

# A summary of public innovation support options



Outputs from Innovate UK projects

Hydrogen and  
Fuel Cells:  
The Time Is  
Now

Birmingham  
NEC

15<sup>th</sup> November 2021

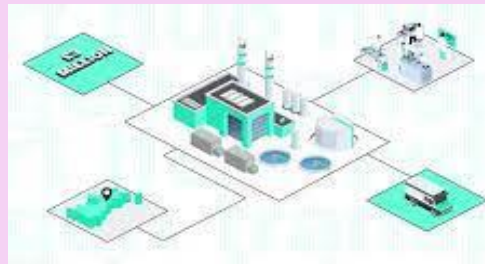
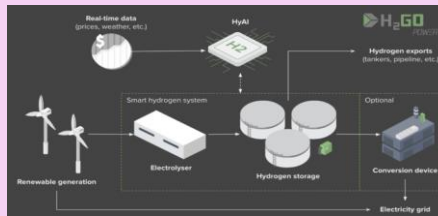
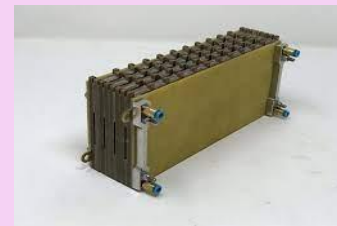
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READY FOR A

QUIZ?

# How many of these hydrogen systems do you recognise?



Outputs from Innovate UK projects

# 1. Public support for hydrogen doesn't usually have "hydrogen" in the title

- Industrial Cluster Decarbonisation ISCF
- Industrial Energy Transformation Fund
- Prospering from the Energy Revolution ISCF
- Future of Flight ISCF
- Aerospace Technology Institute Programme
- Driving the Electric Revolution ISCF
- Dept for Transport's Teesside Hydrogen Hub
- Automotive Transformation Fund/APC/ IDP Programmes
- Zero Emissions Road Freight Trial
- DfT Clean Maritime
- SMART
- Innovation Loans
- Strength in Places Fund
- Energy Catalyst
- Newton Fund
- Clean Air SPF
- Greenhouse Gas SPF
- Ofgem Strategic Innovation Fund
- Wider UKRI programmes
- Low Cost Nuclear
- Faraday Battery Challenge
- Active Building Centre
- Transforming Construction
- UK Energy Research Centre
- Hydrogen and Fuel Cell Supergen Hub
- Hydrogen Research Centres of Excellence and Integration ( in development)
- Decarbonising Heating and Cooling
- Power Networks Demonstration Centre (PNDC)
- Centre for Research into Energy Demand Solutions (CREDS)
- Translation Energy Research Centre
- UK Collaboratorium for Research on Infrastructure and Cities (UKCRIC)
- Place Based Climate Action Network (PCAN)
- UK CCS Research Centre
- Bioenergy Supergen hub
- Networks & Storage Supergen
- Decarbonising Transport Network
- Midlands Energy Research Accelerator
- KTN's Hydrogen Innovation Network
- High Value Manufacturing Catapult (e.g. National Composites Centre)
- Energy Systems Catapult
- Connected Places Catapult

## 2. Multiple initiatives supporting hydrogen supply

- BEIS Hydrogen Supply Competition Phase 2 for the development of novel hydrogen supply solutions
  - Low carbon hydrogen (e.g. with CCUS)
  - Zero carbon hydrogen
  - Storage and Distribution
  - Supply solutions
  - Technology Readiness Level 4-7

<https://www.gov.uk/government/publications/low-carbon-hydrogen-supply-2-competition>
- Ofgem support (networks focus)
  - RII02, NIA, NIC, Strategic Innovation Fund, Innovation Link

<https://www.ukri.org/blog/whats-so-innovative-about-the-strategic-innovation-fund/>  
<https://www.ukri.org/opportunity/ofgem-2021-whole-system-integration-discovery/>
- Collaborative investments by BEIS, UKRI and Ofgem linked to Industrial Decarbonisation of Clusters
- Net Zero Hydrogen Fund

<https://www.gov.uk/government/consultations/designing-the-net-zero-hydrogen-fund>

- Hydrogen Business Model

<https://www.gov.uk/government/consultations/design-of-a-business-model-for-low-carbon-hydrogen>

# 3. Diverse programmes support hydrogen use

## ■ Industry

- BEIS – Innovate UK Industrial Energy Transformation Fund

<https://www.gov.uk/government/collections/industrial-energy-transformation-fund#ietf-phase-2>

- UKRI Industrial Decarbonisation of Clusters

<https://www.ukri.org/our-work/our-main-funds/industrial-strategy-challenge-fund/clean-growth/industrial-decarbonisation-challenge/>

- BEIS – Fuel Switching, Distilleries, Red Diesel Replacement (Construction and mining)

<https://www.gov.uk/government/publications/industrial-fuel-switching-competition>

<https://www.gov.uk/government/publications/green-distilleries-competition-phase-1-feasibility-reports>

<https://www.gov.uk/government/publications/red-diesel-replacement-competition>

- UKRI - Transforming Foundation Industries

<https://www.ukri.org/our-work/our-main-funds/industrial-strategy-challenge-fund/clean-growth/transforming-foundation-industries-challenge/>

<https://www.ukri.org/opportunity/iscf-transforming-foundation-industries-demonstrators/>

## ■ Energy

- UKRI Prospering from the Energy Revolution

<https://www.ukri.org/our-work/our-main-funds/industrial-strategy-challenge-fund/clean-growth/prospering-from-the-energy-revolution-challenge/>

- UKRI Driving the Electric Revolution

<https://www.ukri.org/our-work/our-main-funds/industrial-strategy-challenge-fund/future-of-mobility/driving-the-electric-revolution-challenge/>

## ■ Heat

- BEIS Hy4Heat, Hydrogen Neighbourhood, Village and possibly Town trials

<https://www.hy4heat.info/>

<https://www.gov.uk/government/consultations/hydrogen-for-heat-facilitating-a-grid-conversion-hydrogen-heating-trial>

<https://www.ukri.org/opportunity/ofgem-2021-heat-discovery/>

## ■ Transport

- Multi-modal

<https://www.gov.uk/government/news/competition-winners-to-deliver-uks-first-hydrogen-transport-trials-in-tees-valley>

<https://www.gov.uk/government/publications/tees-valley-multi-modal-hydrogen-transport-hub>

- Land – e.g. DfT, OZEV, Advanced Propulsion Centre, Automotive Transformation Fund, Rail FOAK

<https://apply-for-innovation-funding.service.gov.uk/competition/885/overview>

<https://www.gov.uk/government/news/9-million-fund-opens-to-railway-innovators-and-inventors>

<https://www.apcuk.co.uk/how-the-uk-government-hydrogen-strategy-can-succeed-for-transport/>

<https://www.ukri.org/opportunity/ofgem-2021-zero-emission-transport-discovery/>

- Air – e.g. Aerospace Technology Institute, Future of Flight ISCF, Sustainable Aviation Fuels

<https://www.ati.org.uk/news/aci-ati-launch-joint-report-into-the-integration-of-hydrogen-aircraft/>

<https://www.ukri.org/news/84-million-green-aviation-technology-boost/>

<https://www.ukri.org/opportunity/natep-helping-smes-innovate-in-aerospace-autumn-2021/>

<https://www.ukri.org/opportunity/future-flight-challenge-phase-three-strand-two/>

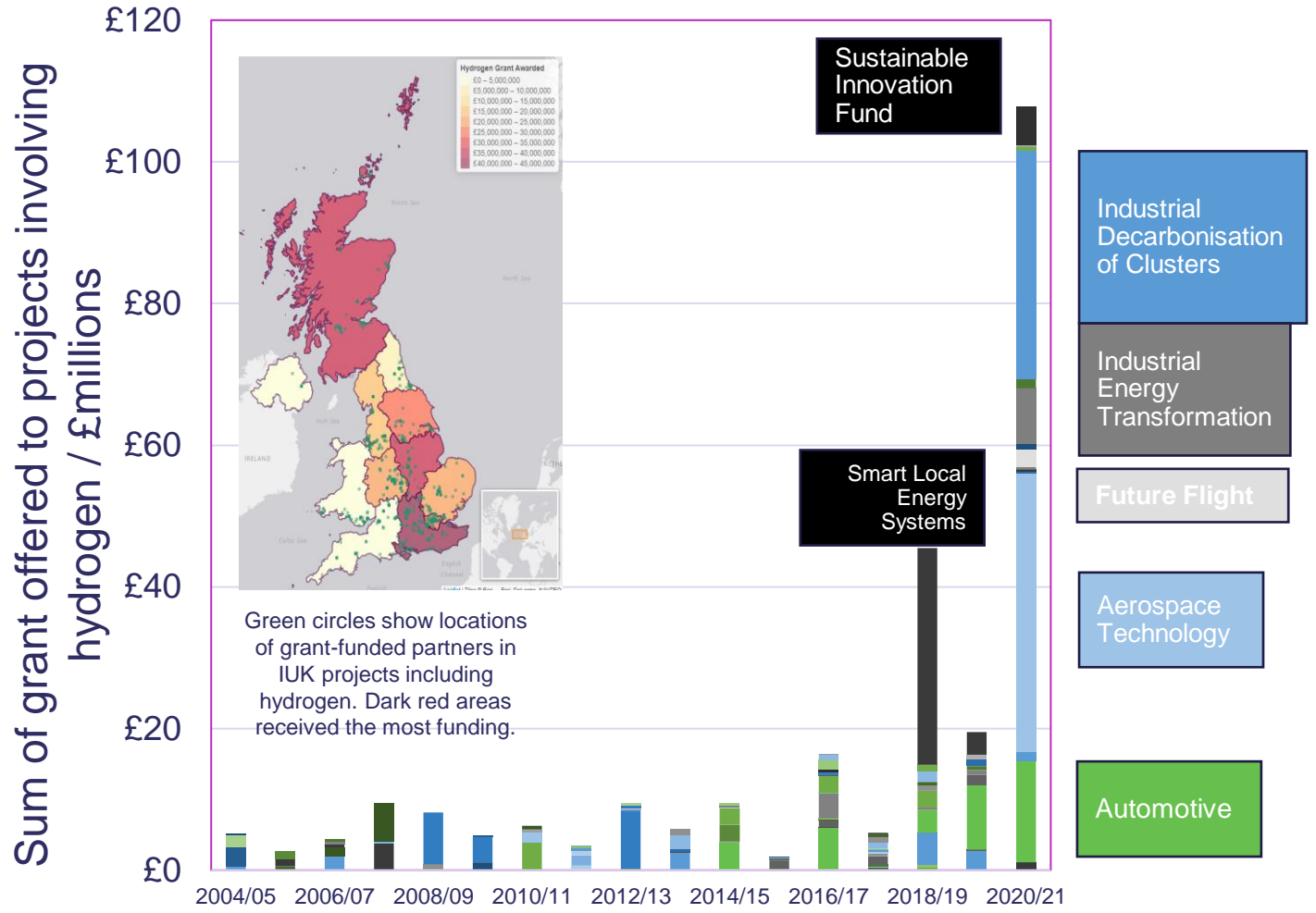
<https://www.ukri.org/opportunity/future-flight-challenge-phase-three-strand-one/>

- Sea – e.g. Clean Maritime Demonstration Programme

<https://www.ukri.org/news/net-zero-at-land-and-at-sea-innovate-uk-teams-up-with-dft/>

# 4. Innovate UK runs a mix of targeted and open funding competitions for business-led innovation projects.

Innovate UK support for hydrogen projects	
Grant Offered	£237 Million
Total Project Costs	£473 Million
#Projects to Date	268
#Live Projects	65
Grant Recipients	452
Average (median) Grant	£90k



Innovate UK committed £100m+ into hydrogen projects in 2020/2021

# 5. Reminder... it doesn't need to have hydrogen in the title

Other schemes:

Smart Grants: <https://www.ukri.org/opportunity/innovate-uk-smart-grants-october-2021/>

Research: <https://www.ukri.org/opportunity/research-the-production-and-integration-of-zero-carbon-hydrogen/>

<https://www.ukri.org/opportunity/become-a-hydrogen-research-coordinator/>

<https://www.ukri.org/opportunity/knowledge-transfer-partnership/>

<https://www.ukri.org/opportunity/eureka-eurostars-3-opportunity-1/>

<https://www.ukri.org/opportunity/build-a-network-to-promote-academic-engagement-with-catapults/>

Urban: <https://www.ukri.org/opportunity/improve-the-sustainability-of-urban-systems-and-infrastructure/>

<https://www.ukri.org/opportunity/business-and-academia-prosperity-partnership/>

Robotics: <https://www.ukri.org/opportunity/sbri-uk-national-robotics-proving-ground-feasibility-studies/>

Farming: <https://www.ukri.org/opportunity/transforming-food-production-series-a-investor-partnership/>

<https://www.ukri.org/opportunity/smes-transforming-food-production-series-a-investor-round-2/>

Energy network systems: <https://www.ukri.org/opportunity/ofgem-2021-whole-system-integration-discovery/>

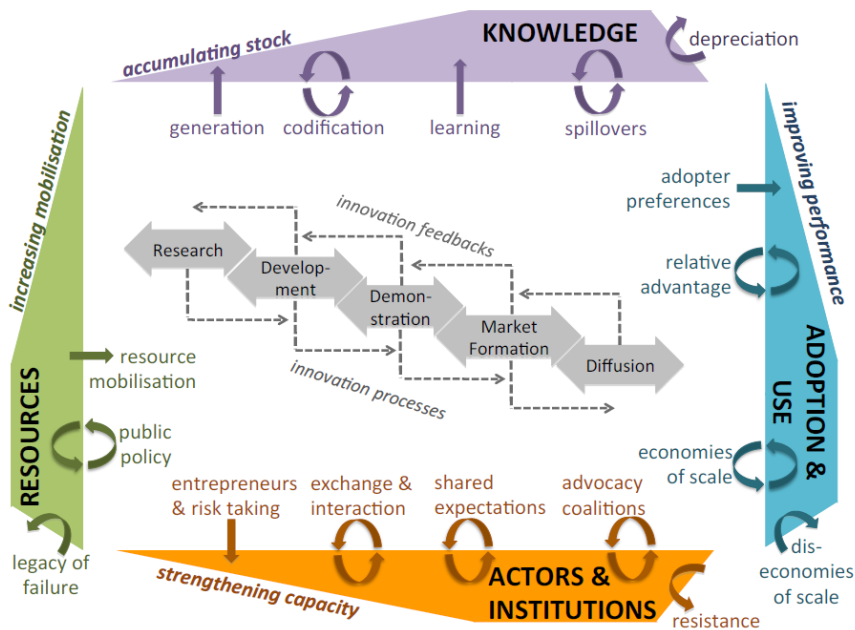
ED&I: <https://www.ukri.org/opportunity/equality-diversity-and-inclusion-in-the-energy-research-community/>

Circular economy: <https://www.ukri.org/opportunity/circular-economy-for-smes-innovating-with-the-nicer-programme/>





# Hydrogen requires more than just technology funding...



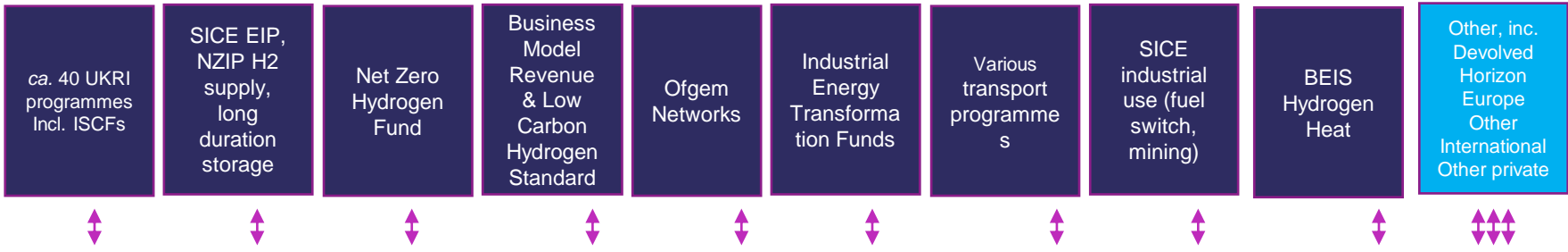
- Many energy innovations fail to achieve their full market potential because complex interactions between diverse decision makers are not coordinated.
- Success more likely when energy innovation projects are integrated with each other and within wider ecosystems.

Grubler, A. and Wilson, C. (2013) **Energy Technology Innovation: Learning from Historical Successes and Failures**. Published by Cambridge University Press Available at <https://doi.org/10.1017/CBO9781139150880>

**...organisations must collaborate develop “systems approaches” to hydrogen**

UK policies

Net Zero by 2050	10 Point Plan for a Green Industrial Revolution	Energy White Paper	Industrial Decarbonisation Strategy	Transport Decarbonisation Action Plan
Innovation Strategy	Infrastructure Strategy	Levelling Up	R&D Places Strategy	<b>Hydrogen Strategy</b>
Build Back Better – plan for growth	Strengthening the Union	COP26	Global Britain in a Competitive Age – The Integrated Review	Heat & Buildings (forthcoming)
Air Quality	Maritime & Jet Zero	Industrial & Clean Growth Strategies	Carbon Budgets	CCUS & Offshore Wind



Future UKRI & Innovate UK hydrogen activities under discussion\*

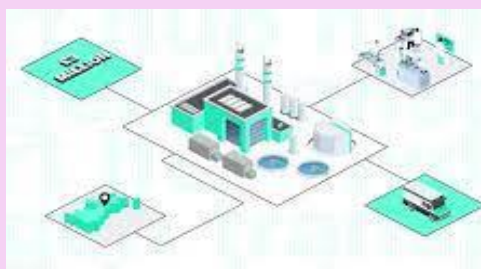
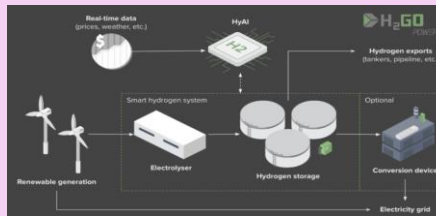
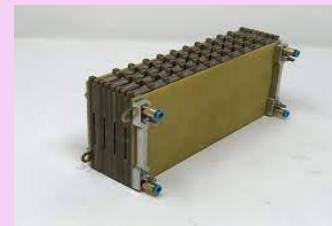
\*Post-spending review discussions are ongoing

# Sources of further information

Organisation	Website
Department for Business, Energy and Industrial Strategy (BEIS)	<a href="https://www.beis.gov.uk">https://www.beis.gov.uk</a>
Department for Transport	<a href="http://www.dft.gov.uk">www.dft.gov.uk</a>
Foreign, Commonwealth and Development Office	<a href="http://www.fcdo.gov.uk">www.fcdo.gov.uk</a>
Dept for International Trade	<a href="http://www.dit.gov.uk">www.dit.gov.uk</a>
UK Research and Innovation	<a href="http://www.ukri.org">www.ukri.org</a>
Innovate UK	<a href="https://www.gov.uk/government/organisations/innovate-uk">https://www.gov.uk/government/organisations/innovate-uk</a>
Catapult Network	<a href="https://catapult.org.uk/">https://catapult.org.uk/</a>
KTN (Knowledge Transfer Network)	<a href="https://ktn-uk.org/">https://ktn-uk.org/</a>
Ofgem	<a href="https://www.ofgem.gov.uk/">https://www.ofgem.gov.uk/</a>
Health and Safety Executive	<a href="https://www.hse.gov.uk/">https://www.hse.gov.uk/</a>
NPL (National Physical Laboratory)	<a href="http://www.npl.co.uk">www.npl.co.uk</a>
British Standards Institution	<a href="https://www.bsigroup.com/">https://www.bsigroup.com/</a>
Advanced Propulsion Centre	<a href="https://www.apcuk.co.uk/">https://www.apcuk.co.uk/</a>
Aerospace Technology Institute	<a href="https://www.ati.org.uk/">https://www.ati.org.uk/</a>


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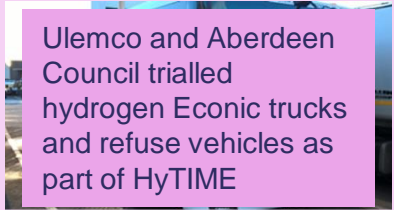
# How many of these hydrogen systems did you recognise?



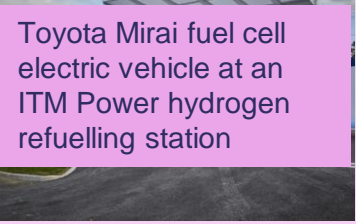
ZERRO: Ulemco's Hydrogen Ambulance, funded by OLEV with the London Ambulance NHS Trust

HyDIME: development of hydrogen diesel injection systems on a commercial ferry in Orkney

Metrodecker H2 Hydrogen fuel cell double decker bus developed by Arcola Energy working for Optare



Ulemco and Aberdeen Council trialled hydrogen Ecomonic trucks and refuse vehicles as part of HyTIME

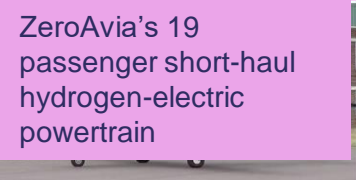


Toyota Mirai fuel cell electric vehicle at an ITM Power hydrogen refuelling station

HydroFlex: Porterbrook, University of Birmingham, Ballard, SNC Lavalin, Fuel Cell Systems, Ricardo, Luxfer

HyNET brings together many partners such as Progressive Energy and Cadent, and is supported by BEIS, UKRI, and OfGEM integrating hydrogen use in industry with a CCS network

Bramble Energy's printed circuitboard hydrogen fuel cell system which was a spin out of UKRI funded projects at UCL and Imperial College

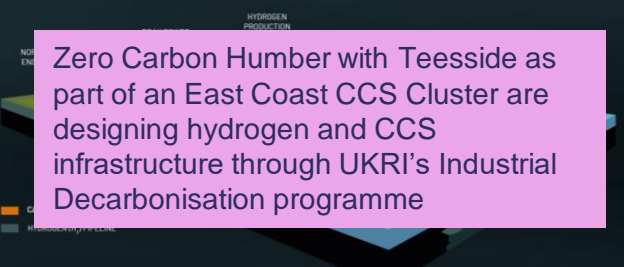


ZeroAvia's 19 passenger short-haul hydrogen-electric powertrain

RiverSimple's ultra-sustainable RASA, being supported as part of UKRI's Milford Haven Energy Kingdom detailed design project

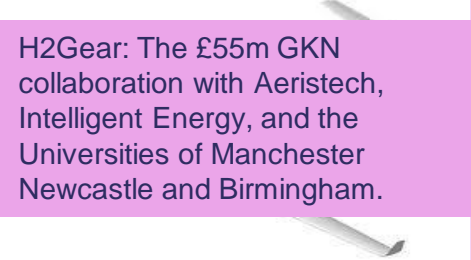
EMEC, H<sub>2</sub>GO Power and Imperial College are trialling the use of Artificial Intelligence funded by the Sustainable Innovation Fund

Doncaster-based Clean Power Hydrogen received a SMART award to prototype a membrane-free electrolyser that doesn't require precious metals



Zero Carbon Humber with Teesside as part of an East Coast CCS Cluster are designing hydrogen and CCS infrastructure through UKRI's Industrial Decarbonisation programme

Innovate UK is delivering the first phase of the £3m Teesside hydrogen hub for the Dept of Transport to investigate the challenges and opportunities for multi-modal hydrogen systems



H2Gear: The £55m GKN collaboration with Aeristech, Intelligent Energy, and the Universities of Manchester Newcastle and Birmingham.



# Thank you for your attention.

To follow up please contact:  
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Examples of organisations that work with Innovate UK on hydrogen projects



Innovate UK is pleased to have supported some 400 organisations to tackle hydrogen challenges together:

- Private businesses (all sizes, new/established)
- Central Government (BEIS, DfT, FCDO, DIT)
- Devolved Governments
- UKRI/Innovate UK
- The Catapult Network
- Innovate UK Edge, KTN
- Individual researchers
- Research Centres and Hubs
- Public bodies (e.g. Ofgem, Local Authorities)
- Universities
- Research & Technology Organisations
- Sector-focussed organisations, e.g. Automotive Council, APC, ATI, Cenex, BRE
- Trade associations
- Regional Associations
- NGOs & Community groups
- EU/EC, FCHJU/FCHJU2, IEA, Eureka, Mission Innovation, IEA
- Other countries, regions, cities