



A Hydrogen Strategy for Northern Ireland

Policy Consultation Paper

Introduction

Northern Ireland is fast emerging as a leading innovator in hydrogen technology. There are a wide range of interests who recognise that Northern Ireland has the potential to become a leader in this field, and based on this, the DUP will consult with a number of key stakeholders, with a view to develop a party policy focused on a new Hydrogen Growth Strategy. This policy will reflect the ambitions of many companies and public bodies, as well as the infrastructure which will be required from government.

The region is long recognised as a perfect destination for on and off shore wind technology, given its location and open coastlines. The renewables sector has grown for many years and the development of the hydrogen sector is regarded as a natural next stage. Already many international companies have a presence in the Northern Ireland market, and growing involvement of local academia and entrepreneurs has further boosted this potential. Another element in the development of the sector is the innovative use of the local gas infrastructure to distribute hydrogen. We are aware of the different types of hydrogen and keen to understand from consultees whether there is potential in one type over another,

The Consultation Process

This consultation paper will involve a detailed research and consultation, producing an in-depth and lengthy document. A three-stage consultation process is therefore envisaged:

- Full consultation paper – This will propose policy ideas and options to address the identified issues and those highlighted in the pre-consultation process. Throughout this process, it is also envisaged that there will be direct engagement with some of those who are currently working in this field, and visits to some best practice examples.
- In parallel with the consultation paper, there will be considerable internal consultation with elected representatives and those with an interest or specialism in the areas outlined.
- Final policy document – Following the consultation process a final policy paper will be adopted that will inform future DUP manifestos.

This is a Public Consultation document released by the Democratic Unionist Party. None of the proposals within it constitute present party policy. The final policy position will be adopted by Party Officers at the end of external as well as internal engagement processes.

If you want to contribute to this consultation please reply with your comments and proposals to:

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We are happy to arrange a meeting in an appropriate format to discuss the issues raised in this paper. please contact George at the email if you wish to do this.

Background

At the moment energy generation is dominated by fossil fuels the use of which creates carbon dioxide. There is now a global commitment to shift energy dependence from fossil fuels, producing carbon dioxide to green energy sources, that is energy sources that can be used without producing carbon dioxide. There is a global commitment to 'net zero' by 2050, that is a global economy the functioning of which does not increase the level of carbon dioxide in the atmosphere. This global political commitment is creating an imperative for the rapid development of green energy technology so that the world economy can continue to function fully without using fossil fuels.

Green Hydrogen Production

One green energy technology in relation to which Northern Ireland enjoys a natural Comparative Advantage is Green Hydrogen production which, with enlightened public policy, lays the foundation for Northern Ireland to become a world leader in the generation of green hydrogen. In order to think clearly about green hydrogen production in policy terms, we have to understand the basis for this Comparative Advantage, which depends on having a clear understanding of the process of green hydrogen production.

Hydrogen is a highly reactive element and only occurs naturally in combination with other elements. Water, the molecular structure of which involves one oxygen atom to two hydrogen atoms, provides a good source of hydrogen. Green hydrogen is produced through a process of electrolysis which breaks down water into its atomic components, producing oxygen and hydrogen. Electrolysis has to be powered by electricity and hydrogen resulting from electrolysis is categorised as 'green hydrogen' if the electrolysis process is itself powered by a green energy source, wind or solar.

In this context, the first basis for Northern Ireland's Comparative Advantage in Hydrogen is our leading position in wind energy generation, which means we have a natural capacity to power the production of green hydrogen.

As the DUP Economy Minister, Diane Dodds observed:

“Northern Ireland has a valuable indigenous source of energy – wind. We are a market leader in renewable electricity generation – 48% of the electricity we generated over the past year was from renewable sources. We lead the way in engineering solutions to get as much of this wind generation as possible onto our electricity network. In both cases we are doing better than anywhere else in the world.”¹

The significance of this is thrown into sharper relief with respect to green hydrogen production by an early consultee to the process that has resulted in the development of this paper:

“The challenge has been identified as to what to do at night-time when the requirement for electricity is lower. Already 15% of wind generating capacity at night is curtailed as wind turbines are turned off. Electrolysis capacity at night-time could use this surplus electricity to produce hydrogen more affordably. Rather than paying for the curtailment of wind turbines, electrolyzers could be key in building wind farm investor confidence as hydrogen becomes more important.”

The second basis for Northern Ireland’s Comparative Advantage in green hydrogen production arises from the combination of world leading universities and engineering technology that is applying itself to the opportunities presented by green carbon production, mindful of the natural advantage Northern Ireland has in this sector because of the very advanced nature of our wind energy sector.

In this context DUP Economy Minister Diane Dodds observed:

“With the global demand for electrolyzers set to soar, my vision is that we will create the world’s largest manufacturing base for electrolyzers. This will leverage Northern Ireland’s expertise in advanced materials handling and engineering and create hundreds of direct sustainable jobs,

¹ <https://www.economy-ni.gov.uk/news/dodds-northern-ireland-can-lead-way-hydrogen-energy>

with thousands in the supply chain. It will provide a lasting legacy from the challenge of taming climate change.”²

NI Water is owned by the Government - accountable to the Department for Infrastructure - and is playing a leading role in hydrogen generation in Northern Ireland. It is already using electrolyzers to extract hydrogen from water and developing hydrogen storage and hydrogen fuelling.

Green Hydrogen Applications

In addition to having the capacity to play a key role in the generation of Green Hydrogen, Northern Ireland is also well placed to play a key role in the application of hydrogen. There are multiple applications for Green Hydrogen, including in relation to household heating and powering cars, buses, and lorries.

Hydrogen vehicles replace petrol and diesel as a means of powering cars, lorries and buses by generating electrical power. A hydrogen fuel cell directs hydrogen to a catalyst with which it reacts, stripping the hydrogen of its electrons forcing them down a circuit, creating electricity with which to power the vehicle and water vapour as a by-product. To the extent that actual power for driving the car is electricity, some might say, why not just have an electric car? There are four significant advantages to hydrogen:

First, the process of refuelling a hydrogen vehicle is much faster than charging an electric vehicle battery. Second, hydrogen vehicles have a longer range than electric vehicles. Third, the production of a battery and disposal of a battery generates significant amounts of carbon dioxide and finally, hydrogen takes up far less space than batteries, leaving much more room for other things. This is a particularly important consideration for lorries and buses.

² <https://www.economy-ni.gov.uk/news/dodds-northern-ireland-can-lead-way-hydrogen-energy>

Wrightbus based in Ballymena has been playing a key role in the application of hydrogen in the context of powering vehicles. As DAERA reported on the occasion of a visit by the Agriculture Minister Edwin Poots MLA:

‘Wrightbus is leading the way in zero emission transport with its world-first hydrogen double-decker bus, the Hydroliner, which it first launched in Aberdeen in January this year. The buses emit only water vapour, with no harmful pollutants. Three zero-emission Hydroliners have been in service in Belfast since last December – which were the first of their kind in Northern Ireland - after the firm won a contract to supply Translink with 20 Hydroliners and 80 of its recently-launched battery-electric Electroliner double decker buses.

In addition to Aberdeen and Belfast, Hydroliners are currently also in operation in London and Dublin, with a fleet expected to launch in Birmingham later this year. So far, its hydrogen buses have prevented an incredible 500,000 kg of CO₂ from entering the atmosphere after clocking up more than 300,000 miles.’³

The Future: A Paradigm Shift on Energy?

More and more commercial organisations in NI are recognising the potential of hydrogen technology. This was underpinned by the recent formation of a trade body, Hydrogen NI, which states:

“Northern Ireland has the resources, ambition, and expertise to develop a world-leading clean hydrogen economy. With a number of successful projects and initiatives already underway, the coming years present major opportunities that will lead to increased levels of investment, job creation and decarbonisation. Hydrogen NI brings together stakeholders from across the sector and provides a voice for the industry as we work to deliver a thriving clean hydrogen economy in NI”⁴.

³ <https://www.daera-ni.gov.uk/news/minister-poots-visits-wrightbus-discuss-their-plans-green-hydrogen-economy-northern-ireland>

⁴ [Home - Hydrogen NI \(hydrogen-ni.com\)](https://hydrogen-ni.com)

DUP Hydrogen Policy

The DUP is deeply committed to Northern Ireland fulfilling its potential which means having a focused strategy to access the full benefits of Northern Ireland Comparative Advantage in Green Hydrogen production and for it also to take a lead in the application of green hydrogen as a green energy source. Comparative Advantages are precious and it is the determination of the DUP to pioneer the best possible policy and legal framework to enable Northern Ireland to seize this opportunity.

It is generally accepted that there is huge potential for hydrogen development in Northern Ireland. Both government and private sector have expressed huge enthusiasm and it is estimated that it could in time meet approximately one-third of local energy need. We are seeking to make energy generation (whether renewables or hydrogen) part of our long-term economic strategy by enabling Northern Ireland to become an energy exporter rather than the importer it is today. We understand there is the potential for the hydrogen sector to meet all those aspects of NI's energy needs that it is best placed to meet, and for it to then export hydrogen to the Republic of Ireland or to Great Britain or further afield.

To this end, the 'Path to Net Zero'⁵ Strategy was published in December by DUP Economy Minister, Gordon Lyons. This is Northern Ireland's future energy strategy, a comprehensive plan to improve energy storage and broaden our range of energy sources. Hydrogen is referenced throughout the paper, its importance reflected by the statement '*We can continue to be world leaders in integrating renewable electricity generation and we can become world leaders in the new hydrogen economy*'. the document also acknowledges the need for a 'hub', referred to a '*centre of excellence in research and innovation*', a priority alongside a catapult which '*In order to take advantage of the unique hydrogen opportunities available to Northern Ireland we will implement a Hydrogen Catapult in partnership with academia. This centre of excellence in research and innovation will bring together key players across the hydrogen economy*'. This strategy has received generally favourable response from the energy sector, and wider industry.

⁵ The Path to Net Zero Energy. Safe. Affordable. Clean. (economy-ni.gov.uk)

DUP Manifesto Commitments

A hydrogen commitment was included last this year as part of a wider green energy pledge in our Assembly manifesto: *Recent energy price rises are impacting on every person and business in Northern Ireland. This is happening because of the global price volatility that comes with fossil fuels. In December 2021 the DUP Economy Minister launched the 'Path to Net Zero' energy strategy which sets out how we will work towards phasing out fossil fuels, ending this volatility and ensuring that more of the money we spend on energy stays in the local economy and helps to create wealth and jobs. However, we know that the cost-of-living crisis is impacting people now.*

As part of our five-point plan we are supporting calls for a Windfall Tax on energy firms and we want to make going green affordable to more homes in Northern Ireland. We welcome the Energy Support Payment to help hard-pressed families as well as more help with energy efficiency schemes for householders Northern Ireland is already a leader in renewable energy, but through investment in new technologies such as hydrogen, we aim to be a global leader in clean energy.

Hydrogen as Part of Wider Green Economy

Ideally the best outcome will be a mix of energy sources, of which hydrogen is one. This would require prioritising this sector for additional public resources over a long-term period so the level of commitment required and policy risk should not be underestimated. However, there would appear to be a clear opportunity of developing Northern Ireland as an energy sector leader. The DUP will publish a wider environmental consultation paper soon. There will inevitably be overlap between it and this paper, and some key points are set out below:

Heating: Gas to Hydrogen

Northern Ireland is too reliant on oil as a source of home heating. This is not only costly for consumers, but is one of the least environmentally friendly forms of heating. In terms of our short to medium energy future, the DUP believes that gas remains crucial, first because it is

immediately available and the most environmentally friendly of traditional options and, second, because gas boilers can be converted over to hydrogen and bio-methane, when supplies become available, which are even more environmentally friendly than gas.

The DUP proposes:

- Continued expansion of the domestic gas network and a corresponding reduction of domestic dependence on oil systems.
- Incentivising the adoption of gas heating within energy efficiency programmes.

*As we stated in Towards Net Zero: 'To ensure we can maximise the potential use of hydrogen in the gas network, we will review existing legislative provision by 2025. The route to fully decarbonised gas is uncertain and we are working with the gas sector to understand viable pathways.'*⁶

Transport Future: Hydrogen

Personal, mass and goods transport will shift away from fossil fuels. The DUP considers the likeliest path to be:

- Electrification of personal and some mass transport – Government is progressed to an Electric Vehicles (EV) only by 2035. This will be a challenge for technology and charging options to be ready and affordable. Consumer usage of HEVs is not making the gains that would be desired and possibly why a straight to EV route has been adopted.
- The 24/7 nature of high use mass transport and high demands of good transport are such that they lend themselves to CNG/Hydrogen rather than slower electric charging solutions. CNG/Hydrogen systems will most likely have a cost advantage on full electric in the short-medium term.
- Hydrogen fuel cells – this will be the longer-term technology but they remain very expensive.
- The establishment of a joint public-private hydrogen hub advancing research, innovation and production of Hydrogen and Hydrogen equipment in Northern Ireland.

⁶ The Path to Net Zero Energy. Safe. Affordable. Clean. (economy-ni.gov.uk)

As we stated in Towards Net Zero

‘For the harder-to electrify sectors including HGVs, we will work on an all-island basis to develop the infrastructure for alternative fuels such as hydrogen and biomethane. Building on our existing capabilities in this area, we will work with partners to support vehicle and refuelling technology trials. We will identify and prioritise measures that:

- Inform technology choice and incentivise transport operators to move towards a zero emissions fleet; and
- Support demand management and behavioural change to incentivise optimisation of resources used to move people and goods.

We will also review how we measure carbon emissions from transport to assist with decarbonisation plans and monitor progress.’⁷

Towards an NI Hydrogen Strategy

Northern Ireland has ambitious commitments to reach a net zero carbon energy position in the decades ahead. To do so will require the different strands to come together and ensure we can meet our objectives. The proposals to develop a Hydrogen strategy will be a key element of this, and will provide an opportunity for the public and private sectors to work together and showcase how Northern Ireland has already taken some key steps in securing its place in hydrogen production and more importantly, how, with the benefit of the plan, it can actually fulfil its potential to become a world leader in this field. The Energy Networks Association recently highlighted its importance when it commented “there is no realistic scenario whereby the UK is able to achieve net zero carbon emissions by 2050 without hydrogen playing a key role in the decarbonisation of large emitting sectors such as industry, transport, power and heat.”

⁷ The Path to Net Zero Energy. Safe. Affordable. Clean. (economy-ni.gov.uk)

Questions

These questions are not exhaustive and we would like to hear as wide a range of opinions as possible, to fully inform the party view of a potential Hydrogen strategy:

1. What policy innovations should a hydrogen strategy commit to in order to make NI a world class centre of hydrogen production?
2. Are there any legislative changes that would help facilitate the development of Northern Ireland as a hydrogen market leader?
3. In conducting this consultation, the DUP is very keen to hear from anyone working in the sector about any developments that we have not mentioned that you think give Northern Ireland a 'Comparative Advantage' in the quest to become a hydrogen market leader, either in the development of hydrogen energy or in its application in transport or heating or for some other purpose?
4. Do you think any Comparative Advantages identified in your answer to question 2 are not fully exploited? What steps should be taken to fully exploit any under exploited comparative advantages?
5. Do you support the idea of the development of a dedicated Hydrogen Strategy for Northern Ireland?
6. Is there any role that Government could play in developing hydrogen as a result of putting any of its land or assets to better or more creative use?
7. What proportion of NI's energy needs could hydrogen meet? Do you agree about 1/3?
8. If so, are there particular aspects of NI's energy needs that hydrogen would lend itself to meeting?
9. Are there any aspects of NI's energy needs that hydrogen would not be well placed to meet?
10. Do you believe that Northern Ireland should focus exclusively on the development of green hydrogen or do you believe there is a case for the pursuit of other forms of hydrogen within the hydrogen rainbow?
11. If you believe there is a market in blue hydrogen what is your response to the research carried out by Prof Robert Howarth:

<https://onlinelibrary.wiley.com/doi/full/10.1002/ese3.956>

12. What areas of skills training should be provided for the sector to develop in NI?
13. What are the priority sectors you see benefitting from hydrogen technology?
14. What examples of international best practice could Northern Ireland policymakers seek to emulate or develop further?
15. Is there a particular gap in the market regarding hydrogen that you think NI would be particularly well placed to fill?
16. Does there need to be a strategic oversight body to drive the delivery of any future strategy?
17. What incentives will be most effective to support companies in this sector, new and existing?
18. How do you feel the Northern Ireland planning system will be impacted by a focus on hydrogen technology, and what recommendations for improvement would you make?
19. It is said that one of the drawbacks of hydrogen is that it takes up a lot of space. Do you see this as a problem? Are there creative ways of addressing this challenge? Does the space issue limit the potential of hydrogen in any way and or make export uneconomic?
20. What complications may there be in storing and or transporting Hydrogen in the future, vehicle transportation or infrastructure?
21. Should there be Government support or incentive to produce hydrogen for one principle use only for e.g., heavy transport, rather than general production?
22. What potential other uses for Hydrogen could develop in the future and how could this change patterns of behaviour or markets?
23. What potential uses for water or oxygen within the production of hydrogen could be utilised?
24. What is the view on a potential Green Energy Fund, one that encourages job promotion and investment in the hydrogen and wider environmental sector?