EIP059

How can we assure the quality of hidden pipework?

Problem Statement Details

The proposed hydrogen village trial will see current natural gas infrastructure repurposed for hydrogen service, particularly downstream of the gas distribution network, in people's homes and businesses. The process of conversion will require inspection into the condition of existing assets to ensure they are suitable for repurposing to carry hydrogen.

Current practice in domestic properties with natural gas is to carry out a visual inspection of the pipework that is visible/accessible followed by a tightness test to ensure there are no leaks. Elevated pressure testing (strength testing) will be used in commercial/industrial premises as a means of providing additional assurance.

The act of conversion naturally allows the industry to review current practices to assess whether there are areas that ought to be improved upon before a new gas is introduced. As an industry, one of the questions we are being asked is, "In properties due for conversion, what are we doing to assure the quality of pipework that we cannot access/see?". Currently, a successful tightness test is taken as sufficient evidence to assure the quality of a gas installation, however, this test is only an instantaneous measure of tightness and does not allow for detection of potential failure modes in the pipework which may be activated over time.

Pipeline Inspection Gauges (PIGs) are used on the high-pressure gas network today to inspect sections of underground pipeline for changes in ovality/corrosion/potential leak sources etc. The question here is, is there a similar technique that can be introduced to smaller diameter, smaller pressure pipework, that allows a non-intrusive visual inspection of pipework in properties that we cannot currently access/see (i.e., because they are hidden in or behind the building fabric)?

Key Stakeholders

All UK GDNs (Cadent, NGN, SGN, WWU), British Gas

Target Market

Initially this will support the conversion of c. 2000 properties as part of the UK Hydrogen Village Trial. Depending on the UK Government policy decision in 2026, this could affect millions of customers who would be converted to hydrogen in the future.

Enablers and Constraints

One of the key constraints is that this inspection will be carried out in people's homes and businesses and so must be suitable for implementation in those types of environments.
Currently, an NIA funded project is underway to look at the downstream pipework conversion strategy for hydrogen, research is being carried out into the potential use of novel inspection techniques, however, there doesn't seem to be a 'ready-made' solution available.
The Hydrogen Village Trial is a key enabler to this work and there is definitely appetite for an innovative inspection technique to be introduced if it can be proved to be feasible.

Scalability and Target Implementation Date

If a solution is found and accepted, it will have to be incorporated into the overall conversion plan for the Hydrogen Village Trial. The conversion plan will dictate the required scale to enable 2000 properties to be converted in Spring/Summer 2025.

Innovation Strategy Target Areas

Innovation Theme	Target Area	Primary or Secondary
Data and Digitalisation	The shift to data-driven, digitally-enabled networks is critical as we move towards Net Zero. We need your help to drive standardisation, interoperability, security and digital skills whilst accelerating our transformation to data-driven networks by the mid 2030s.	Not applicable
Flexibility and Market Evolution	Energy networks must quickly and efficiently respond to the rapidly evolving needs of the energy system transition. We need your support to eliminate barriers to new market entrants, deploy novel commercial and network management solutions whilst ensuring fair participation and eliminating regulatory barriers within the RIIO-2 price control periods.	Not applicable
Net zero and the energy system transition	In order to meet the UK net zero targets of 2050 we must start converting our networks to deliver low carbon fuels today. We want to work with you to develop the role of our gas networks into the future by investigating, trialling, implementing and delivering safe, low carbon alternatives to natural gas such as Hydrogen.	Primary
	Net Zero requires connection of more low and zero carbon sources of energy generation, storage and demand to both the transmission and distribution networks. We need your innovative methods for effective network management and accessing flexibility to improve visibility, forecasting and modelling of low carbon technologies.	
Optimised assets and practices	Innovation has a key role to play in ensuring our networks continue to remain reliable, safe, secure and resilient to our changing climate. We are constantly looking to improve and welcome support to identify methods to prevent interruptions, ensure resilience, reduce climate impact and future-proof our networks.	Secondary
Supporting Consumers in Vulnerable Situations	Equality and fairness are the foundations of a just transition to Net Zero. We hope you can provide insight into the transient and situational nature of vulnerability and how we can overcome the impact the energy system has on consumers, building strong relationships for the future.	Not applicable
Whole Energy System Transition	The energy system must consider the full range of opportunities, risks and interdependencies that exist across the energy networks to integrate and optimise them in a way that best serves the consumer. We are looking for ways to improve visibility of the networks and transitional options, co-ordinate approaches and collaborate across the UK.	Secondary