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To whom it may concern,

### **Draft Hydrogen Action Plan: Consultation Response**

Scottish Renewables is the voice of Scotland's renewable energy industry, working to grow the sector and sustain its position at the forefront of the global clean energy transition. We represent around 270 organisations across the full range of renewable energy technologies in Scotland and around the world, ranging from energy suppliers, operators and manufacturers to small developers, installers, and community groups, as well as companies throughout the supply chain.

Scottish Renewables welcomes the Scottish Government's Draft Hydrogen Action Plan and its commitment to developing the hydrogen economy in Scotland.

In responding, we would like to highlight the following points:

We strongly recommend that The Scottish Government clearly delineate green renewable hydrogen as the goal of the hydrogen economy in Scotland. Green hydrogen carries the greatest economic potential for Scotland.

Green hydrogen needs to be prioritised in the short term to ensure Scotland 'learns by doing' and creates early mover economic opportunities.

We recommend a specific green hydrogen target of at least 3GW by 2030. Jobs and GVA benefits are dependent on Scotland producing green hydrogen that is competitive in a European market<sup>1</sup>. Not having a specific target for green hydrogen and a clearly articulated view on its role will hinder our competitiveness.

Scottish Renewables would be keen to engage further with this agenda and would be happy to discuss our response in more detail.

Yours sincerely,



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## **Draft Hydrogen Action Plan: Consultation Response**

We are pleased to see the publication of The Scottish Government's draft Hydrogen Action Plan, which sets out the necessary steps that will need to be taken over the next five years to develop Scotland's emerging hydrogen economy. We are delighted to see the strong emphasis on the export potential of hydrogen; however, this should be married with a sector coupling approach domestically to ensure local supply chains are built and end-use sectors are hydrogen-ready. We welcome projections that a strong hydrogen sector in Scotland could support up to 300,000 jobs across all skill levels by 2045.

As part of our response to this draft plan and to The Scottish Government's Hydrogen Policy Statement, we developed a Policy Position Paper on green hydrogen<sup>ii</sup> in consultation with our members. Our paper sets out the views of the Scottish Renewables membership on the significant role and economic opportunity presented by green hydrogen in the developing hydrogen economy and makes recommendations to The Scottish Government intended to realise the potential of green hydrogen.

### Comments on the Draft Hydrogen Action Plan

It is our view that The Scottish Government has taken a cautious approach to keeping both blue and green hydrogen as options. We strongly recommend that The Scottish Government clearly delineate green renewable hydrogen as the goal of the hydrogen economy in Scotland. The work carried out by Arup on the Hydrogen Assessment Project clearly demonstrated that the greatest economic potential for Scotland comes from green renewable hydrogen. In response to this, green hydrogen needs to be prioritised in the short term to ensure Scotland 'learns by doing' and creates early mover economic opportunities. Green hydrogen needs to be central to the draft action plan if Scotland is to realise the extensive economic opportunities.

We note the lack of specific targets in the action plan, against the backdrop of ambitions for 5GW and 25GW by specific dates. This omission must be addressed with a dedicated green hydrogen target of at least 3GW by 2030, with a potential 2025 interim green hydrogen target. The Hydrogen Assessment Project report states that jobs and GVA benefits are dependent on Scotland producing green hydrogen that is competitive in a European market<sup>iii</sup>. Not having a specific target for green hydrogen and a clearly articulated view on its role will hinder our competitiveness. Questions remain on the makeup of the UK's 5GW target in relation to Scotland's 5GW target. Clarity is needed from both the UK Government and The Scottish Government on how much of the 5GW will be green hydrogen.

Additionally, we are concerned that 5GW by 2030 may not be sufficient to meet domestic demand. A recent Scottish Enterprise report<sup>iv</sup> projected the UK's hydrogen demand to be approximately 60TWh by 2030, and 220TWh by 2050. Demand is currently unclear due to the

lack of a coherent strategy and target for green hydrogen. Demand must be unlocked through a clear set of policy tools that strategically target end-use sectors.

The action plan must have a clear focus on UK hydrogen production for UK hydrogen users but must also have a clear goal of the quantity of hydrogen intended for export. If Scotland intends to export, rapid early action will be required to ensure our place in a competitive developing sector where we are seeing ambitions from other countries including Chile, Australia, and Saudi Arabia. The technology-neutral approach adopted in the draft action plan may mean Scotland misses the opportunity to maximise the economic benefits from our abundant wind energy resources.

We are also concerned that the timescale of Scotland's hydrogen ambitions could be too late to match the ambitions of potential export markets. Scotland's export ambition needs to be accelerated to meet off-takers demands in export markets. However, this raises questions regarding UK Government export funding support.

The UK Government is not 'minded to' support production for export via the Business Models. The UK Government's business model consultation<sup>v</sup> does not take account of hydrogen exports nor does the UK Government's new Export Strategy mention hydrogen, creating a potential source of conflict between UK and Scottish policy.

Additionally, consideration must be given to investing in infrastructure for export. In the short-term hydrogen in the form of ammonia could be developed for export until the shipping options can be expanded.

Regarding the ambition of 5GW of hydrogen by 2030, it is unclear how this 5GW will be allocated between transport, industry, heating, and export sectors. This ambiguity creates uncertainty for producers resulting in a reluctance to invest. We also question whether 5GW will be enough to meet these needs.

While transport seems to be the focus of this action plan, it is unclear where the main priority lies due to ongoing debate and research into the sectors best suited to hydrogen use. Scotland has other net-zero options for transport, for example, electrification, while industrial processes have fewer options.

The action plan does not make it clear what sectors are going to be prioritised over the next 5–10 years. Without this prioritisation, industry cannot effectively plan where to focus production -in regional hubs or for transport use. This is also a lack of clarity on whether industrial use of hydrogen is intended to displace current grey hydrogen use in industry or stimulate new demand in industry, for example, in steel production.

Other countries, such as Colombia and Canada, have performance indicators that could be adopted for the Scottish situation. For example, 1000 buses running on green hydrogen by 2030 or increasing the amount of hydrogen refuelling infrastructure in Scotland.

We are concerned that the action plan is predominantly urban focused, with minimal mention of islands and rural issues. Rural areas of Scotland may struggle with decarbonisation as the net-zero targets approach particularly with transportation issues. There needs to be more focus and support for rural areas within the action plan.

With regards to the location of hydrogen production onshore. Co-location of hydrogen production with renewable energy generation is a highly cost-effective way to produce green hydrogen. However, green hydrogen production is intrinsically industrial by nature and co-location may not be appropriate in all settings, particularly in rural areas where onsite water availability, landscape issues of above-ground hydrogen storage and access in the winter for hydrogen transport can be issues. Hydrogen and planning policy should therefore be designed to encourage co-location but also accommodate hydrogen projects where this would not be appropriate.

Offshore, there are opportunities for the co-location of electrolyzers on offshore turbines, with hydrogen being piped onshore. However, this would require licensing mechanisms for hydrogen pipelines to be clarified as matter of urgency.

There should be 'in principle' support for green hydrogen projects with developers expected to demonstrate a design-led approach to the location and layout of the proposed development. Policy should therefore support both 'grid-connected' and 'private wire' links between renewables generation and green hydrogen production facilities in more industrial settings where this is a more appropriate solution.

A recent IRENA report<sup>vi</sup> states that the water source for large scale hydrogen production should be explicitly accounted for in hydrogen strategies, as the volumes might be significant for water-stressed regions.

It is unclear to what extent water stress issues may affect the development of Scotland's green hydrogen sector. Therefore, a strategic approach to addressing water availability for green hydrogen production must be developed. The approach to this issue should be consistent with that taken elsewhere in the UK.

In areas where there is high potential for renewable energy generation but there are constraints in grid capacity or demand, the constrained electricity can be used to generate green hydrogen. A good example of this can be seen in Orkney where grid capacity constraints have resulted in renewable energy that would otherwise be wasted being used to produce green hydrogen.

Policy should support the production of green hydrogen using renewable generation in areas of constraint to encourage the most efficient use of our renewable energy generation capacity.

With regards to grid-connected electrolyzers, we ask The Scottish Government to support the industry's position that grid-connected electrolyzers should not pay environmental levies as one decarbonisation technology should not be subsidising another.

Grid-connected electrolysis to produce green hydrogen should be supported in geographical areas where the carbon intensity of the grid has already reached suitably low levels or if the electrolyser can be proven to be securing power from renewables (via a cPPA and/or guarantee of origin), such as Scotland, given the huge differential in emissions from power production in the best- and worst-performing parts of the country.

We believe that this approach could kick-start grid electrolysis in the first half of this decade in suitable locations and unlock a significant production pathway with lower emissions than fossil gas SMR with CCS, for example. This approach would also allow production to be located close to demand, rather than restricted to locations close to electricity generation, which are often sited remote and/or rural locations; in turn supporting the action plan's goal of system integration across power, heat and transport.

The consultation for the UK Low-Carbon Hydrogen Standard<sup>vii</sup> sets out strict additionality requirements. However, this will add significant delays and would require green hydrogen projects to coordinate with new-build renewables; which may not be possible. There is a risk that additionality could impose unnecessary complexities and constraints on green hydrogen project qualifications which could constrain future pipelines.

Regarding the definitions set out on page 6 of the draft plan, we would urge The Scottish Government to include grid-connected electrolysis as a form of low carbon hydrogen, given that Scotland's electricity grid is already largely decarbonised. Annual emissions from Scotland's power sector in 2019 were 41g/kWh, compared to 181g/kWh for Great Britain in 2020.

Indeed, Scotland's emissions have been below 50g/kWh for the last three years and are expected to fall further from 2025, when National Grid ESO's Stability Pathfinder project displaces the requirement for Peterhead gas-fired power station to support the stability of the transmission network. Data is readily available to measure the carbon intensity of the grid in real-time, and therefore of hydrogen produced through grid-connected electrolysis.

There are also issues around the supply chain. We are encouraged to see that the Scottish Government is considering the hydrogen supply chain but there is a lack of electrolyser producers in Scotland, and this may be the case for other necessary components.

With recent announcements of collaborations such as Scot2Ger and working with other countries, there needs to be an emphasis on the protection of local supply chains. However, this needs to be balanced with the need for more choices in the supply chain.

We recommend a focus on attracting one or more electrolyser manufacturing plants to base themselves in Scotland. The Scottish Hydrogen Assessment report<sup>viii</sup> articulates that “capturing more of the green hydrogen production value chain, including electrolyser integration or even **manufacturing upstream would result in greater economic benefits**”. If Scotland is to realise the jobs and growth potential of hydrogen, it needs to support local original equipment manufacturers (OEMs), for example.

While we applaud the ambition in the draft action plan, we feel that there is a lack of focus in many areas. The plan states that there is an abundance of renewables in Scotland and there are resources waiting to be deployed to green hydrogen production. However, as we move towards electrification it is not clear how The Scottish Government sees hydrogen production from renewable electricity being used.

To ensure the security of supply and to foster the hydrogen economy, it cannot always be a by-product or secondary activity. There must be recognition of a dedicated renewables-to-hydrogen production pathway. It is not clear from the draft action plan whether the Scottish Government has considered this in their plans and more clarity is needed.

We note there is a commitment to sustainable blue hydrogen, however, the plan only references carbon emissions, and not fugitive emissions, methane, or wider greenhouse gasses. The greenhouse gas intensity of the Scottish hydrogen mix over time needs to be consistent with the trajectory to net-zero and carbon budget milestones.

We are concerned about the lack of sector coupling with industry in the draft action plan and strongly suggest that there needs to be some mechanism where this takes place. One of the recommendations in our policy position paper states that The Scottish Government and industry should work together to review funding to see where it is needed most to develop the hydrogen economy in Scotland. There needs to be an action recommending establishing a public private sector group with senior leader oversight steering these discussions, to ensure that industry and Government stay aligned.

We are concerned whether The Scottish Government has sufficient resources in place to enable this work. The long list of actions in the plan will correlate to approximately 30–40 work packages, and the work that is going to happen around the integration of electrolysers onto the system is a large complex piece of technical work. There is a need to prioritize some of these actions over others and get some of these larger actions down to a more manageable size. Practically, there is

a lack of detail on how The Scottish Government intends to progress these actions. The action plan must set out practical steps for delivering the actions listed.

We are also concerned about the time taken to produce the draft action plan following the Hydrogen position statement and further plans are still to be published. It is crucial that delivery of projects gets underway and project progress is not hindered by policy development timeframes.

The draft action plan needs to be much stronger on whole system planning. Our recommended 3GW green hydrogen target in our Policy Position Paper<sup>x</sup> should be underpinned by an Action Plan that uses a whole system planning approach that:

- Includes early identification of potential hydrogen demand clusters and commercial-scale green hydrogen production projects.
- Identifies the most cost-effective priorities for the initial deployment of hydrogen in Scotland.
- Identifies the key barriers to the deployment of the green hydrogen economy in Scotland and articulates the actions that will be taken to address them.
- Identifies the supporting infrastructure that will be required to support the emergence of a green hydrogen economy in Scotland and articulates a pathway to ensuring this infrastructure is put in place.
- Articulates a support mechanism that incentivises investment in both the supply and demand side of the clusters, projects and priorities identified to attract international investors.
- Provides flexible funding programmes covering each part of the hydrogen value chain with ring-fenced and prioritised support for green hydrogen production.
- Identifies the places in Scotland where hydrogen is expected to be the most cost-effective or practical method of decarbonising heat and ensures that the evidence base that is required to make informed decisions on heat decarbonisation in a Just Transition is prioritised and accelerated.
- Articulates how hydrogen infrastructure will be treated in the planning and consenting system (both on and offshore), ensuring that the planning system is fit for purpose and fully supportive of Scotland's hydrogen ambitions

Regarding the last point above, a development for the production of hydrogen only as a feedstock would be determined under the Town and Country Planning Act whilst the same installation used for hydrogen which also generates electricity above 50MW would fall under the Electricity Act.

It would be useful to see links with the Control of Major Accident Hazards (COMAH) and Hazardous Substances Consent. Additionally, help in establishing guidance for safe distances from residences etc. based on the capacity of a hydrogen plant would help industry move forward quicker.

Furthermore, the UK Offshore Energy Strategic Environmental Assessment states that “unlike natural gas and carbon dioxide, there is no consenting route for projects transporting hydrogen by

offshore pipeline, either under the Energy Act 2008 (as amended), or related Regulations such as the Offshore Oil and Gas Exploration, Production, Unloading and Storage (Environmental Impact Assessment) Regulations 2020). Similarly, the consenting route for hydrogen generation offshore requires definition". We would welcome clarity on pathways to consent for hydrogen production and transportation both on and offshore.

Regarding more specific targets, we need to understand sooner rather than later where hydrogen is going to play the right role, where the best place is to produce it, where is best to connect it to wider infrastructure, who will use it. Therefore, a whole system planning approach needs to be accelerated with a specific focus on the priority areas.

We are encouraged by The Scottish Government's engagement with Europe and other countries for the medium to long-term export potential but would caution that it does not detract from shorter-term priorities. We should embrace an indigenous market and tackle some of the low hanging fruit, easy to decarbonise sectors, that cannot be decarbonised by other means.

## **PRIORITIES AND GAPS**

We propose that the areas that must be prioritised over the next five years are: -

1. There needs to be clarity over the UK's 5GW and Scotland's 5GW ambitions. The business models need to be aligned with both of these to be able to deliver 5GW of hydrogen. Industry questions whether 5GW is truly ambitious enough. It would send a clear signal to industry if the 5GW target was either fully green hydrogen or low-carbon and would easily differentiate Scotland from the wider UK.
2. We recommend a specific green hydrogen target of at least 3GW of green hydrogen by 2030.
3. Scotland is aiming for 5GW by 2030, which is a longer-term target. There should be interim smaller targets, which would help to establish a route map to get to the 5GW by 2030 target. This would create a more sustainable pathway to the target.
4. There need to be more examples of public and private partnership projects, for example, the Aberdeen Hydrogen Hub, which is securing demand, demonstrating the technological solutions and helping to position Aberdeen to be the first hydrogen city, and helping to get that early mover's advantage for Scotland.
5. There needs to continue to be some sort of funding hook for green hydrogen projects to sustain the pipeline of projects. We welcome the announcement that the £100 million of funding, part of the Emerging Energy Technologies Fund (EETF), will be used for green hydrogen projects although there is little detail on this fund. The Scottish Government's EETF funding should be linked to the application process for the Net Zero Hydrogen Fund and Hydrogen Business Model support or work in a similar way. We feel strongly that



early pathway projects, which give Scotland the early mover advantage, still need to be resourced and these will also benefit Scotland's 5GW ambitions. These projects will then be better positioned to make gains once the hydrogen business models are realised.

6. There is a lack of detail about the £100 million EETF funding and more information is needed on what The Scottish Government want to fund, the timing of funding rounds and what the eligibility and evaluation criteria will be.
7. Linking with our overall points about developing renewable energy in Scotland, the regulatory and consenting framework could have a significant impact if it is joined up and streamlined taking into consideration grid connection capacity. The Scottish Government has an important role here to consider how projects are treated with regards to planning and consenting.
8. An important issue for the hydrogen action plan to develop is funding supply and demand. For example, it would be useful to know how much of the £100 million is supporting supply and how much is stimulating demand, especially in terms of whether Scotland uses its own hydrogen or exports it. If we use our own hydrogen, it would be useful to know how much of that fund will be used to stimulate demand.
9. It would be useful to have more information about the Hydrogen Backbone Link project, which is potentially useful for floating wind, ScotWind and INTOG projects. It would be in Scotland's interest to develop the Scottish leg of the hydrogen backbone as one of the earliest legs to be constructed. It would be useful to have clarity over the Scottish Government's role in encouraging the UK Government and Ofgem to approve this and start to fund the FEED studies that are needed to deliver it.
10. We ask The Scottish Government to support industry efforts highlighting that it is not appropriate that grid-connected electrolysers should pay environmental levies as one decarbonisation technology should not be subsidising another.
11. Our members agree that there is a need to meet domestic demand first, initially from industry, however if the demand is coming from other countries sooner for hydrogen, then meeting that demand would create hydrogen production opportunities which would help to get Scotland on a route towards lower cost hydrogen.
12. The Action Plan focuses heavily on the production of hydrogen and not enough on demand. Scotland could be producing GWs of hydrogen, but it is a major problem if there are no customers. Early movers both in terms of production and demand, consumers and volume of consumption need to be supported.

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<sup>i</sup> Arup. Scottish Hydrogen: Assessment Report. December 2020

<sup>ii</sup> Scottish Renewables. [Policy Position Paper on Green Hydrogen](#). 2022

<sup>iii</sup> Arup. Scottish Hydrogen: Assessment Report. December 2020

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- <sup>iv</sup> Scottish Enterprise. Development of early, clean hydrogen production in Scotland. August 2021
  - <sup>v</sup> UK Government. Consultation on a business model for low carbon hydrogen. August 2021
  - <sup>vi</sup> IRENA. Green Hydrogen Cost Reduction: Scaling up Electrolysers to Meet the 1.5°C Climate Goal. 2020
  - <sup>vii</sup> UK Government. Designing a UK low carbon hydrogen standard. August 2021
  - <sup>viii</sup> Arup. Scottish Hydrogen: Assessment Report. December 2020
  - <sup>ix</sup> Scottish Renewables. Policy Position Paper on Green Hydrogen. 2022