

Note on German Hydrogen Import Strategy, published 24 July 2024

The German federal ministry for Economy and Climate Action (BMWK) this week published its [Import Strategy for Hydrogen and Hydrogen Derivatives](#), citing it as a core element of its National Hydrogen Strategy, which was updated in summer 2023.

This import strategy outlines the scale of imports envisaged; the importance of gaseous and liquid hydrogen imports and the role of hydrogen derivatives from further afield; the main transportation options; and measures to strengthen and scale hydrogen imports, i.e. strengthening demand, building sustainable import infrastructure, regulation and certification, support including financial instruments, the focus of international cooperation, and the importance of research and development.

The strategy's' basic premise is set out in its opening statement:

A large proportion of Germany's hydrogen requirements will have to be covered in the medium and long term by imports from abroad, and Germany will be one of the world's largest hydrogen importers in the world. A resilient, i.e. sustainable, stable, secure and diversified, supply with sufficient hydrogen and hydrogen derivatives is in Germany's strategic interest. The aim of the Federal Government is therefore to ensure the reliable supply of green, permanently sustainable hydrogen and its derivatives. (p. 2)

Alongside this, the document explicitly states several times that it is aimed at producer countries and investors, providing market certainty and enabling them to prepare:

The import strategy is intended to help provide investment security for hydrogen production in partner countries and the development of the necessary import infrastructure, thus accelerating the global energy transition. The import strategy opens up major market opportunities for potential hydrogen exporters and also sends a signal to the German economy about the reliable supply of sufficient quantities of hydrogen and its derivatives which is necessary for the switch to climate-friendly [industrial] processes. (p. 2)

and

This import strategy provides a reliable framework for private-sector hydrogen imports to Germany. It thereby contributes to ensuring investment security for hydrogen production in partner countries and the development of the necessary import infrastructure. [...] It is intended to provide orientation to producers, project and infrastructure developers, traders of hydrogen and hydrogen derivatives, buyers, financial institutions, network operators and local stakeholders in producer countries. [...] **The import strategy should also give governments in partner countries clarity about German import requirements for hydrogen and its derivatives, as well as the overarching goals and framework conditions for the establishment and expansion of hydrogen partnerships.**

The strategy is positive for Scotland. Firstly, it reinforces Germany's predicted hydrogen import requirements, confirming figures in its 2023 National Hydrogen Strategy update.

- German demand for hydrogen and its derivatives is expected to total ~95-130 TWh by 2030, with an import share of 50-70%, i.e. 45-90TWh (p. 10). German sources usually say that 'around two thirds of German H2 requirements will be imported.
- By 2045 this is expected to rise to ~360-500 TWh for hydrogen and 200 TWh for hydrogen derivatives.

- Current predictions are for these to be primarily for the steel industry, feedstock and petrochemicals, mobility and logistics, and the power sector, both through the substitution current fossil fuels and through new manufacturing processes.

This is important for the Scottish sector and for UK policy as it deals with those who ask whether hitherto stated goals will materialise and whether UK/Scotland should be looking to export.

Means of transport

Whilst the German government will promote both pipeline and shipped imports, the preference is for more cost-effectively pipeline infrastructure where possible, with shipped transport focused on geographically more distant countries that for technical and economic reasons cannot be connected by pipeline (p. 3):

In the medium term it can be assumed that a large proportion of the demand for hydrogen will be covered by pipelines if these import routes - as is currently the case for typical distances in the North Sea, Baltic Sea and Mediterranean region - are cheaper and more environmentally than ship transport and the resulting cost savings in transport are greater than the potential higher production costs. (p. 14)

Similar to conclusions from Scotland's NZTC Hydrogen Backbone Link project:

Pipeline-based hydrogen infrastructure enables the cost-efficient transport of molecular hydrogen from Europe [the EU] and neighbouring countries to Germany without conversion losses. In addition to the construction of new pipelines, the conversion of natural gas pipelines may have various advantages such as lower costs, conservation of resources, etc., as long as technically feasible and taking into account the security of gas supply [in the meantime].

Where hydrogen derivative imports are required, the report echoes SG expectations that it is sensible for Scottish players to export derivatives only where they will be used in this form by offtakers, e.g. ammonia for fertiliser or feedstock:

It is more energy efficient and tends to be more economical to utilise the imported hydrogen derivatives directly as far as possible. The needs-based conversion of derivatives back into molecular hydrogen can play an important role if sufficient quantities of hydrogen are not produced nationally or obtained via hydrogen pipelines. (p. 14)

Import countries and partnerships

The basic premise is that Germany will need multiple import partners and routes to avoid dependencies such as in the past on Russia for natural gas:

The German government is planning to diversify the supply of hydrogen and its derivatives as broadly as possible. To this end, the Federal Government is working in bilateral and multilateral cooperation formats with a large number of partner countries, regions and international players. (p, 3 and section 2.3)

The reference to regions is significant as it seems to lay down a marker that the German government will engage not only with nation states, such as the UK, but also with regions such as Scotland as necessary. This is important for our bilateral engagement.

More widely,

In order to achieve the objectives of the import strategy, increased co-operation within the EU **and with countries neighbouring the EU (e.g. Norway, Great Britain or countries in North Africa)** is of great importance. The aim is to utilise favourable production potential for hydrogen as effectively as possible and to establish resilient import relationships.

In addition to in-depth cooperation, **the rapid establishment of a pipeline-based, trans-European hydrogen network is crucial**. This should connect the important production, import and consumption centres for hydrogen within the EU and **enable the distribution of [...]** **hydrogen imports from third countries**. The German government is leading the way here by creating a hydrogen core network [of nearly 10,000km domestic hydrogen pipeline by 2032] as the basic framework for the trans-European hydrogen network, thereby increasing planning security for the players involved at home and abroad.

[REDACTED]

The German government's goal is to embed the German hydrogen core network within European networks from an early stage. It is to be closely linked to the emerging hydrogen networks of EU member states and neighbouring countries via interconnectors and trans-European hydrogen import corridors. (p. 22)

Of the four potential pipeline corridors (North Sea, Baltic Sea, Southwest and South) the first is the North Sea, and in more detail than the others. It details the first international pipeline being built between Germany and Denmark, plans for a pipeline between Norway and Germany, and then reference to 'the UK (including Scotland)' The accompanying map shows a clear import arrow from Scotland. The full section reads (my emphasis in bold):

Co-operation with our respective neighbouring countries will be built up and deepened along the corridors. The respective focal points of our cooperation are outlined below as examples:

In the North Sea region, the Federal Government is striving for an integrated system overall. The enormous generation potential of renewable electricity (especially offshore wind) and hydrogen is to be utilised and made available in a closely meshed network. To this end, the Federal Government, together with its partners is committed adjusting the regulatory framework for investments in offshore wind capacity and standardised approval processes. **The BMWK plans to present an offshore cooperation strategy for an offshore cooperation strategy for renewable electricity and green hydrogen at the North Sea Summit in Hamburg in [June] 2025. [REDACTED]**

In addition, several specific hydrogen infrastructure projects are being pursued:

- The first cross-border pipeline is to be built between **Germany and Denmark**. Work is currently underway to finalise the framework for a final investment decision (FID) in 2025

and for it to become operational at the end of 2028. This rapid implementation is anticipated by the Federal government to provide an important impetus for other cross-border hydrogen projects.

- A joint feasibility study on a hydrogen pipeline between **Germany and Norway** has already been carried out. Work is currently underway on creating the framework for FID. Among other things, this is being implemented within the framework of an established task force between both countries' ministries. The pipeline is intended to enable hydrogen imports from Norway as early as 2030.
- **As part of the energy partnership with the United Kingdom** [signed in Berlin in Sept 2023], talks are being held on the possible construction of a hydrogen pipeline between Germany and the United Kingdom (e.g. Scotland).
- Both the **Netherlands and Belgium** are aiming, in the context of their respective national hydrogen developments, imports of shipped hydrogen and a close connection into the German core grid. According to the current draft application from November 2023, **the [German] hydrogen core grid envisages four German-Dutch interconnectors and one German-Belgian interconnector by 2032.**
- The Baltic Sea region is another key building block for German hydrogen supply due to its high potential for onshore and offshore wind power and for hydrogen storage. Two pipeline projects involving all EU Baltic Sea neighbours are currently being developed: one offshore pipeline through the Baltic Sea (Baltic Hydrogen Collector), and an onshore pipeline through the Baltic States and Poland (Nordic Baltic Hydrogen Corridor), establishing connections between Finland and Germany.
- The Iberian Peninsula is characterised by high potential for solar and wind energy. The south-west corridor envisages connecting Spain, Portugal and possibly Morocco with Germany via France. The 'H2Med' pipeline project and its connection to Germany, 'Hy-FEN', are intended to be used to import of hydrogen [to Germany]. To accelerate this expansion, the German government is also intensifying dialogue with neighbouring countries on regulatory framework conditions and is in favour of joint projects, e.g. in the field of electrolyser production.
- The southern corridor is to be a direct connection between Algeria, Tunisia, Italy, Austria and, in the long term, Switzerland and Germany, and will largely consist of reused natural gas pipelines. The European section of this corridor (SouthH2) has been granted PCI status. Its realisation will require the timely and ambitious ramp-up of hydrogen production in Tunisia and Algeria.'

Abb. 4: Schematische Darstellung europäischer Importkorridore (aktuell angedachter Stand; gestrichelte Linie symbolisiert perspektivische Ausbaustufe)



Quelle: BMWK

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This import strategy outlines the scale of imports envisaged; the importance of gaseous and liquid hydrogen imports and the role of hydrogen derivatives from further afield; the main transportation options; and measures to strengthen and scale hydrogen imports, i.e. strengthening demand, building sustainable import infrastructure, regulation and certification, support including financial instruments, the focus of international cooperation, and the importance of research and development.

The strategy's' basic premise is set out in its opening statement:

A large proportion of Germany's hydrogen requirements will have to be covered in the medium and long term by imports from abroad, and Germany will be one of the world's largest hydrogen importers in the world. A resilient, i.e. sustainable, stable, secure and diversified, supply with sufficient hydrogen and hydrogen derivatives is in Germany's strategic interest. The aim of the Federal Government is therefore to ensure the reliable supply of green, permanently sustainable hydrogen and its derivatives. (p. 2)

Alongside this, the document explicitly states several times that it is aimed at producer countries and investors, providing market certainty and enabling them to prepare:

The import strategy is intended to help provide investment security for hydrogen production in partner countries and the development of the necessary import infrastructure, thus accelerating the global energy transition. The import strategy opens up major market opportunities for potential hydrogen exporters and also sends a signal to the German economy about the reliable supply of sufficient quantities of hydrogen and its derivatives which is necessary for the switch to climate-friendly [industrial] processes. (p. 2)

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This import strategy provides a reliable framework for private-sector hydrogen imports to Germany. It thereby contributes to ensuring investment security for hydrogen production in partner countries and the development of the necessary import infrastructure. [...] It is intended to provide orientation to producers, project and infrastructure developers, traders of hydrogen and hydrogen derivatives, buyers, financial institutions, network operators and local stakeholders in producer countries. [...] **The import strategy should also give governments in partner countries clarity about German import requirements for hydrogen and its derivatives, as well as the overarching goals and framework conditions for the establishment and expansion of hydrogen partnerships.**

On Germany's predicted hydrogen import requirements, the strategy confirms figures from its 2023 National Hydrogen Strategy update.

- German demand for hydrogen and its derivatives is expected to total ~95-130 TWh by 2030, with an import share of 50-70%, i.e. 45-90TWh (p. 10). German sources usually say that 'around two thirds of German H2 requirements will be imported.
- By 2045 this is expected to rise to ~360-500 TWh for hydrogen and 200 TWh for hydrogen derivatives.

- Current predictions are for these to be primarily for the steel industry, feedstock and petrochemicals, mobility and logistics, and the power sector, both through the substitution current fossil fuels and through new manufacturing processes.

This is important for the Scottish sector and for UK policy as it deals with those who ask whether hitherto stated goals will materialise and whether UK/Scotland should be looking to export.

Means of transport

Whilst the German government will promote both pipeline and shipped imports, the preference is for more cost-effectively pipeline infrastructure where possible, with shipped transport focused on geographically more distant countries that for technical and economic reasons cannot be connected by pipeline (p. 3):

In the medium term it can be assumed that a large proportion of the demand for hydrogen will be covered by pipelines if these import routes - as is currently the case for typical distances in the North Sea, Baltic Sea and Mediterranean region - are cheaper and more environmentally than ship transport and the resulting cost savings in transport are greater than the potential higher production costs. (p. 14)

Where hydrogen derivative imports are required, the report echoes SG expectations that it is sensible for Scottish players to export derivatives only where they will be used in this form by off-takers, e.g. ammonia for fertiliser or feedstock:

It is more energy efficient and tends to be more economical to utilise the imported hydrogen derivatives directly as far as possible. The needs-based conversion of derivatives back into molecular hydrogen can play an important role if sufficient quantities of hydrogen are not produced nationally or obtained via hydrogen pipelines. (p. 14)

Import countries and partnerships

The basic premise is that Germany will need multiple import partners and routes to avoid dependencies such as in the past on Russia for natural gas:

The German government is planning to diversify the supply of hydrogen and its derivatives as broadly as possible. To this end, the Federal Government is working in bilateral and multilateral cooperation formats with a large number of partner countries, regions and international players. (p. 3 and section 2.3)

The reference to regions is significant as it seems to lay down a marker that the German government will engage not only with nation states, but also with regions such as Scotland as necessary.

More widely,

In order to achieve the objectives of the import strategy, increased co-operation within the EU **and with countries neighbouring the EU (e.g. Norway, Great Britain or countries in North Africa)** is of great importance. The aim is to utilise favourable production potential for hydrogen as effectively as possible and to establish resilient import relationships.

In addition to in-depth cooperation, the rapid establishment of a pipeline-based, trans-European hydrogen network is crucial. This should connect the important production, import

and consumption centres for hydrogen within the EU and enable the distribution of [...] hydrogen imports from third countries. The German government is leading the way here by creating a hydrogen core network [of nearly 10,000km domestic hydrogen pipeline by 2032] as the basic framework for the trans-European hydrogen network, thereby increasing planning security for the players involved at home and abroad.

[REDACTED]

The German government's goal is to embed the German hydrogen core network within European networks from an early stage. It is to be closely linked to the emerging hydrogen networks of EU member states and neighbouring countries via interconnectors and trans-European hydrogen import corridors. (p. 22)

Of the four potential pipeline corridors (North Sea, Baltic Sea, Southwest and South) the first is the North Sea. It details the first international pipeline being built between Germany and Denmark, plans for a pipeline between Norway and Germany, and then reference to 'the UK (including Scotland). The accompanying map shows a clear import arrow from Scotland. The full section reads (my emphasis in bold):

Co-operation with our respective neighbouring countries will be built up and deepened along the corridors. The respective focal points of our cooperation are outlined below as examples:

In the North Sea region, the Federal Government is striving for an integrated system overall. The enormous generation potential of renewable electricity (especially offshore wind) and hydrogen is to be utilised and made available in a closely meshed network. To this end, the Federal Government, together with its partners is committed adjusting the regulatory framework for investments in offshore wind capacity and standardised approval processes. **The BMWK plans to present an offshore cooperation strategy for an offshore cooperation strategy for renewable electricity and green hydrogen at the North Sea Summit in Hamburg in [June] 2025. [REDACTED]**

In addition, several specific hydrogen infrastructure projects are being pursued:

- The first cross-border pipeline is to be built between **Germany and Denmark**. Work is currently underway to finalise the framework for a final investment decision (FID) in 2025 and for it to become operational at the end of 2028. This rapid implementation is anticipated by the Federal government to provide an important impetus for other cross-border hydrogen projects.

- A joint feasibility study on a hydrogen pipeline between **Germany and Norway** has already been carried out. Work is currently underway on creating the framework for FID. Among other things, this is being implemented within the framework of an established task force between both countries' ministries. The pipeline is intended to enable hydrogen imports from Norway as early as 2030.
- **As part of the energy partnership with the United Kingdom** [signed in Berlin in Sept 2023], talks are being held on the possible construction of a **hydrogen pipeline between Germany and the United Kingdom (e.g. Scotland)**.
- Both the **Netherlands and Belgium** are aiming, in the context of their respective national hydrogen developments, imports of shipped hydrogen and a close connection into the German core grid.

Abb. 4: Schematische Darstellung europäischer Importkorridore (aktuell angedachter Stand; gestrichelte Linie symbolisiert perspektivische Ausbaustufe)



Quelle: BMWK

- According to the current draft application from November 2023, **the [German] hydrogen core grid envisages four German-Dutch interconnectors and one German-Belgian interconnector by 2032.**
- The Baltic Sea region is another key building block for German hydrogen supply due to its high potential for onshore and offshore wind power and for hydrogen storage. Two pipeline projects involving all EU Baltic Sea neighbours are currently being developed: one offshore pipeline through the Baltic Sea (Baltic Hydrogen Collector), and an onshore pipeline through the Baltic States and Poland (Nordic Baltic Hydrogen Corridor), establishing connections between Finland and Germany.
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Establishment of terminal infrastructure and green shipping corridors

- To enable the import of hydrogen derivatives by ship, import terminals in German harbours must be converted and equipped for hydrogen derivatives. In particular, available areas and quaysides in seaports must be expanded or upgraded.
- Currently planned landside LNG terminals are designed in such a way that they can land hydrogen derivatives following LNG utilisation. This is intended to prepare for the cost-

efficient transformation from gas infrastructure to future hydrogen infrastructure and to improve the economic viability of investments in hydrogen infrastructure. Additional capacity for large-scale ammonia imports will probably only be created in the early 2040s. [...]

- The national port strategy defines the need for action for the expansion and modernisation of port infrastructure, to ensure sufficient and sustainable import capacities for hydrogen derivatives. The legal framework for the authorisation of the legal framework is to be harmonised.
- In addition, the EU regulation on the development of infrastructure for alternative fuels (AFIR) introduces specific requirements for the upgrading of sea and inland ports (e.g. to ensure provision of shore-side power infrastructure and the provision of refuelling points for LNG. [...]).
- The Federal Government is currently developing BMDV and BMWK and with the involvement of numerous stakeholders, is developing a National Action Plan for Climate-Friendly Shipping (NAPS). [...] In this context hydrogen and hydrogen derivatives and their availability in German harbours are of particular importance. Furthermore, the NAPS, in line with the Clydebank Declaration, also promotes the establishment of green shipping corridors. [...] The action plan is to be finalised in spring 2025 and implemented from mid-2025.

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The basic premise is that Germany will need multiple import partners and routes to avoid the energy dependencies of the past:

The German government is planning to diversify the supply of hydrogen and its derivatives as broadly as possible. To this end, the Federal Government is working in bilateral and multilateral cooperation formats with a large number of partner countries, regions and international players. (p. 3, see also p. 31)

The reference to regions is significant as it seems to lay down a marker that the German government will engage not only with nation states, such as the UK, but also, as necessary, with regions such as Scotland. This is important for our bilateral engagement.

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In addition to in-depth cooperation, **the rapid establishment of a pipeline-based, trans-European hydrogen network is crucial**. This should connect the important production, import and consumption centres for hydrogen within the EU and **enable the distribution of [...] hydrogen imports from third countries**. The German government is leading the way here by creating a hydrogen core network [of nearly 10,000km domestic hydrogen pipeline by 2032] as the basic framework for the trans-European hydrogen network, thereby increasing planning security for the players involved at home and abroad.

At the same time, the import strategy seeks not to undermine a core element of Germany's first National Hydrogen Strategy in 2020 by striking a balance with Germany's commitments to emerging and developing countries. It reinforces their role in the

developing global hydrogen economy and in producing shipped hydrogen in future, as well as that of German companies and technologies in helping build out their sectors. However, it is clear that this must be done in a sustainable and responsible manner that respects international human and workers' rights and environmental standards.

[REDACTED]

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- A joint feasibility study on a hydrogen pipeline between **Germany and Norway** has already been carried out. Work is underway to create the framework for FID, [including] within the framework of an established task force between both countries' ministries. [REDACTED].
- The pipeline is intended to enable hydrogen imports from Norway as early as 2030.

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- **As part of the energy partnership with the United Kingdom** [signed Sept 2023, partly on the back of preparatory work by the SG hub, with Cabinet Secretary Net Zero present], **talks are being held on the possible construction of a hydrogen pipeline between Germany and the United Kingdom (e.g. Scotland).**
- Both the **Netherlands and Belgium** are aiming, in the context of their respective national hydrogen developments, for imports of shipped hydrogen and a close connection into the German core grid. [NB. NL is also planning a pipeline to bring hydrogen onshore from its offshore wind parks]. According to the current draft application from November 2023, **the [German] hydrogen core grid envisages four German-Dutch interconnectors and one German-Belgian interconnector by 2032.**

[REDACTED]