Planning for Hydrogen: Building Confidence Through Stakeholder Engagement

Context

Scotland's commitment to achieving net zero by 2045 places hydrogen at the heart of its energy transition. Green hydrogen, produced using renewable electricity, offers a practical solution for decarbonising sectors that are difficult to electrify, such as heavy transport, marine operations, grid balancing, and industrial heat. For planning authorities, this means new types of infrastructure will emerge, often in coastal or rural locations, requiring careful integration with existing land use policies. Understanding hydrogen's role helps planners anticipate applications that support local and national climate objectives while ensuring developments align with safety and environmental standards and continue to support National Planning Framework 4 (NPF4) policy 11 principles of expanding renewable, low carbon, and low emissions technologies.

The Orkney Islands has hosted a number of new innovative hydrogen developments, including Surf'n'Turf, BIG HIT and HySeas3 projects since 2015. Each project was developed to be successive

in nature, integrated infrastructure across the development in order to develop a green hydrogen generation and demonstration system in Orkney. These Orkney hydrogen projects integrate renewable hydrogen production from curtailed wind energy via electrolysis, housed hydrogen storage, and developed use cases for hydrogen across domains including heat, power and transport. Rather than developing in one single location, hydrogen developments across the Orkney projects spanned a number of urban and rural locations on the mainland of Orkney as well as on two of the North Isles: Eday and Shapinsay. These networked hydrogen assets tested mobility logistics over time and the associated planning cases have come to act as examples in how best to consider hydrogen in the local planning system across urban and rural settings in both marine and terrestrial environments.

The Challenge

BIG HIT represented a novel use of hydrogen that had been previously underexplored meaning that that there was little guidance to support local authorities in decision making processes regarding proliferation of net-zero technologies. This increased complexity to hydrogen project development contributed to uncertain conditions within which to support planning decisions leading to delays, less favoured site selection and increased costs to projects.

Approach Taken

Planning requirements needed to be considered at the earliest stages of project design, which made timely engagement with developers essential. Statutory consultees played a critical role in shaping these projects by addressing fundamental issues such as water use, land ownership, and regulatory compliance. Beyond statutory engagement, adopting a multistakeholder approach emerged as best practice for hydrogen infrastructure planning. Open dialogue among developers, local authorities, community representatives, and non-statutory consultees created a transparent environment for addressing concerns and aligning priorities. This collaborative model was particularly valuable for projects located on or near the coast, where planning authorities had to bridge terrestrial and marine considerations. By coordinating across these domains, planners ensured that hydrogen developments integrated seamlessly with existing land-use policies while respecting environmental sensitivities and maritime safety requirements. This holistic approach not only streamlined the planning process but also strengthened public trust in hydrogen as a cornerstone of Scotland's transition to net zero.

Obstacles and Issues

Due to the novel nature and hydrogen not being expressly mentioned in the Town and Country Planning (Scotland) Act 1997, the planning process took an extended period. Lack of legislative steer placed an increased responsibility on planners to take accountability.

Hydrogen developments may fall into any of the following use classes:

- Classes 1-3: Hydrogen may fall into to these classes where there are ancillary developments;
- Class 4 – Business: Offices, research and development, and light industrial processes suitable for residential areas;
- Class 5 – General Industrial;
- Class 6 – Storage and distribution.

Each local authority develops its own local plan stating which areas of land have been classified for which uses. Developers may not be aware of the governance structures extant to local authorities, these may vary from authority to authority. Planning departments should be aware of incoming projects at the early stages of project development to allow applications to progress through the committee cycle. Some projects may be deemed to be of national significance which may add additional time, in the order of months, and complexity to a project.

Lessons Learned

- Statutory consultees play a specific role in hydrogen developments and engagement across statutory and non-statutory consultees should be encouraged at the earliest possible stage of the project or development.
- A proactive multistakeholder approach beyond statutory consultees provided confidence in decision making in the planning process.
- A basic awareness of key hydrogen design principles supports expedient decision making, as does an understanding of the role that green hydrogen plays in the wider statutory and legislative frameworks developed to contribute meaningfully towards carbon reduction.
- Safe handling of hydrogen is well established, provided the elements key properties are understood and handled in accordance with relevant HSE guidance.
- When engaged with at an earlier stage, developers can use the planning process as a tool to inform their design based on sound safety principles, awareness of local development priorities and understand how local development zones and competing safety considerations may influence site selection.

Next Steps

The planning process is not only a statutory requirement but a critical enabler of hydrogen projects providing a structured framework for stakeholder engagement and ensuring developments progress efficiently while meeting safety, environmental, and community expectations.

NPF4 explicitly supports renewable energy development, including hydrogen production and associated infrastructure. Policy 11 encourages planning authorities to facilitate all forms of renewable energy development, covering generation, storage, transmission, and hydrogen

production by electrolysis. Local development plans are expected to identify opportunities for renewable and low-carbon energy projects, ensuring alignment with Scotland's statutory climate targets under the Climate Change (Scotland) Act 2009 and the Town and Country Planning (Scotland) Act 1997.

The Scottish Government's Hydrogen Policy Statement (2020) and Hydrogen Action Plan (2022) set ambitious targets of 5 GW of renewable and low-carbon hydrogen production by 2030 and 25 GW by 2045, positioning hydrogen as a national development priority. Annex B of NPF4 confirms that renewable hydrogen projects, particularly in island and coastal areas, are considered national developments, meaning they carry significant weight in planning decisions. Planning officers should also note guidance from the National Planning Hub Hydrogen Process Map (2025), which outlines timelines, statutory consultees, and best practice for consenting hydrogen projects.

Several hydrogen-related planning applications are already in the system, and the process provides a framework that not only enables these projects but also supports a pipeline of successful future applications.

This case study has been prepared in collaboration by UHI and the National Planning Improvement Team at the Improvement Service. We publish good practice case studies identified through our work on the National Planning Improvement Framework and the National Planning Hub. They aim to support the sharing of good practice and build collaboration across the sector in addressing common challenges. Please email us at npi@improvementservice.org.uk if your authority has a good practice case study to share.