

## PRODUCTION

VIA STEAM METHANE REFORMING WITH CARBON CAPTURE AND STORAGE



Monitoring composition of hydrogen and blends of hydrogen and natural gas at injection and exit points



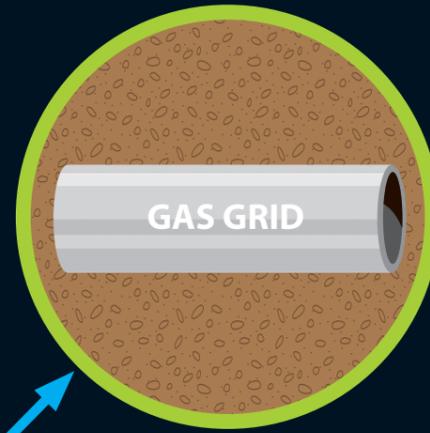
VIA ELECTROLYSIS

Development of in situ diagnostic techniques and accelerated test methods to support lifetime extension of electrolyzers

# ENERGY TRANSITION

## Measurement needs within the hydrogen industry

H<sub>2</sub>



## DISTRIBUTION

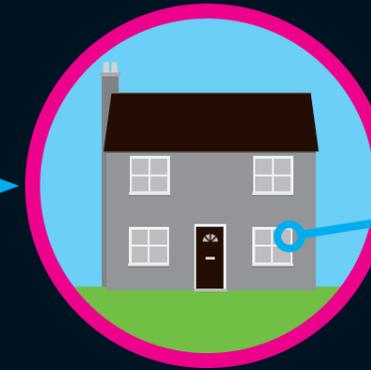
Assessing the risk of embrittlement in materials used in gas distribution infrastructure, including the existing pipeline network, that may occur due to the introduction of hydrogen

Ensuring robust leak detection through development of improved sensors and validation of network leakage models for emergency response to comply with health and safety standards

Assessing the impact of odorants (added for leak detection) on the performance and durability of end use appliances

## END-USE

COMBUSTION FOR HEAT



Measuring the combustion properties of hydrogen in domestic appliances, such as flame propagation, visibility, temperature and NOx emissions, to ensure that existing appliances are suitable or new ones are developed

Ensuring hydrogen quality standard is suitable for new or existing appliances and equipment



Measuring calorific value and validating volumetric metering techniques for hydrogen and natural gas blends in the grid to accurately bill the consumer

FUEL CELLS FOR TRANSPORT



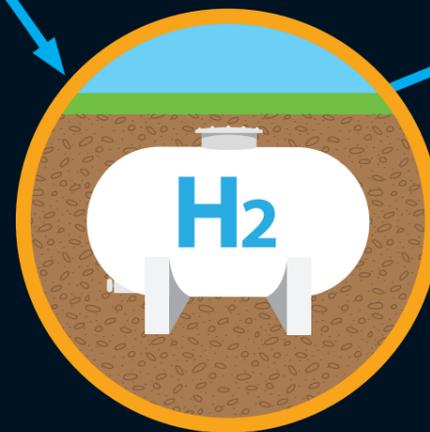
Advanced techniques for measurement of impurities in hydrogen used in fuel cell vehicles to ensure compliance with international standards

Extension of fuel cell lifetime and durability through development of novel in situ diagnostic techniques, modelling tools and standard test methods

## STORAGE

Undertaking live field trials for large-scale storage such as salt caverns and depleted gas fields, including measurements for leakage and any contamination of the hydrogen that may occur due to the method of storage

Metering for hydrogen storage to accurately measure flow in and out of the storage mechanism



On-board diagnostics for fuel cell vehicles and hydrogen refuelling stations to monitor any potential issues that may impact their lifetime and durability



Developing flow meters that reflect operational conditions at the refuelling station to accurately bill the consumer

Developing next generation materials through advanced characterisation techniques to reduce the costs of fuel cell technologies and make them more commercially competitive



Measuring the efficiency of storage mechanisms and their capacity to address fluctuations in demand on a national scale

Assessing the impact of contaminants in the hydrogen fuel and the air on the performance and lifetime of the fuel cell

FUEL CELLS FOR ELECTRICITY

