safety and handling protocols.

Anticipated growth in the global market for ammonia means that ammonia transport infrastructure will need to increase by a factor of 10 to 15 by 2050, according to the International Renewable Energy Agency (IRENA) and the Ammonia Energy Association (AEA).²¹ This will also necessitate significant annual investment in the wider transport and storage supply chain, such as ships to transport additional volumes of ammonia by sea.

Present day

- Transport by pipeline is typically short distances of 1 to 2 kilometres, with pipelines located within industrial areas and often at or near port facilities.
- For ammonia that is not processed close to ports of entry to the UK, it is transported by road or rail. Fleets of pressurised road tankers, which are governed by strict regulations, transport anhydrous ammonia to end users via the UK road network.

- 'Bulk' storage of liquid ammonia at industrial facilities and fertiliser storage is typically in large pressurised tanks. At even larger scales, such as import terminals and ports at Hull and Middlesbrough, ammonia is also often stored in refrigerated liquid form in large tanks at -33C. These facilities must be retained.
- All transport and storage of ammonia is heavily regulated, with strict safety management systems in place.
- New investment in bulk tank storage terminals (including for handling ammonia) has been announced across the world, with Europe (as a region, including the UK) announcing investment in adding 5,247 kcbm (thousand cubic metres). Of this, c. 2,825 kcbm is already under construction.²²
 - In the UK, port-based terminals are the current focus for ammonia transport and storage infrastructure investment. While the Immingham Green Energy Terminal is currently on pause, the plans for the site provide a clear example of the core model for this type and scale of infrastructure upgrade. The project has been designed to deliver a new liquid bulk import terminal with dedicated jetty infrastructure, on-site ammonia storage and handling, and integration into hydrogen production and distribution systems.



- Other ports are being equipped to handle low-carbon fuels, including ammonia, in future. For example, Associated British Ports (ABP) completed its Lowestoft Eastern Energy Facility in 2025, at the UK’s most easterly port, which is equipped with infrastructure to support alternative fuels and shore power.
- This investment is designed to help alleviate the existing practical constraints in ammonia logistics, which include port access, and which will only increase as the global trade of low-carbon ammonia grows over time.

2026-2029

- As adoption of ammonia and hydrogen, and specifically low-carbon forms of both, increases, requirements to scale up existing bulk storage infrastructure emerge.
- Investment of up to £1.5 billion by the UK tank storage industry takes place over this period, through to 2030. Low-carbon fuels currently account for a small proportion of annual storage capacity. Some of this investment is expected to go into scaling up ammonia infrastructure.²³
 - This includes storage tanks associated with domestic ammonia production, which will begin to come online in this period.
- Trials examining the potential to store low-carbon ammonia in existing bulk storage tanks and pipeline networks continue, demonstrating the ability for the UK to manage greater volumes of ammonia.
- At the same time, hydrogen transport and storage business models are updated to accommodate ammonia as a hydrogen vector and key enabler of the hydrogen economy.
 - Planned upgrades at existing transport and storage facilities take place alongside trials. This includes investments in digitalisation, automation, and safety standards, as well as establishing initial capabilities in low-carbon ammonia import logistics, storage, and conversion at key locations.

2030-2035

- Several UK ports, particularly those with strong existing chemical and liquid bulk handling and domestic production capacity, upgrade their infrastructure to enable bunkering of ammonia and other low-carbon fuels. This could include Immingham, Teesside, and Portland Port.

- Analysis by the Mærsk Mc-Kinney Møller Center for Zero Carbon Shipping has demonstrated that chemical ports are better positioned to transition to alternative fuels, compared to other port types.²⁴
- Investment into ammonia transport and storage at key locations, such as coastal and hard-to-abate industrial sites, scales up into larger, multi-user energy hubs. At these hubs, ammonia is imported, stored, and then converted to hydrogen for wider distribution across the UK.
- This coincides with the UK’s first regional hydrogen transport and storage network coming online in 2031, with potential for more to follow in this period.
- As hydrogen transport and storage networks expand, low-carbon ammonia helps to ensure security of hydrogen supply and provides a grid balancing service.

2036 onwards

- Over time, a network of low-carbon ammonia import and distribution terminals is established.
- These are increasingly integrated with hydrogen distribution infrastructure and wider energy systems such as carbon capture.
 - The Immingham Green Energy Terminal provides a blueprint for this evolution of ammonia storage and transport infrastructure, from single-site terminals to a backbone for both onward distribution of ammonia and on-site conversion to support national hydrogen supply.
- Ammonia becomes used as a strategic tool for seasonal long-duration energy storage (LDES), acting as a complementary support to the estimated 60 to 100 TWh of hydrogen storage capacity required in Great Britain by 2050.²⁵



4. Socio-economic benefits

The UK Ammonia Alliance has conducted the first survey of businesses with an interest in the UK market for low-carbon ammonia. This survey asked a series of questions about the socio-economic benefits that growth in the UK market could deliver, and revealed the potential scale of jobs and investment growth for the first time.

A total of 31 businesses responded to the survey. These included small and medium enterprises (14) and large multinationals (17). It should be noted that with little existing policy and funding clarity from government as to its ambitions for low-carbon ammonia, there is a degree of uncertainty in the survey results. The investment and employment figures should be considered early stakeholder evidence, and as such are presented as a high and low estimate. Their realisation will depend on the development of future market, policy, and investment decisions.

The UK Ammonia Alliance intends to repeat this survey as the market grows, to continue to provide the most accurate forecast of the long-term impact of rebuilding and growing the UK’s ammonia industry.

Investment

- By 2036 there is potential for at least £1.16 billion and up to £1.52 billion of new capital investment into low-carbon ammonia projects, infrastructure, and supply chains. This level of investment would make a material contribution to the Government’s ambitions for reindustrialisation, by attracting private capital into industrial regions, ports, and manufacturing centres across the UK.
 - Two major producers and infrastructure developers indicate they are ready to invest >£500 million into UK projects in the next 5 to 10 years.
 - Technology developers and manufacturers could each invest between £5 million and £100 million in the same period, depending on how the market matures.
- Government support will be key to unlocking this investment, with 17 of 28 respondents saying they expect to use UK government financial support. The most frequently cited mechanisms were Contracts for Difference (CfD) style support (15 respondents) and CAPEX grants (14 respondents), followed by carbon pricing mechanisms.
- The primary barrier to realising this investment is policy uncertainty, followed by demand uncertainty, planning and permitting, and price risk.

Jobs

- The survey asked how many long-term, direct jobs respondents expect to create in the UK from low-carbon activities in the periods 2026-29, 2030-35, and 2036 onwards.

How many long-term, direct jobs do you expect to create in the UK from low-carbon ammonia activities in...	
2026-29	450-1332
2030-2035	1020-2125
2036 onwards	1540-2718

- The survey also asked the same question for construction jobs, giving a clear picture of the additional impact on short-to-medium term employment opportunities:

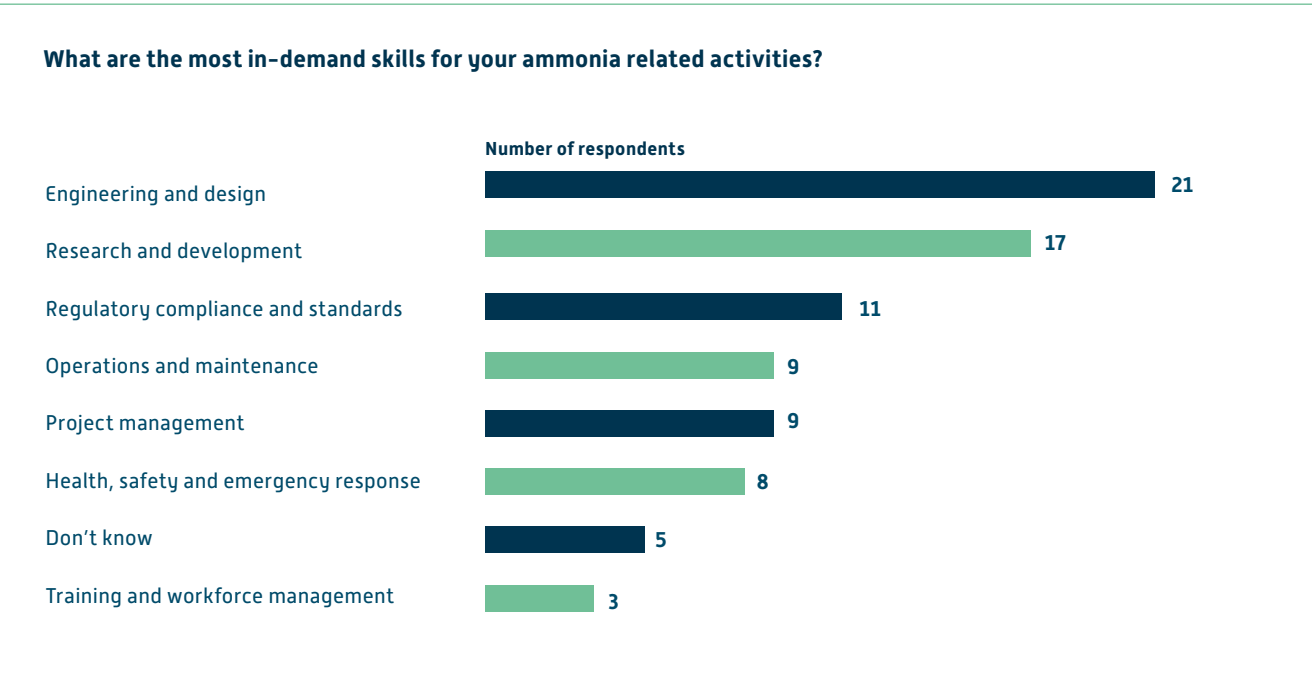
If focused on developing infrastructure for the production, distribution, and trade of low-carbon ammonia, how many construction jobs do you expect to create in the UK from low-carbon ammonia activities in...	
2026-29	620+
2030-2035	1,360+
2036 onwards	1,270+

- Both sets of answers are consistent with a sector moving from early-stage deployment to commercial scale-up, showing larger numbers of jobs appearing after 2030 as the supply and uptake of low-carbon ammonia increase.
- Respondents were also asked which regions they currently operate in, and intend to operate in. There is a strong correlation between the regions most commonly selected and growing clusters for energy and industry-specific skills. The most commonly selected regions were:
 - London
 - Scotland
 - North East and Cumbria
 - South East
 - North West
 - Yorkshire and the Humber
 - South West

- This was supported by respondents choosing industrial clusters as the area where they were likely to direct the highest proportion of investment from ammonia-related activities, followed by coastal regions. These employment opportunities are therefore likely to be most concentrated in sectors and regions that have historically played a central role in the UK's industrial heritage, helping to ensure that the benefits of growth in low-carbon ammonia are felt across the country.

Skills

- Respondents provided a clear picture of the most in-demand skills for their ammonia-related activities. The suite of skills required provides an indication of the good, long-term jobs that could be on offer to UK workers if the market for low-carbon ammonia develops in line with expectations.
- Of those respondents who gave a view on job composition, highly-skilled roles emerged as more likely to account for a meaningful share of employment than entry-level or apprenticeship roles.
- However, the small sample size and relative nascency of the UK low-carbon ammonia sector may explain this finding, and as the market develops and the number of jobs grows there is likely to be increasing opportunity for entry-level and apprenticeship roles.



Conclusion

The UK has a clear opportunity to build a competitive low-carbon ammonia industry that boosts the UK's industrial economy and energy and food resilience. In doing so, it can also support the Government's wider objectives of tackling cost-of-living pressures, strengthening energy security, and driving reindustrialisation across regions.

This roadmap shows that low-carbon ammonia can help decarbonise existing uses in fertilisers, chemicals, and industrial processes, while also enabling new applications in maritime fuel, flexible power generation, hydrogen storage, and hydrogen supply to hard-to-abate sectors.

By combining early imports with the phased restoration and scale-up of domestic production, the UK can position itself as a future hub for low-carbon ammonia trade. This will strengthen UK energy security while reducing exposure to volatile fossil fuel markets.

With data collected from the first ever UK low-carbon ammonia market survey, this roadmap has also demonstrated the benefits that this industry can provide to people and communities across the UK. The low-carbon ammonia economy can create new long-term skilled jobs, stimulate infrastructure investment,

and support growth in industrial clusters and coastal regions. By anchoring new or increased investment in communities across Scotland, the North of England, Wales, and coastal regions, the sector can play a meaningful role in rebuilding Britain's industrial base and delivering "good growth in every postcode."

Low-carbon ammonia should therefore be treated as a strategic national capability: essential to the UK's decarbonisation goals, industrial competitiveness, food security, and long-term energy resilience.

Realising this opportunity will require coordinated action from government and industry. This roadmap signals industry's strong commitment to, and progress towards, making the UK a leader in low-carbon ammonia. Investment in production, import terminals, storage, bunkering, ammonia cracking, and wider transport infrastructure must be matched by a policy framework that recognises and supports ammonia's strategic role for the UK's future.

Early policy certainty will be critical to unlocking private capital, accelerating first-of-a-kind projects, and ensuring that the UK does not fall behind other countries already moving quickly in the emerging global market.

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