Warwick District Hydrogen Strategy

1 Aim

This strategy supports the District's ambition to be Net Zero Carbon by 2030 by providing the framework and impetus to introduce and grow a supply of green hydrogen to provide local services and businesses with an affordable alternative to fossil fuels.

Warwick District Council is committed to working to put our District at the forefront of green hydrogen development by bringing forward local green hydrogen production by the mid 2020s whilst also seeking to expand the local demand and supply of green hydrogen through to 2040.

This strategy therefore provides the framework for urgent and focused investment now, as well as supporting the long-term transition of the District's economy to low carbon energy.

2 Introduction

The challenge of achieving significant carbon reductions across our District is at the forefront of everything the Council is doing. We have ambitions to achieve a 55% reduction in the District's carbon emissions by 2030. To do this we need to be ambitious and innovative. Perhaps the biggest challenge we face is eliminating fossil fuels from energy and transport whilst working to ensure affordable and low carbon energy is available for our communities and economy to thrive. To do this we need to work with partners to ensure a range of energy sources are available to meet future energy demands. Whilst the District Council cannot address this challenge alone, we recognise that we have a part to play as a community leader, as a provider of services and an investor in local low carbon energy.

Hydrogen has an important role to play in this, in the short term as a fuel for heavy road vehicles and transportation and in the medium to longer term as a fuel for other forms of transportation and heating. This is recognised by the UK Government, which has produced a hydrogen strategy and is providing financial support to encourage investment in the supply of, and demand for, hydrogen. The Government is clear that the time for hydrogen expansion in the UK is now.

Hydrogen is a versatile gas which can be used in a variety of applications. It is being widely promoted, including by the UK Government, as one of the key fuels to support the energy transition and the journey to net zero. Hydrogen can also be considered a form of energy storage. That aside, whilst being the most plentiful element in the known universe, on earth it is nearly always found in chemical compounds with other elements, in particular in water but also in fats, sugars, petrochemicals, acids, alkalis and many minerals.

The production of hydrogen is resource intensive, in that energy is required to break the chemical bonds holding the compound together. In some circumstances, this can make it expensive when compared to fossil fuels. Therefore, applications of hydrogen need to be considered carefully to ensure economic viability and carbon efficiency. However, as hydrogen production costs reduce, it is likely that the economics for broader uses will improve and thus increase adoption.

Potential uses can be summarised as:

- Transportation: lpng distance heavy haulage (HGVs); Refuse collection vehicles (RCVs); Buses / Coaches; Forklifts; Trains; Shipping / aviation; Emergency services vehicles; Light goods vehicles; Private automobile
- Power and heat generation: Combined heat and power; emergency generation; Natural gas replacement in homes / boilers
- Energy storage: Inter-seasonal storage as pressurised gas; Within chemical hydrogen carriers such as ammonia
- Chemical feedstock

- Fertilisers
- Pharmaceuticals
- Plastic Manufacturing
- Industry: Iron and steel smelting; Process heat – cement, metal smelting and forging, glass and ceramics production

Whilst hydrogen has a range of potential uses, it has the potential for immediate use with the transport sector. Hydrogen demand for heavy transport such as buses, Refuse Collection Vehicles (RCVs), Heavy Goods Vehicles (HGVs) and other public service vehicles is growing.

3 Our Strategy

A) Green Hydrogen Production

Warwick District Council intends to play a leading role in bringing green hydrogen* production into the District in a way that enables levels of production to grow to support three phases of use as set out below. In leading this area of work, our ambition is to have introduced green hydrogen production by the mid-2020s, with a view to ongoing expansion through to 2040.

In leading this work we will:

i. Proactively identify locations that are suitable for Green Hydrogen production, including identifying renewable energy sources to provide green electricity for the electrolysis process.
ii. Work with public sector partners and agencies to fund, plan and deliver a scalable green hydrogen hub (hydrogen production, storage and supply) by the mid-2020s, to deliver an affordable and effective supply of transportation fuel.
iii. Work with the private sector to identify private investment in the development of a hydrogen hub and to work with a private sector partner to manage and operate the Hub and market the hydrogen to potential commercial users
iv. As demand for hydrogen grows, continue to work with commercial partners to expand hydrogen production at the hydrogen hub
v. From the mid-2020s through 2040, explore the potential for further hydrogen production facilities across the District and /or infrastructure to support affordable distribution of hydrogen.

*green hydrogen refers to hydrogen which uses a renewable energy source for the electrolysis process (the process which breaks down chemical bonds to produce hydrogen)

B) Hydrogen Demand

Warwick District Council will play an active role in promoting hydrogen use, alongside a commercial partner. We envisage the expansion of hydrogen demand to take place in three overlapping phases.

i. Phase 1 (2024/25 to 2029/30): Public Service Vehicles. Warwick District Council will seek to utilise hydrogen for its own vehicles where this can be demonstrated to be operationally and financially viable. We will work with other public sector organisations to promote the use of hydrogen for a range of vehicles such as fire service trucks and buses
ii. Phase 2 (2027/28 to 2035): Commercial Heavy Goods Vehicles. Warwick District Council will work with regional organisations and a private partner to promote hydrogen hub for use by heavy goods vehicles
iii. Phase 3 (2030 to 2040): As opportunities arise, we will work with partners and through the planning system to enable the use of hydrogen for domestic power and heat; and as an energy store
iv. In addition, we recognise that hydrogen could have important role to play in providing power for industrial processes and to provide heat and power to commercial and institutional

buildings. Whilst this is likely to be driven more at national level than local level, (and therefore sits outside the scope of Phases 1 to 3), we will keep abreast of developments in this area and will support the local use of hydrogen for such purposes where we can add value.

C) Hydrogen Distribution

Recognising the initial hydrogen hub is likely to operate primarily on the basis of on-site vehicle refuelling, we also need to consider options for distribution of hydrogen so that it is operationally effective for potential users. We will therefore explore three options:

i. The transportation of hydrogen on vehicles for delivery to convenient locations for users
ii. The development of multiple hydrogen hubs so that hydrogen is available more locally to the point of demand
iii. Support national and regional initiatives to use and expand the national network of pipes as a way of distributing hydrogen. Whilst this is likely to be longer term and to be driven at national level, we will keep abreast of developments in this area and will support the distribution of low carbon hydrogen through this network where we can add value.

4 Benefits

In putting forward this strategy, we will seek to achieve tangible benefits for climate change, our communities and our economy. These are

- Reductions in the public sector's carbon emissions
- Reduction in carbon emissions from across south Warwickshire
- Affordable, local and reliable low carbon fuel source for our residents and local businesses
- Local jobs and skills in the green economy
- An important "brand statement" for our local economy, marking out Warwick District as an innovate, low carbon and green place to do business
- Improvements in local air quality (with associated health benefits) arising from the use of this clean fuel for transport

5 Timescales

Phase	**Date**	**Projected Hydrogen Capacity**
Hydrogen Hub Production - Development of hydrogen hub	2024/25	
Hydrogen Demand Phase 1a – Public Service Vehicles – Dual Fuel RCVs and some buses	2024/25	1MW
Hydrogen Demand Phase 1b – Other Public Service Vehicles such as fire vehicles, HCF RCVs, expanded bus fleet, etc	2029/30 onwards	3MW
Hydrogen Demand Phase 2a – Commence Commercial Vehicles usage: Heavy Good Vehicles; delivery vehicles and other private vehicles (e.g SUVs; taxis etc)	2027/28	
Hydrogen Demand Phase 2b – Extend Commercial Vehicles usage	2029/30 onwards	5MW
Hydrogen Demand Phase 3 – Support initiatives to enable use of low carbon hydrogen for Domestic Power and Heat; Energy Storage; and commercial and industrial uses	2030s	10MW to 100MWmore