

EU ENGAGEMENT REPORT	
Minister	Mr Matheson (MM)
Type of engagement	Bilateral meeting
Date	3 May 2022
Location	Scottish Parliament
Who	Dr Stefan Kaufmann (SK) , German Green Hydrogen Commissioner, BMBF
Key points	<ul style="list-style-type: none"> • SK opened the meeting by explaining that Germany would be needing to import green hydrogen on a large scale in the coming years if it is to achieve its 2045 net zero targets (7GW of capacity would be required for one steelworks alone), and since renewables were too expensive in Germany, this green hydrogen would have to be imported. • MM said that hydrogen had risen up the agenda, particularly with the increased focus being shown by the German government. Just a few months ago it was difficult to envisage the scale of the market, but this was now becoming clearer. • SK said the EU was looking to work together collectively to achieve net zero targets and to compete effectively globally. • MM explained Scotland's strengths as a major future exporter of green hydrogen, namely our expertise in energy, human capital, innovation and wind potential. He added that a large number of oil and gas companies had shown an interest in pivoting to renewables during the ScotWind leasing round, and that hydrogen can be produced without a need to connect to the grid, saving time and money. He raised the issue of the length of time required for consent, saying that Scotland and Germany could work together to share best practise in managing an efficient and effective consent process. • MM went on to explain that SG and UKG's hydrogen strategies are complementary, and that the difference in focus reflects the different needs of Scotland and the rest of the UK. He added that Scotland's focus was on renewables and innovation, including battery storage, rather than on nuclear. • SK asked about Scotland's co-operation with Norway. MM explained that Norway is ahead of Scotland in CCUS, but that have a lot to learn from each other and that we will aim to increase engagement through SG's new Copenhagen Hub. • MM asked how Scotland can ensure it is on Germany's list of hydrogen-exporting countries. SK explained that [Redacted] • SK said that political commitment, industry commitment and capital would be needed for countries to become major exporters, with many countries more domestically focused. He said that he was pleased to see that Scotland has these different factors. • SK asked about the Scotland-Hamburg MoU, saying he was pleased to see these agreements. [Redacted] MM said he hoped there would be opportunities for federal-level engagement in the coming months, highlighting the First Minister's visit to Germany in October.

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	<ul style="list-style-type: none"> • SK and MM will both be attending a conference in Rotterdam the following week, and agreed to meet again there.
Comments	A constructive meeting in which Mr Matheson was able to set out Scotland's potential to be a major exporter of green hydrogen, and give a sense of the projects and commitment that would help realise our ambitions. Dr Kaufmann set out the scale of Germany's green hydrogen import requirements and the meeting afforded a useful discussion as to how Scotland and Germany could work together in this regard.
Attending official	[Redacted] , Head of Hydrogen Evidence and Engagement [Redacted] , Central Europe Policy Adviser, DEXA
Copy List	Cabinet Secretary for Constitution, External Affairs and Culture Scott Wightman Frank Strang John Webster European Engagement [Redacted]

**CABINET SECRETARY FOR NET ZERO, ENERGY AND TRANSPORT – MEETING WITH
GERMAN GREEN HYDROGEN COMMISSION «Name»**

What	Meeting with the German Commissioner for Green Hydrogen, Dr. Stefan Kaufmann	
Where	TG.24 – Digital Meeting Room, Scottish Parliament	
When	Tuesday 3 May 2022 15:30-16:15	
Key Message(s)	<ul style="list-style-type: none"> • Scotland has the potential to fulfil Germany’s long-term hydrogen import requirements, with an ambition of generating 5GW of renewable and low-carbon hydrogen by 2030 and 25 GW by 2045. • Scotland’s extensive renewable resources means we are well-placed ensure long-term security of supply of green hydrogen in Europe Scotland is just 750km away from the North German coast (<i>compared to 3500km to Morocco</i>). • The UKG Hydrogen Strategy and SG Hydrogen strategy complement each other and are not in conflict, they simply set different priorities (<i>the UK strategy focuses primarily on blue hydrogen for domestic use, and on becoming a technological leader, whereas the Scottish strategy focuses primarily on large scale production of green hydrogen for export</i>) • Scotland can become a strategic hub within Europe as part of a North Sea alliance, with new transit routes allowing Scotland to establish its position in the wider European hydrogen network (<i>new priority</i>) 	
Why	<p>Key outcomes to achieve:</p> <ul style="list-style-type: none"> • Raise awareness at the Federal Government level of Scotland’s green hydrogen export potential which can help fulfil Germany’s long-term import needs. • Discover how Germany is looking to work with potential import/export partners and what support it will provide to these future partners • Establish what would be required to secure Scotland’s place on Germany’s list of hydrogen import countries (<i>and suggest how we could fulfil this</i>) • Suggest a meeting between the First Minister and Federal Economy Minister Robert Habeck, either virtually or in person (<i>they have met previously</i>) • Ensure that Commissioner Kaufmann understands that the UKG Hydrogen Strategy and SG Hydrogen Strategy complement each other and are not in conflict [Redacted] • Highlight the potential advantages of partnering our expertise and resources with German engineering expertise. • Establish the potential for Scotland to be included in international hydrogen projects funded by H2Global • Position Scotland as a strategic hub within Europe as part of a North Sea alliance, looking to explore existing and potential shipping and pipeline connections to establish Scotland’s position in the wider European hydrogen network, including exploring transit links from Ireland to Northern Europe and between Scotland, Norway and Denmark (<i>this represents a new priority</i>). 	
Supporting official	[Redacted], Head of Hydrogen Evidence and Engagement [Redacted], Central Europe Policy Adviser	
Briefing contents	Briefing is included as follows: Annex A – Biographies and Dr Kaufmann’s programme	Pages 3 6-9

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BIOGRAPHIES



Dr. Stefan Kaufmann has been Germany’s Commissioner for Green Hydrogen since June 2020. He was a member of the Bundestag between 2009 and 2021, representing the constituency of Stuttgart I in Baden-Württemberg for the CDU.

Kaufmann grew up in Stuttgart and studied law at Tübingen University on a scholarship from the CDU-associated Konrad Adenauer Foundation. He later worked as a scientific assistant at Hohenheim University. He founded the “Tübingen Forum for Higher Education” in 1992 and later worked as an assistant to Doris Pack (CDU) in her time as the EPP’s education spokesman in the European Parliament.

He was elected to the Bundestag in 2009, winning the Stuttgart I constituency ahead of prominent Green politician Cem Özdemir and went on to retain this seat in the 2013 and 2017 elections. He served on the Committee for Education, Research and Technology Assessment, eventually becoming leader of the CDU/CSU fraction within the committee, and was part of the working group on education policy in the 2017 negotiations on a new coalition government under Chancellor Merkel.

Dr. Kaufmann was named Germany’s Commissioner for Green Hydrogen in June 2020 by federal Education and Research Minister Anja Karliczek (CDU). The position had been newly created as a result of the Federal Government’s newly approved National Hydrogen Strategy, which the new coalition intends to maintain and build upon. Although as Green Hydrogen Commissioner, Kaufmann reports into the Ministry of Education and Research (BMBF), he works in the interests of all four ministries with an interest in green hydrogen, most notably with the Robert Habeck’s Economy and Climate ministry

Kaufmann lost his seat in the 2021 election and failed to win election via the CDU’s list in Baden-Württemberg, but was reappointed as Commissioner for Green Hydrogen by the incoming “traffic-light” coalition led by Chancellor Scholz, now working under Education and Research Minister Bettina Stark-Watzinger (FDP).

Dr. Kaufmann will be accompanied by **[Redacted]**, who began working as an advisor at the Federal Ministry for Education and Research at the start of 2022.

Dr. Andreas Zimmer, Consul General



Dr Andreas Zimmer has been Consul General for the federal Republic of Germany since April 2021. The Consulate General has maintained the close relations between Germany and Scotland for more than 60 years. It is also the point of contact for all German nationals in Scotland.

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Visit Programme for Dr Stefan Kaufmann, 3rd-6th May

[Redacted]

Germany and hydrogen

Scotland's Aims in Germany

In The Germany Hub's engagement with Germany on hydrogen, our aim is to:

- promote technology exchange and the exchange of experience, best practice and learning to help Germany and Scotland establish the hydrogen economy more effectively and more quickly together, recognising that this is a global challenge;
- help develop import/export potential between Scotland and Germany;
- position Scotland as a strategic hub within Europe as part of a North Sea alliance, looking to explore existing and potential shipping and pipeline connections to establish Scotland's position in the wider European hydrogen network - to include exploring connections between Scotland, Norway and Denmark, and possible transit links from Ireland to Northern Europe. (This represents a new priority.)

Germany's need to rapidly find alternative energy sources

- Green hydrogen plays a key role in the plans set out by the new federal coalition government to decarbonise the economy. The urgency is increasing rapidly as Germany needs to reduce its energy dependence on Russia as soon as possible. This is even more critical in the wake of Russia cutting off gas supplies to Poland and Bulgaria, a move it may replicate with other European countries.
- In the long-term, Germany's leaders envisage a net zero energy policy characterized by a far greater degree of self-sufficiency, with green hydrogen playing a key role; in the short-term, alternative energy sources are urgently being sought.

Dr. Kaufmann's Tour

- Dr. Kaufmann is currently undertaking a worldwide tour of potential hydrogen partners for Germany, including countries previously deemed unsuitable for human rights reasons.
- He recently travelled to Sweden to participate in a hybrid conference on green hydrogen and is due to visit Iceland and Australia after this visit to Scotland. He has also held recent meetings in Berlin with the Irish, Qatari and Namibian ambassadors.
- Dr. Kaufmann represents our key point of influence for German federal ministers, who saw fit to keep him in his role even after the change in governing parties, to ensure continuity of approach. Our key aim from this trip is to see Scotland added to Germany's list of potential hydrogen import countries.

Economy and Climate Minister Habeck's Tour

- German Vice-Chancellor and Minister for the Economy and Climate Protection, Robert Habeck, last month went on a tour to countries with the potential to supply large volumes of liquefied natural gas (LNG) and hydrogen to Germany.
- Starting with Norway on 16th March, Habeck signed a joint statement with Norway's Prime Minister Jonas Gahr Støre over cooperation that aims to spur large-scale hydrogen exports from the Nordic nation to Europe's largest economy. Germany and Norway now plan to carry out a feasibility study on the construction of a green hydrogen pipeline. This will likely link into wider plans Germany has to link in with

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pipeline infrastructure across Europe and develop a “European Hydrogen Backbone”. The two countries don’t rule out a temporary transport of blue hydrogen (produced from fossil gas linked to carbon capture and storage) through the suggested pipeline, but Germany has emphasized that would only be considered for transitional period until green hydrogen (made from renewables via electrolysis) is economically more viable. [To note – until the crisis in the Ukraine, German was reluctant in practice to import hydrogen from Norway since it did not wish to import blue hydrogen.]

- Habeck then visited Qatar on 19th March to discuss a new agreement to supply LNG gas to Germany. The need is particularly acute as there is no desire within either the German population or government to deviate from Germany’s planned deactivation of all nuclear power stations by the end of this year.
- This was followed by visit to the UAE on 21 March to discuss plans to import hydrogen from UAE using liquid organic carrier (LOHC) technology. Northern German company UNIPER will work with other companies to start a demo project with the goal of building up an H2 supply chain to the German port of Wilhelmshaven in Lower Saxony.
- Habeck attended the Berlin Energy Transition Dialogue on March 29-30 alongside Foreign Minister Annalena Baerbock, where he stressed the need to bring back renewable energy manufacturing to Europe, even if this leads to higher costs.
- Germany is moving to end imports of Russian oil and join a proposed EU-wide embargo on Russian oil, increasing the urgency of securing alternative energy sources. It expects to announce it has ended Russian oil imports over the next week.

Scotland’s comparative advantage for Germany hydrogen export

- Scotland’s hydrogen export potential aligns significantly with Germany’s future import needs. In June 2020, Germany adopted a ‘package for the future’ which makes available €7bn for speeding up the market rollout of hydrogen technology in Germany and another €2 bn for fostering international partnerships.
- Germany will require 90-110 TWH of green hydrogen p.a. by 2030. Our analysis indicates that Scotland will have an export potential of 96TWH of green hydrogen p.a. by 2045. This represents an enormous market for us to tap into.
- The German Government has stated that Germany is aiming for technological leadership in green hydrogen solutions, while other countries are better suited for large-scale production, as better conditions for renewable energies guarantee more efficient and cost-effective generation. To help other non-EU countries, the Government has created a fund of €350 million to help overseas (non-EU) Hydrogen projects. Ultimately the potential to supply Green Hydrogen to Germany must be seen as a realistic, high value, long-term trading goal.
- Scotland benefits from the geographical advantage of being considerably closer to Germany than many of the other countries Germany is currently negotiating with regarding Green Hydrogen imports, among them Morocco, the UAE and Chile.

Scotland’s existing engagement in Germany

- Scotland has hydrogen interests in five key states in Germany - Bavaria, Baden-Württemberg, Hamburg, North-Rhine Westphalia and Lower Saxony - and is building its engagement at federal level. Dr Kaufmann’s visit signifies a considerable step forward in federal engagement.
- In 2020, the economic development organisations of the northern German states of Lower Saxony, Bremen, Hamburg, Mecklenburg-Vorpommern and Schleswig-

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Holstein collectively formed the green hydrogen alliance HY-5, aiming to make Northern Germany Europe's hub for Green Hydrogen through close cooperation in coordinating Green Hydrogen production, import and storage.

- Lower Saxony and Hamburg are particularly critical both to Germany's hydrogen import strategy and to Scotland's hydrogen ambitions through market development and export.
- A hydrogen-specific MOU with the state of **Hamburg**, signed in late November 2021, provides a framework for hydrogen players across Scotland to collaborate with Hamburg and north German partners across research; production; mobility and industrial applications; logistics; and transportation on to the rest of Germany and northern Europe.
- Deepening our engagement, SDI Germany arranged a select business delegation to Hamburg in late April 2022, during which SHFCA signed an MOU with the Renewable Energy Hamburg Cluster EEHH on 28 April; in 2020, the Port of Cromarty Firth had already signed a Letter of Intent with the Hamburg Port Authority. Officials are developing a plan of activity that includes joint webinars on mutual priorities, roundtable discussions between academics and research institutes, a business delegation from Hamburg to Scotland later this year, Scotland's participation in Wind Energy Hamburg in September, and joint activity in Brussels.
- Scotland is in the early stages of developing a renewable energy and hydrogen-specific partnership with **Lower Saxony**. This gives the opportunity to be able to develop up to three export routes from Scottish ports into Germany (to Hamburg, Wilhelmshaven or Cuxhaven), potentially focusing on different forms of hydrogen transportation and its derivatives (liquid / tanker / LOHC / pipeline / ammonia) depending on the suitability of local infrastructure, transportation options to the end-destination, and likely offtakers.
- A delegation from Lower Saxony visited Scotland in April 2022, led by Minister-President Stephan Weil (SPD). Weil met with the First Minister and yourself, with the latter meeting proving a highly productive exchange on hydrogen. **[Redacted]**
- A business MOU was signed with **North Rhine Westphalia** in March 2022 that includes a strong focus on hydrogen.
- **Baden-Württemberg's** Minister-President Kretschmann and Energy Minister Thekla Walker met with the First Minister and Energy Minister Matheson in Glasgow. Frau Walker was keen to sign a hydrogen MOU with Scotland and to establish concrete projects. The draft text for this MOU as recently been cleared by Ministers.
- Planned joint activities with BW or visits include the Hydrogen Accelerator participating in a mobility workshop in April 2022, a session on Scot2Ger, and potential engagement in the H2 Sued Wasserstoff Woche. Ms Forbes will also be meeting with Minister Walker in May.
- Engagement with **Bavaria** is being developed within the scope of the 2017 Joint Declaration of Intent between Scotland and Bavaria, with its focus on economic cooperation. Bavaria's Hydrogen Strategy, published in August 2020, and its Hydrogen Roadmap published in April 2022, explicitly name Scotland as a potential import country.
- The Germany Hub engages regularly with H2 Bavaria, which is headquartered in Nuremberg, and has provided speakers for its Nuremberg Hydrogen Dialogue. Ongoing plans include a visit by H2 Bavaria as part of the 2022 Nuremberg visit to Glasgow in May 2022, followed by a visit by Bavaria's Economy Minister Hubert Aiwanger in June

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- The **Scot2Ger** project, announced at COP26, aims to evaluate the opportunity for Scotland to export green hydrogen at scale from Scotland to Germany and to demonstrate the delivery of green hydrogen produced in Scotland to offtakers in Germany by the mid-2020s. Lower Saxony is an important partner for this project as Wilhelmshaven is the project's German port of choice. The key offtakers will be in NRW. The project is supported by Scottish Enterprise and led by Scottish Power, Wood, DS Consulting and KPMG Germany.
- In addition, the Scottish Government has provided, through the Hydrogen Action Plan, funding for a **Scotland-Germany Hydrogen Research Scheme**. This supports four initial research collaboration projects with a view to establishing lasting research partnerships between Scotland and Germany. The projects are intended to focus on: optimising the large-scale production of green hydrogen and achieve a reduction in costs; medium-long term hydrogen storage solutions; and cost-effective long-distance transport and distribution solutions.
- The first four projects are focused on: a digital toolbox for hydrogen production (Strathclyde/Technical University of Braunschweig); new structures for the delivery of sustainable hydrogen (University of St Andrews / Munich Technical University TUM); the production of green hydrogen from brewing biomass (Robert Gordon University / Hochschule (University of Applied Sciences) Bonn-Rhein-Main-Sieg; and hydrogen sensors for gas leak detection (National Subsea Centre, RGU / Berlin University of Applied Sciences. In this context, it is worth noting that Kaufmann reports into the German Ministry of Education and Research.

Brünsbüttel and Wilhelmshaven LNG Terminals, UNIPER

- Germany currently lacks its own LNG import terminals and has only recently approved plans to construct two terminals on the country's north coast, including one terminal in Brünsbüttel in Lower Saxony. Construction of these terminals is not expected to be completed before 2026. Importantly for Scotland, it is envisaged that these terminals will be hydrogen-ready.
- UNIPER will likely play a key role here – they are both a key partner in the Flotta project and are building the new hydrogen-ready terminal in Wilhelmshaven. More generally UNIPER has large ambitions to produce and sell green hydrogen in the global market.

H2 GLOBAL – Germany’s financial instrument for funding international projects

Introduction

- The H2Global Stiftung (foundation) is a German Government and industry backed organisation which aims to promote the protection of the environment and address the climate crisis. It will achieve this by providing a financial instrument to promote the production and use of Green Hydrogen and other climate-neutral energy carriers at national and international level. Based in Hamburg, the organisation’s key mission “is the timely market ramp-up and import of Green Hydrogen and Power-to-X (PtX) products to Europe”.

German Government backing

- The German Federal Ministry for Economic Affairs and Climate Action issued details in December 2021 of how H2Global would work. It has approved €900 million to accelerate the international market ramp-up of green hydrogen through a "double auction mechanism". This means that hydrogen or its derivatives are purchased at a low price on the world market and resold in the EU to the highest bidder.
- Through a competitive procedure, hydrogen or hydrogen derivatives will be purchased in non-EU countries at the lowest possible price on the basis of 10-year contracts. These contracts are managed by the intermediary HINT.CO (Hydrogen Intermediary Company). Products will be sold via the intermediary through short-term auctions to German and European companies to speed up their decarbonisation.
- In the current market ramp-up phase, the production price of green hydrogen is still relatively high so that HINT.CO is expected to spend more money for purchases than it can earn through sales. The resulting losses will be compensated for by federal funding for a maximum of 10 years. Losses will become lower over time as the willingness to pay higher prices for sustainable energy is likely to increase.
- The German government has set the criteria for awarding €350 million before the end of 2024 for green hydrogen projects outside the country. The initiative’s goals are to encourage the use of German technology abroad, to help establish a global market for green hydrogen and to create structure for importing hydrogen to Germany. The fund is likely to be used to take German technology to other countries to help them speed up their hydrogen producing processes.
- Following the approval of the funding instrument under State Aid rules by the European Commission on 20 December 2021, some first purchase contracts will be concluded in 2022. Deliveries of sustainable hydrogen-based fuels to Germany and Europe are expected to take place from 2024.

The process

- HINT.Co will conclude long-term purchase contracts on the supply side and short-term sales contracts on the demand side. Based on a mechanism similar to the Contracts for Difference (CfD) approach, the difference between supply prices (production and transport) and demand prices will be compensated by grants from the German Government.
- On the purchase side and on the sales side the price is determined via competition based bidding procedures. With this process, operators and investors receive the planning and investment security necessary for the development of large volume

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electrolysis capacities, as they can base their business and financing model on long-term purchase agreements with a solvent contract partner at cost reflective prices.

- On the offtake side of HINT.Co, it enables the integration of PtX products into the economic cycle at market reflective prices.
- International cooperation is an explicit part of Germany' National Hydrogen Strategy as it is acknowledged that Germany will need imports to meet its goals. Therefore some of the funds will be used to help quickly build up supply chains for green hydrogen from abroad. Commercial enterprises can receive up to EUR 15 million under this initiative, while projects by research and scientific institutions are eligible for EUR 5 million.

Who can participate?

- Foreign trade partnerships will be established with countries in which Green Hydrogen can be produced efficiently due to their geographical location. In addition, green technologies will be established in partner countries where the local energy transition will be supported, and a contribution made to meet the massive demand for PtX products in Germany and Europe.
- It is worth noting the involvement of GIZ, the German International Development Foundation who see the opportunity to use this scheme to work with less developed nations such as Morocco. The involvement of European State aids rules has ensured that EU Member States cannot participate, but may ultimately benefit from the Hydrogen produced.

Summary and implications for Scotland

- Germany has made it clear that it will import Green Hydrogen in large quantities. To help speed up the process, H2Global will work with organisations in other countries to both help invest in their infrastructure and to agree long term contracts that enable producers to invest with confidence. This offers a funded, albeit competitive, route to speeding up Hydrogen production in Scotland.
- The close links with Germany's economic development policy mean that although Scotland was initially not explicitly excluded, it was not explicitly included and the response to early queries was not encouraging. However, work to raise Scotland's profile and increased energy security issues have changed this. This week the head of the Germany hub spoke separately with an expert Director and the MD of H2 Global, both of whom were enthusiastic about Scotland and **confirmed that Scotland is eligible for the mechanism.**
- Overall, Scotland, as a non-EU member state, and with the ability to produce Green Hydrogen through Scotwind and other sources would have the opportunity to participate. Scottish companies could in theory apply to the €15m investment fund and could secure long term supply deals to Germany. It will be important for Scottish Hydrogen related companies to keep an eye on the dates for the auctions, with the SG and SDI in Berlin liaising with H2Global and keeping interested Scottish companies informed.
- In addition, H2Global indicated that they could arrange a tailored round for Scotland or north sea partners. **We have suggested that we arrange a briefing session with H2Global** and 6-7 key players in Scotland so that we can explore concrete options and potential financial implications (including potential funding expectations).

HYDROGEN

Top Lines

- Scotland's huge potential for renewable energy generation, with a pipeline of over 25GW of offshore wind projects, perfectly complements our ambitions to produce industrial-scale quantities of renewable hydrogen for domestic use and export.
- Scotland is already a net exporter of electricity and in the past decade renewable electricity output has grown markedly.
- Scotland is well placed in terms of proximity and infrastructure connectivity to key locations in Northern Europe that are already developing their hydrogen import strategies and building the necessary international relationships required to secure sufficient energy supply to meet their own decarbonisation requirements.
- Scotland has industry experience and expertise through a strong track record for advancing hydrogen technologies and demonstrating its production and use across a wide ranging number of applications.
- Scotland has a long and proud tradition of innovation in the energy sector, with world class research institutions, testing facilities and businesses with expertise across the hydrogen value chain.
- Scotland's legacy oil and gas infrastructure, combined with its experienced energy and oil and gas workforce and, a supply chain focused on energy transition are critical to establishing a prominent role for Scotland in the emerging global hydrogen market.

Scotland's Renewable Hydrogen and Export Potential

- Scotland's geography and vast renewable resources mean we have the potential to be a major producer of sustainable, secure and low-cost green hydrogen
- Our economic analysis concludes that Scotland has the potential to deliver up to 126TWh of green hydrogen per year by 2045, with up to 96TWh of hydrogen for export to Europe and the rest of the UK.
- Germany will require 76-96 TWH of green hydrogen p.a. by 2030.
- We believe strongly that Scotland should be part of a sustainable renewable energy and hydrogen portfolio for Germany and the EU.

Development of a Hydrogen Economy in Scotland

- Scotland has a strong track record in supporting hydrogen demonstration projects, many of which are world-leading. We are now working in partnership with industry to scale up hydrogen production in Scotland to serve both a domestic and an export market.
- We expect renewable hydrogen production in Scotland to increase at pace throughout the 2020s supported by onshore wind.
- Onshore wind is a cheap and reliable source of electricity generation, with Scotland's resource and commitment seeing us lead the way in onshore wind deployment and support across the UK.
- This early hydrogen production will support the growth of a domestic market and the development of the distribution, storage and port infrastructure required to serve a future export market. Hydrogen may be available to export as early as 2025.
- Through the late 2020s and 2030s Scotland's vast offshore wind resources will bring forward large-scale renewable hydrogen production and will allow Scotland to become a major producer and exporter of renewable hydrogen.

Transport of Hydrogen to Germany

- The cost of hydrogen transportation from place of production to place of demand is an important consideration. Scotland's geographic proximity to Germany, unlike other nations looking to be major hydrogen producers, such as Australia, the UAE and Chile, makes it an ideal European export partner.
- We are currently assessing the most cost-effective options for transportation and export of hydrogen from Scotland to Europe.
- It is likely that different options, such as gaseous hydrogen pipelines, and marine vessel transportation of liquid hydrogen, green ammonia and methanol, and Liquid Organic Hydrogen Carriers (LOHC), could all be used for export at different scales and depending on end-purposes and off-takers.
- The Scot2Ger project, led by Scottish Power, KPMG and Wood and supported by Scottish Enterprise, is looking to export green hydrogen to Germany by ship by 2025 to serve a German transport market.
- The Scottish Government are also funding the Net Zero Technology Centre to assess the potential to connect to a European Hydrogen Backbone by repurposing and optimising existing pipeline infrastructure or through the development of new infrastructure.

Scotland's Oil & Gas Assets

- Scotland is an experienced energy producer and exporter with developed North Sea offshore skills in oil & gas.
- We already have design and operational expertise, together with some of the port and offshore infrastructure that will be required to support a future hydrogen export market.
- Locations such as existing oil terminal on the island of Flotta in Scapa Flow, Orkney, will be used for large scale green hydrogen and ammonia production by the late 2020s. The oil terminal at Sullom Voe in the Shetlands has also identified as another potential green hydrogen hub, as part of a wider energy transition for Scotland.

Scotland's Renewable Energy Potential

- The majority of Scotland's renewable electricity generation currently comes from onshore wind, with a further 8-12GW to be installed by 2030.
- Scotland has 892MW of operational offshore wind, 4.9GW of consented projects and a further 4.4GW in the pipeline. Two of the largest offshore wind projects in the world, the 950MW Moray East project and the 1,075MW Seagreen project, are under construction in Scottish waters.
- The results of the ScotWind offshore wind seabed leasing process were announced on 17 January 2022 and show a tremendous vote of confidence in Scotland.
- The combined ambition of ScotWind projects is 25GW of generating capacity, which if approved, would deliver far in excess of our current planning assumption of 10GW of offshore wind.

CALENDAR OF RECENT/FORTHCOMING ENGAGEMENTS

2022

- 28 Jan [Redacted]
- 23 Feb Webinar with SDI, British Chamber of commerce in Germany and Bavarian Chamber of Commerce - Business Opportunities in Scotland: Renewable Energy, Green Hydrogen and AI
- 23 March Hamburg Import Strategy launch
- 29-30 Mar Berlin Energy Transition Dialogue
- 31-31 Mar Lower Saxony visit to Scotland, incl. hydrogen workshop, reception, ministerial engagement, engagement with SDI and SHFCA, visit to Aberdeen & PoCF.
- 4-5 April SDi attended H2 Forum, Berlin, organised by NOW
- 5 April Gerry Agnew, H2 Accelerator, participated in UK-BW mobility webinar
- 6 April Nigel Holmes, SHFCA spoke at Ambassadors' roundtable in Berlin, organised by BDI and German Weltenergierrat;
- 6 April online meeting with German Hydrogen Commissioner, Stefan Kaufmann
- 21-22 April Mr Robertson attendance at Ludwig Erhard Summit, incl. bilaterals with Bavarian hydrogen stakeholders and panel discussion on European security incl. energy security.
- 28 April In-person delegation to Hamburg, incl. meeting with H2Global, the entity set up by the federal government to organise funding of major projects involving international players
- 11-13 May H2 Bavaria hydrogen delegation visit, incl. All Energy conference (11-12 May in Glasgow)
- 24 May Ms Forbes meeting with B-W Environment Minister Thekla Walker
- 8 June Elke Zimmer, BW Transport ministerial State Secretary to speak at POLIS Leadership Summit: The transition to Zero-emission, in Glasgow on Climate Neutrality Strategies and Related Targets
- 13-14 June Delegation from Bavaria visits Scotland led by Bavarian Energy Minister to discuss hydrogen import opportunities
- June tbc Lower Saxony / Scottish Hydrogen Conference in Berlin
- 25 June-3 July Hydrogen Week South- potential delegation to various hydrogen projects across B-W, Bayern, Hessen, Rhineland-Pfalz & Saarland
- September Wind Energy Hamburg – including engagement with Hamburg and Lower Saxony
- Sept/Oct SHFCA annual conference and potential dedicated delegation from Germany to Scotland, including visits to Fife, Aberdeen and Aberdeenshire, Orkney, and Shetland
- October Windforce, Bremerhaven
- 8 November Mission Hydrogen Online Conference - international 24-hour hydrogen conference, 30,000+ attendees
- Tbc 4 events to showcase key Scottish hydrogen regions and clusters, e.g. Aberdeen, Orkney, Fife and Glasgow

DIPTTEL BERLIN (SENSITIVE): [Redacted]