

## Project summary

### Liverpool-Manchester Hydrogen Cluster

Emissions from burning and using gas are the largest source of greenhouse gas emissions in the UK. In principle the use of hydrogen in place of natural gas, offers a potential long-term route to widespread decarbonisation of gas distribution networks.

The Liverpool-Manchester Hydrogen Cluster is a conceptual project to develop a practical and economic framework to introduce hydrogen into the gas network in the Liverpool-Manchester area.

It proposes converting natural gas into clean-burning hydrogen gas, using a process called steam methane reforming. The process also removes CO<sub>2</sub> from the gas, which can then be captured using existing carbon capture and storage technology, and stored in depleted offshore gas reservoirs.

The hydrogen gas would then be supplied to a core set of major industrial gas users in Liverpool-Manchester and fed into the local gas distribution network as a blend with natural gas.



## Funding

The Project would be lower cost and hold far lower development risk if funded as an allowable expenditure within Ofgem's RIIO price control mechanism, along with Government input to underwrite certain CCS risks and costs.

## Future potential

A future major conversion project could support the objectives of the Government's forthcoming 'Clean Growth Plan' and Industrial Strategy White Paper. The Liverpool-Manchester Hydrogen Cluster could also lead the way for similar projects in other industrial clusters across the UK.

## Potential path to delivery

The initial conceptual project is complete. A further project is now in progress to scope out the proposed design in more detail. The results of this project will be available in Spring 2018.

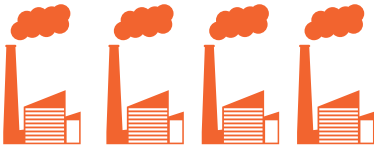
A Final Investment Decision for the proposed major implementation project could be possible in the early 2020s.

# Liverpool-Manchester Hydrogen Cluster

## CO<sub>2</sub> savings



Introducing a blend of hydrogen to the gas network will reduce carbon intensity in a highly populated area.



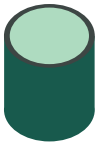
Material decarbonisation of 10-15 large industrial plants through direct hydrogen supply.

## Customer focused



No changes needed to heating or other domestic or commercial gas appliances.

## Carbon Capture and Storage (CCS)



Includes the creation of very low cost CCS infrastructure compared with alternative locations for a project of this size.

Around 1.5 million tonnes of CO<sub>2</sub>/yr could be captured and stored in the Liverpool Bay Oil and Gas Fields.

**1.5M  
tonnes**

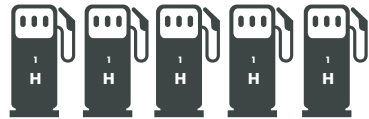
## Economic value

Job creation and boost to the economy could be significant, and deliver on the goals of the Government's Industrial Strategy. No need for costly underground storage of hydrogen in initial phase.



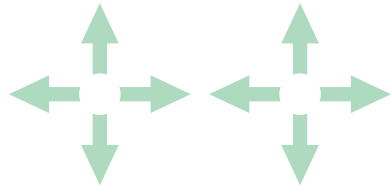
Potentially cheaper way of reducing CO<sub>2</sub> than nuclear or offshore wind and significantly cheaper than air source heat pumps.

## Cleaner air



A network of hydrogen vehicle refuelling stations would mean cleaner air and help towards decarbonisation of the transport sector.

## Accessible



Hydrogen storage in the Cheshire salt basin and CO<sub>2</sub> storage in the Liverpool Bay oil and gas fields are both accessible; and mean hydrogen supply could be extended further in the future.