Velocity Design with Hydrogen

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Future of Energy Project Manager

Agenda

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Current Network

Gas velocities are governed by IGEM technical standards including IGEM/TD/1, TD3, TD4 and TD/13. This is to manage the impacts from particle transport, erosion, noise and vibration.

Filtered Gas

40m/s

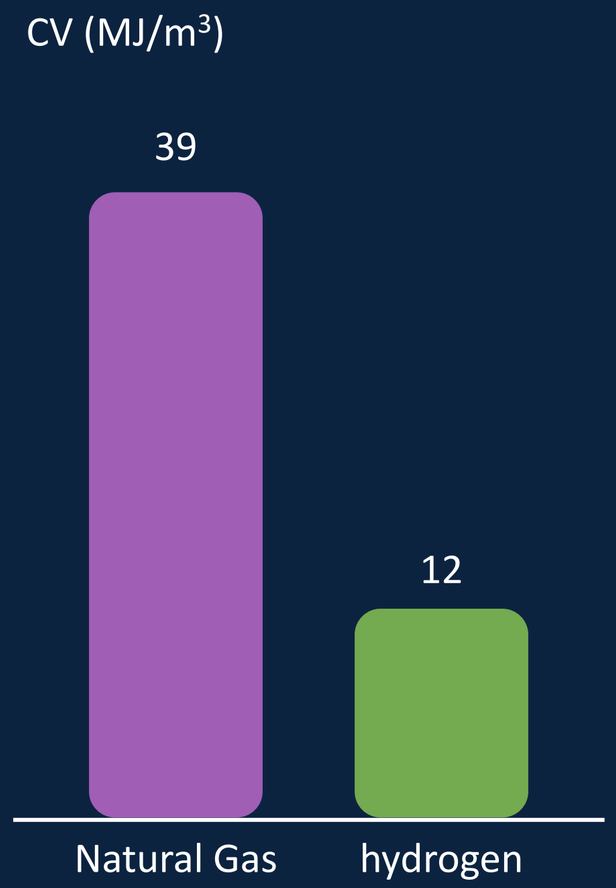
Unfiltered Gas

20m/s

Institution of Gas Engineers & Managers

The Problem

H_2 vs CH_4



01

Energy Content
Hydrogen has approximately one third the energy by volume of Natural Gas

02

Increased Consumption
This would result in consumers having to use 3 times the volume to achieve the same energy output

03

Network Upgrades
To match this energy requirement without increasing pressure or velocity would incur significant mains reinforcement costs

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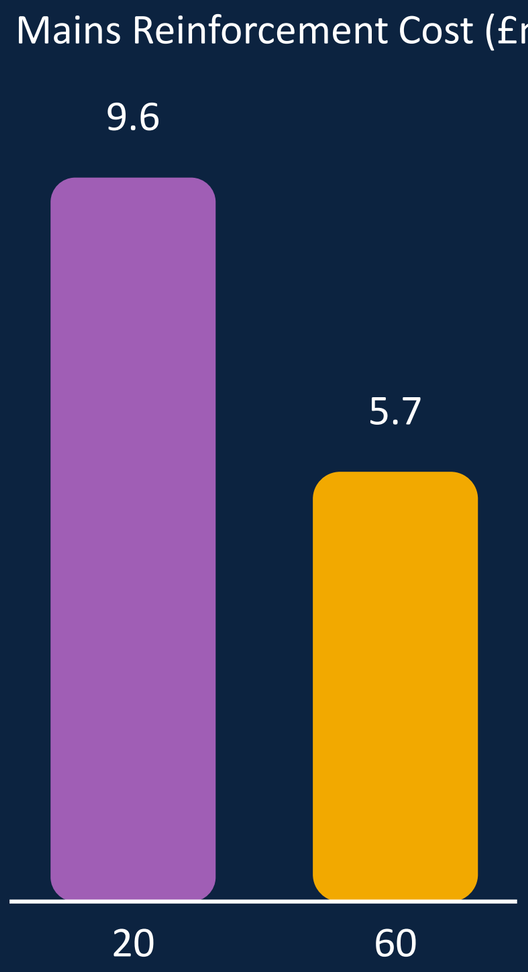

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Project Scope

The key questions this project is looking to address are...

01

Particle Transport

Does particle transport increase when flowing gas at higher velocities?

02

Erosion

Is there a change in pipe erosion rates between hydrogen and Natural Gas?

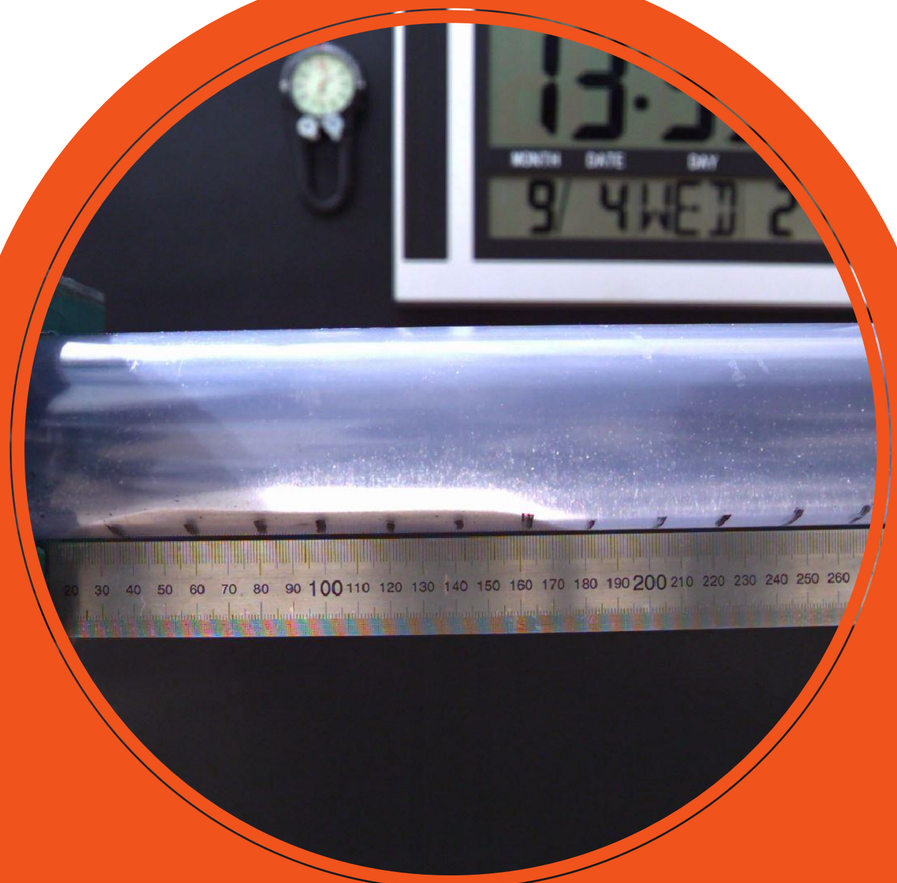
03

Vibration & Noise

Does vibration and noise increase when flowing hydrogen at higher velocities?

Initial Results

- Both experimental work completed to date and modelling predictions (British Gas model and CFD) indicate that particles are mobile at the lower velocity limit currently used on the gas network (20m/s).
- Particle transportation occurs at lower velocities for Natural Gas than for hydrogen.
- An increase in velocity from 20m/s for Natural Gas to 70m/s for hydrogen should therefore not result in a corresponding increase in particle transport.



Next Steps

< 7barg Erosion Testing

Dec 2024

Feb 2025

Cost Benefit Analysis

> 7barg Erosion Testing

Feb 2025

Jun 2025

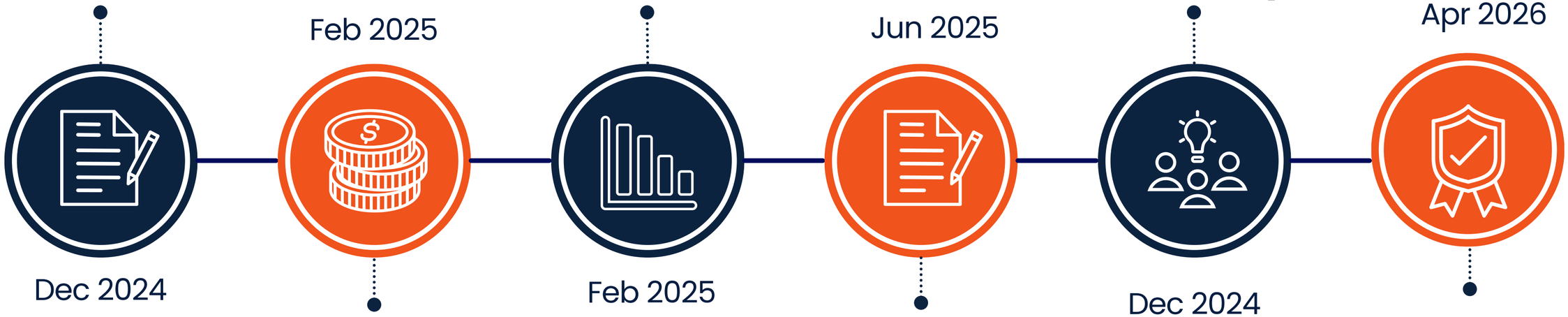
Vibration & Noise Testing

IGEM Workshops

Dec 2024
Mar 2026

Apr 2026

Project Close



Thank you