

Hydrogen Action Plan

Business and Regulatory Impact Assessment

December 2022

1. Purpose and intended effect

On the 14th of December 2022, the Scottish Government published the finalised Hydrogen Action Plan, detailing the actions which will be taken from 2022 to 2026 to support the development of the hydrogen economy in Scotland and the Scottish Government's efforts to reduce greenhouse gas emissions from Scotland's energy system, homes, industry and transport, while ensuring a just transition.

This document finalises the initial indicative Partial and Business Regulatory Impact Assessment, published alongside the Hydrogen Action Plan in November 2021. It takes into consideration the views gathered through the public consultation and provides an updated assessment of the impact of the Hydrogen Action Plan on various parties and sectors within the Scottish economy.

1.1 Background

The Scottish Government's overall approach to meeting the country's climate change targets is set out in its Climate Change Plan which outlines a decarbonisation trajectory for each of Scotland's main sectors and describes the policies and proposals that will facilitate these reductions. The plan, which was updated in 2020, sets ambitious targets to end Scotland's contribution to climate change by 2045, committing to reduce emissions by 75% by 2030 (compared with 1990) and to net zero by 2045.

While the Scottish Government has not stipulated a preferred mix of technology solutions for enabling Scotland's transition to a net-zero emissions economy, hydrogen represents one such solution, referenced within the Climate Change Plan as a potential means of decarbonising heat, transport and industrial processes, as well as being a potentially important vector for balancing energy supply and demand.

The Scottish Government published its Hydrogen Policy Statement in December 2020, confirming its support for a strategic approach to the development of a hydrogen economy in Scotland and setting a clear ambition to achieve 5GW of installed hydrogen production capacity by 2030 and 25GW by 2045. The Hydrogen Policy Statement was informed by the Scottish Hydrogen Assessment and a range of other analysis to deepen the evidence base in order to inform the Government's policies on hydrogen going forward. From the assessment, it is clear that hydrogen is not just an energy and emissions reduction opportunity; it could also have an important role in generating new economic opportunities in Scotland.

The finalised Hydrogen Action Plan is the next step in the development of the government's hydrogen policies and sets out the actions that the Scottish Government's will take forward from 2022 to 2026 to assist the strategic development of a Scottish hydrogen economy capable of supporting Scotland's energy transition to net zero and a key component of a just green economic recovery.

1.2 Objective

1.2.1 The main objective of the Hydrogen Action Plan is to ensure we take the action needed, working in partnership with others, to ensure Scotland is in the best possible position to achieve our ambition of 5GW of hydrogen capacity by 2030 and 25GW by 2045. The actions are designed to set Scotland on the pathway to becoming a leading

hydrogen nation by 2045 in the production of reliable, competitive, sustainable hydrogen and provide the potential to secure Scotland's future as a centre of international excellence as we establish the innovation, skills and supply chain that will underpin our energy transition.

1.2.2 These actions are intended to:

- Drive Scotland's hydrogen production capability to meet an ambition of 5GW of renewable and low-carbon hydrogen by 2030 and at least 25GW by 2045.
- Address current barriers to the uptake of hydrogen including the need to reduce production costs
- Support the growth of Regional Hydrogen Energy Hubs.
- Encourage and stimulate demand for hydrogen by supporting hydrogen use and developing supply chain capability
- Support the realisation of Scotland's hydrogen potential
- Secure broad economic benefit from public sector and private sector support for development of regional hydrogen production and use.
- Encourage the development of a strong hydrogen sector in Scotland which supports a Just Transition to net zero.

1.3 Rationale for Government intervention

1.3.1 The Scottish Government has a strong track record of supporting a number of world-leading hydrogen demonstration projects in Scotland that have assisted in determining the role that hydrogen could play in Scotland's energy system. This section briefly describes why it is unlikely we will realise the scale of hydrogen production and use required to meet our ambitions and at the pace required to meet our climate change targets in the absence of government intervention.

1.3.2 While there are a number of successful hydrogen demonstration projects already in operation in Scotland, the market is immature and commercialisation pathways are not certain or sufficiently proven to negate risks for early project developers. This makes it unlikely that the market will develop at the pace required without government signalling and intervention. These risks include the need for settled long term policy and regulatory frameworks, certainty of offtake or production costs which results in early mover-projects facing greater risks.

1.3.3 To realise the economic, environmental and societal opportunities presented by the growth of a hydrogen sector in Scotland, action must be taken in the short term to create the required environment to help de-risk early projects, to support the growth of the supply chain, to upskill the workforce and to unlock private sector investment.

1.3.4 The Hydrogen Policy Statement published in 2020 confirmed the Scottish Government's position of support for hydrogen production as set out in previous publications, including the Scottish Energy Strategy and the Climate Change Plan (both previously subject to SEA).

1.3.5 The Action Plan reaffirms the Government's support for the development of a Scottish hydrogen economy and sets out the actions that it will take over the coming years to ensure that the development of a hydrogen economy delivers increased environmental, economic and social benefits.

1.4 Consultation Across Government

1.4.1 A wide range of directorates, agencies and non-departmental public bodies were consulted during the development of the Hydrogen Action Plan, including:

- Directorate for Energy and Climate Change
- Directorate for Economic Development
- Directorate for Fair Work, Employability and Skills
- Directorate for International Trade and Investment
- Directorate for External Affairs
- EU Directorate
- Directorate For Local Government And Communities
- Marine Scotland Directorate
- Transport Scotland
- Scottish Enterprise
- Highlands and Islands Enterprise
- South of Scotland Enterprise
- Scottish Development International

1.5 Public Consultation

1.5.1 An 11 week public formal consultation took place between the 10th of November 2021 and the 5th of January 2022 to allow stakeholders time to provide their views and feedback on the draft action plan. A total of 95 responses were received, reviewed and taken into account in the finalisation of the Hydrogen Action Plan.

1.6 Business

1.6.1 The development of the Hydrogen Action Plan is aligned with the recommendations regarding the development of the hydrogen economy made by the Scottish Energy Advisory Board (SEAB) during the Energy Task Force Joint Business Plan meeting on the 18 March 2021. SEAB provide a forum for strategic discussion on the current and future energy challenges and opportunities for Scotland and is formed by key organisations in the Scottish energy sector, including the Scottish Government, Scottish Enterprise, Highlands and Islands Enterprise, and from industry and the STUC.

1.6.2 Further discussions were undertaken with hydrogen and fuel cell businesses during the consultation period, including the Scottish Hydrogen Fuel Cell Association (SHFCA) which hosts some of Scotland's specialised fuel cell companies, power generation companies, academic institutions, research and development bodies, energy consultants, Scottish Enterprise and local enterprise companies and councils with an interest in Hydrogen & Fuel Cells.

2. Options

2.1 Options 1: Do nothing

2.1.1 An assessment like this usually requires consideration of a 'do nothing' option. The Scottish Government could have chosen not to publish a finalised Hydrogen Action Plan for Scotland.

2.1.2 However, the Scottish Government has committed to publishing the Hydrogen Action Plan in its Programme for Government 2022/23 as well as in its previously published Hydrogen Policy Statement. Therefore, the "Do nothing" approach was not a viable option.

Benefits

2.1.3 The staffing, resource and capital costs associated with the Hydrogen Action Plan would not be required.

Costs

2.1.4 There would be significant reputational, political, environmental, social and economic costs for Scotland if Ministers were unable to support the development of a Scottish hydrogen economy due to the Hydrogen Action Plan not being published.

2.1.5 Moreover, failing to provide the sector with a cohesive strategy, long-term vision, objectives and priorities for action could have a detrimental effect on its future growth and development. Hydrogen has been identified as a significant business opportunity for Scotland and the benefits to potential investors, developers and supply chain of having a clear strategic commitment to the development of the sector from Government are therefore significant. Without government intervention in support of the growing sector and transition of the existing supply chain, the full range of benefits that a hydrogen economy could provide may not be effectively realised in the desired timescales.

2.1.6 This would not be in alignment with the Scottish Government's ambitions for the sector or its aspirations to transition to a net zero economy by 2045 and support a just green economic recovery.

2.1.7 We are witnessing a rush to grow the global hydrogen market illustrated by the publication and development of hydrogen strategies, export plans and legislative frameworks, across the globe. The finalised Hydrogen Action Plan sets out action in Scotland to ensure partnerships are in place which will enable opportunities to be grasped and economic benefit to be realised. Without publication of the finalised Action Plan, Scotland would be left behind its counterparts and would not be in a competitive position as the market develops.

2.2 Options 2: Publish a Hydrogen Action Plan

2.2.1 A Hydrogen Action Plan is published as committed in the Scottish Government's Programme for Government 20/21 and 21/22 as well as in its Hydrogen Policy Statement.

Benefits

2.2.2 As outlined above, the publication of the Hydrogen Action Plan is required to ensure that Ministers are able to purposefully support, the strategic development of a Scottish hydrogen economy capable of supporting Scotland's energy transition to net zero and a key component of the green economic recovery.

2.2.3 The Hydrogen Action Plan does not propose new policy, but is a complimentary document to be read alongside the Hydrogen Policy Statement. The Hydrogen Action Plan provides details on our planned approach and proposed actions to implement our policy positions between 2022-2026.

2.2.4 The Hydrogen Action Plan acts as a blueprint for the development of the hydrogen sector, not only within the Scottish Government, but across all sectors of the Scottish economy. It illustrates the core areas for skill building and developing expertise, highlights the action being taken to develop a cohesive regulatory framework and identifies projects which are planned or already underway in Scotland. This will allow the sector to develop in a coordinated manner, with the Action Plan rooting activities in key focus areas.

2.2.5 Economic impact scenarios developed through the Scottish Hydrogen Assessment Project published in 2020 suggest that in the most ambitious scenario, establishing Scotland as an exporter of renewable hydrogen to Europe, where there is already growing demand, could result in a £25 billion annual gross contribution to Scotland's Gross Value Added (GVA) by 2045.

2.2.6 The Scottish Hydrogen Assessment 2020 further estimated that, in the same scenario, the hydrogen sector could support over 300,000 jobs by 2045.

2.2.7 The report suggests that this would be achieved by unlocking Scotland's vast offshore wind potential, resulting in Scotland producing large-scale, 'renewable hydrogen' that is competitively priced within a growing European market. Unlocking that potential is possible due to Scotland's impressive renewable capacity, geological features, established oil and gas industry as well as technical and transferable infrastructure and skills, and it's legacy of innovation and research.

2.2.8 Scotwind is the world's largest commercial round for floating offshore wind and places Scotland at the forefront of offshore wind development globally, with the potential to deliver almost 28GW of offshore wind, creating huge potential for renewable hydrogen production.

2.2.9 Many of the existing oil and gas assets in the North Sea are approaching end-of-life and decommissioning in the next 10 years, making them potential candidates for repurposing. Repurposing existing natural gas pipelines has been illustrated to be a cost-effective means for hydrogen transport.¹

2.2.10 Pipelines are the cheapest option for transporting large volumes of hydrogen across long distances, and some European Infrastructure operators – including the National Grid – are exporting the development of a network of interconnected

¹ NZTC Hydrogen Backbone Report, p.61

hydrogen pipelines across 28 countries in Europe, including the UK, through the European Hydrogen Backbone Initiative.²

2.2.11 Scotland has several oil terminals and ports which can be redeveloped to accommodate ship-based export of hydrogen.³ Depleted oil and gas reservoirs can also be utilised for hydrogen storage, which are typically larger than salt caverns often proposed.⁴ The Hydrogen Action Plan illustrates our focus on building on Scotland's natural assets for the development of the hydrogen economy.

2.2.12 Scotland has a huge number of highly skilled and specialist oil and gas talent, and 46,500 working in the low carbon sector, with crucial and transferable skills for hydrogen. Scotland continues to focus on investing in ambitious skills to meet industry demand through the National Energy Skills Accelerator (NESA) and the Energy Skills Partnership (ESP). The Hydrogen Action Plan demonstrates our continued support to grow the growing Scottish skills base, identifying skills gaps and taking appropriate action for long term development.

2.2.13 The Scottish Government has a strong track record of supporting a number of hydrogen demonstration projects in Scotland that have assisted in determining the role that hydrogen could play in Scotland's future energy system. The development of a Hydrogen Action Plan is a continuation of that established approach, providing focus for action and assurance to businesses on the direction of travel.

2.2.14 The proposed Government funding and support outlined in the Hydrogen Action Plan will help to de-risk early projects, accelerate the pace of development and stimulate further private sector investment essential to the deployment of renewable and low carbon hydrogen production at scale, whilst also ensuring the benefits of the growing sector are spread geographically across Scotland and facilitate a just transition for our communities and businesses.

Costs

2.2.15 The Hydrogen Action Plan is accompanied by £100 million funding to boost excellence in research, innovation development and demonstration of secure, renewable hydrogen production. This will be provided through the Emerging Energy Technologies Fund (EETF) – a £180m package of funding between 2022-2026 that will provide capital support to accelerate low carbon infrastructure projects that will be essential to deliver net zero – as committed in the Hydrogen Policy Statement.

2.2.16 The purpose of this hydrogen funding programme is to support the development of a hydrogen economy in Scotland, facilitate a just transition and to help overcome challenges to scaling up hydrogen production and deliver lasting benefits for business and communities.

2.2.17 Between 2022-2026, the Scottish Government will invest in the emerging hydrogen sector through its capital funding programme focusing on the following types of activity:

² CXC Green Hydrogen Cost Study

³ ORE Catapult, SE, NZTC, 'Development of early, clean hydrogen production in Scotland' August 2021, p.117

⁴ ORE Catapult Report, p.121

- Regional hydrogen production hubs
- Renewable Hydrogen production linked to demand case
- Innovation

2.2.18 With an emphasis on balancing support for supply and demand and supply chain opportunities along the whole value chain, the EETF will continue to support appropriate pre-commercial projects to accelerate demand and support the sector to move beyond small pilot stage to large scale commercial projects.

2.2.19 Innovation and research across hydrogen production, storage, distribution and end-use technologies will be central to driving the efficiencies, performance optimisation and cost reduction that will underpin the growth of commercial scale hydrogen projects.

2.2.20 The £10m Scottish Hydrogen Innovation Scheme, launched in June 2022, as the first tranche of the EETF, will support Scottish researchers and innovators to drive innovation that will support the realisation of Scotland's 5GW by 2030 ambition and to ensure Scotland benefits from and contributes to the global research and innovation network through international collaboration.

2.2.21 The actions and funding principles set out in the Hydrogen Action Plan intend to enable government, industry and academia to work together to lay some of the early building blocks required to enable the growth of a strong and sustainable hydrogen economy in Scotland. They represent new and sustainable economic activity and transition opportunity for the Scottish supply chain.

2.2.22 The action plan provides a structured approach for the Scottish Government to support the strategic development of a hydrogen economy in Scotland and is not expected to have negative impact on business operations or impose any additional burdens or duties on the sector.

2.3 Sectors and groups affected

2.3.1 The Hydrogen Action Plan will provide a framework for the strategic development of a Scottish hydrogen economy. The actions within the plan to support this will have an impact on the people in Scotland. For some, the impact of these actions will be direct e.g. through increased use of hydrogen fuel across various applications or the availability of funds to develop hydrogen projects. For others, the impact of these actions will be indirect, e.g. through the decarbonisation of hard to abate sectors and the enhancement to air quality.

2.3.2 Actions in the plan will have an impact on hydrogen and fuel cell businesses, from developers supporting the production of hydrogen fuels through to business using hydrogen fuel in different applications.

2.3.3 The main businesses affected by the development of a Scottish hydrogen economy include well established sectors such as oil and gas, subsea, maritime, onshore and offshore renewables, chemicals and petrochemicals and aerospace which contain a wealth of skills and capacity, and for which hydrogen represents an attractive diversification opportunity the economy continues its transition to net zero.

2.3.4 The development of a hydrogen economy will also require a strong domestic supply chain across the whole hydrogen value chain, including engineering, manufacturing, consultancy, and design.

3. Legal Aid Impact Test

3.1.1 It is not anticipated that the action plan will have any effect on individuals' rights of access to justice through the legal aid fund or in an increase in people seeking legal assistance or being taken through the courts.

3.2 Post-implementation review

3.2.1 The finalised Hydrogen Action Plan covers a period from 2022-2026. The Action Plan will be reviewed in the mid-2020s to evaluate progress and to assess the support that will be required to accelerate this progress throughout the second half of the decade.

4. Summary and recommendation

4.1.1 The Scottish Government has undertaken an extensive and comprehensive period of evidence-gathering over the past years which examines the issues, challenges and opportunities presented the development of a Scottish hydrogen economy.

4.1.2 The principles of Government setting strategic direction for the development of a hydrogen economy in Scotland are well established. The economic impact associated with publishing the action plan in addition to the £100m of supportive funding already committed in our 2021/22 Programme for Government, are expected to be outweighed by the benefits to society and businesses.

4.1.3 Based on the analysis above and on the fact that, to enable Ministers to carry out the ambition set in the Hydrogen Policy Statement to support the development of a Scottish hydrogen economy, a Hydrogen Action Plan that meets the requirements and policy positions outlined in the Policy Statement must be in place.

Declaration and publication

I have read the Business and Regulatory Impact Assessment and I am satisfied that, given the available evidence, it represents a reasonable view of the likely costs, benefits and impact of the leading options. I am satisfied that business impact has been assessed with the support of businesses in Scotland.

Signed:

A handwritten signature in grey ink, appearing to read 'Michael Matheson', with a long horizontal flourish extending to the right.

Date 13/12/2022

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