ofgem Making a positive difference for energy consumers

Ofgem's Role in Hydrogen Safety.

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OFG1161

What am I going to cover today?

- Who is Ofgem
- What is our purpose
- What our net zero obligations are
- Why & How have we funded hydrogen safety research
- Which projects have we funded and what they are delivering
- Hydrogen Market work

Who are Ofgem?

"We are a non-ministerial government department and an independent National Regulatory Authority. Our role is to protect consumers now and in the future by working to deliver a greener, fairer energy system."

- Ofgem's Powers and duties are set out in the Gas Act
  - Covers conveyance of Gas through pipes
  - Gas is described as methane, ethane, propane, butane, **hydrogen** or carbon monoxide

- Working with government, industry and consumer groups to deliver a net-zero economy, at the lowest cost to consumers
- Stamping out sharp and bad practice, ensuring fair treatment for all consumers, especially the vulnerable
- Enabling competition and innovation, which drives down prices and results in new products and services for consumers.
- Funded through a levy on Licensed companies

Infrastructure Leadership structure (Jan 25)

Infrastructure Group, Director General
Akshay Kaul

Infrastructure coordination and prioritisation (DG wide)
Richard Banks
Deputy Director

Network Price Controls **Steve McMahon** **Director**	**Major Projects** Beatrice Filkin **Director**	**Energy Systems Management & Security** **Georgina Mills** **Director**	**Energy System Design & Development** **Eleanor Warburton** **Director**	**Engineering & Technology** **Peter Bingham** **Director**	**Cyber Regulation** **Stuart Okin** **Director**
Price Control Setting – Elec **James Veaney** **Deputy Director**	**Major Projects Delivery** **Thomas Johns** **Interim Deputy Director**	**Markets & Security** **Adrian Richardson** **Deputy Director**	**Digitalisation, Innovation & Decentralisation** **Marzia Zafar** **Deputy Director**	**Engineering & Asset Health** **Martin Queen** **Interim Chief Engineer**	**Cyber Investments & AI** **Pippa Robertson** **Interim Deputy Director**
Price Control Setting – Gas **Nathan Macwhinnie** **Deputy Director**	**Offshore Network Regulation** **Stuart Borland** **Deputy Director**	**Institutions for Net Zero** **Grendon Thompson** **Deputy Director**	**System Planning & Connections** **Jack Presley Abbott** **Deputy Director**		**Cyber Policy, Guidance & Monitoring** **Natasha Zoe Smith** **Deputy Director**
Price Control Ops **Pete Wightman** *(from March)* **Interim Deputy Director**	**Low Carbon RAB** **Gordon Hutcheson** **Deputy Director**	**Electricity Charging & Market Design** **Shai Hassid (cover for Elle Wood)** **Deputy Director**	**REMA (temp)** **Shai Hassid (cover for Elle Wood)** **Deputy Director**		**Cyber Assurance & Response** **Kiran Turner** **Deputy Director**

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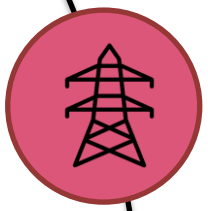
Protect, Build, Change, Deliver

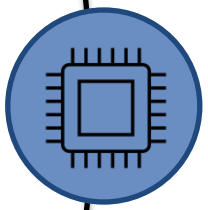
Ofgem's Multiyear Strategy

Overview slides

Shaping a retail market that works for consumers

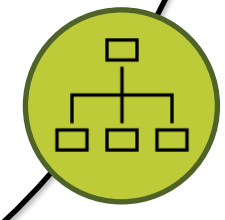


Enabling infrastructure for net zero at pace



Establishing an efficient, fair and flexible energy system

Advancing decarbonisation through low carbon energy and social schemes



Strengthening Ofgem as an organisation

- Energy Act got Royal Assent - 26th October 2023
- Specific mandate to support the Government to meet its legal obligation to get to net zero by 2050.
- Major New Powers : Net Zero Duty, NESO, Heat Networks, Energy Codes, Offshore hybrid assets, Energy Intensive Industry, CO2 transport and storage and Hydrogen Transport & Storage.

What does the Strategy cover?

Shaping a retail market that works for consumers

- Ensure fair prices
- Ensure high quality of service
- Enable competition and investability through financial resilience
- Support new and evolving markets

Enabling infrastructure for net zero at pace

- Progress strategic planning
- Expand electricity networks
- Prepare for the future of natural gas
- Facilitate deployment of low carbon technology
- Network performance and connections
- Secure and resilient supplies

Establishing an efficient, fair and flexible energy system

- Ensure the right governance and institutions are in place
- Deliver effective and efficient market incentives and signals
- Enable consumer-focused flexibility
- Make a more digital energy system work for consumers

Advancing decarbonisation through low carbon energy and social schemes

- Increase impact for our customers
- Maximise the value for taxpayers' money
- Improve what it's like to work in Delivery and Schemes

Strengthening Ofgem as an organisation: Setting out how Ofgem will evolve to continue to deliver for consumers in an increasingly complex sector.

Enabling infrastructure for net zero at pace

Progress strategic planning

Enabling a decisive shift towards system planning and coordination through new functions including the Strategic Spatial Energy Plan, which will help to coordinate decision making, minimise investor uncertainty, and keep costs down.

5.1 Oversee production and implementation of a new Strategic Spatial Energy Plan (SSEP) – The SSEP is a whole system plan that will maps the optimal mix and location of generation technologies needed to deliver net zero by 2050.

5.2 Establish and implement mechanisms to realise the Centralised Strategic Network Plan (CSNP) – The CSNP will lay out the design of the onshore and offshore transmission networks necessary to deliver the SSEP.

5.3 Establish Regional Energy Strategic Planners (RESP) – These will set direction and coordinate actors at regional and local levels.

Facilitate deployment of low carbon technology

Developing new regulatory frameworks to facilitate investment in low carbon technology, particularly new nuclear, carbon capture and storage, and hydrogen, while minimising consumer costs.

8.1 Establish and oversee a regulatory regime for nuclear power – take on role as economic regulator for nuclear power, beginning with the implementation of a nuclear RAB regime for the new Sizewell C NPP

8.2 Regulate carbon capture, transport, and storage (CCUS) – including working towards successful implementation of transport and storage licences.

8.3 Develop new hydrogen transport business models – supporting Government's ambition to deliver up to 10GW of low carbon production hydrogen capacity by 2030.

8.4 Support the development of long-duration electricity storage – including playing a role in regulating LDES if the Govt decide in future that this is the best approach

Prepare for the future of natural gas

Regulating future spending and the return of past investment on the gas networks, including through our network price controls. To reduce uncertainty for consumers and the sector, there is also a need for a clear Government decision on the role of hydrogen in home heating at the earliest possible date.

7.1 Recover the cost of the existing gas network – including by considering whether to accelerate the recovery of investment costs in gas consumers' energy bills in RIIO-3

7.2 Prepare for repurposing and decommissioning of the gas grid – With decisions still to be made by Government on whether hydrogen will play a major role in heating, we need to prepare for potential repurposing and/ or decommissioning of the gas grid.

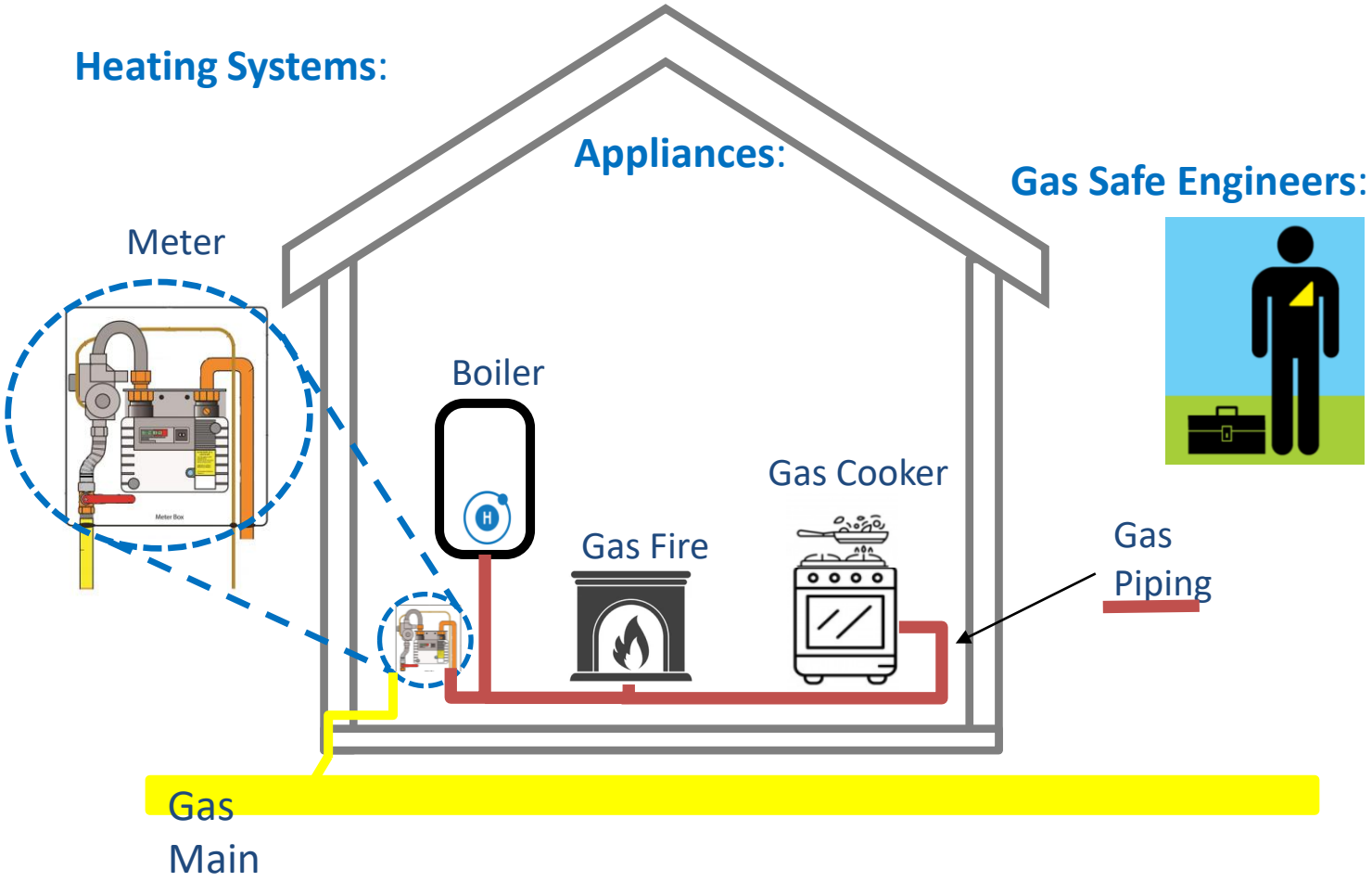
Why did we need to fund Hydrogen Research ?

- BEIS funded HSE to carry out preliminary Research
- Identified 65 key areas of Safety, mainly on consumer side.
- From combustion to transmission pipelines
- Government Decision on Hydrogen for Heat
- Dependent on proven Hydrogen Case for Safety
- Hy4heat government funded
- Gas Distribution Networks commenced work in RIIO 1

Through the lens of consumer protection:

- **Re-purposing** existing natural gas installations
  - Feasibility (Safety, materials
  - Convenience
  - Gas Safe Workforce
  - Cost

- **Replacing** existing natural gas appliances
  - Supply
  - Range of appliances
  - Cost



How is the work funded - RIIO model

Revenue =

Set the amount network companies can earn over the price control period

Base revenue ± **Uncertainty mechanisms (Annex)** ± **Rewards/penalties from incentive schemes** = **Allowed revenue**

Incentives +

- Incentives to encourage companies to submit ambitious Business Plans and tell the truth
- Totex Incentive Mechanism: encourage network companies to improve efficiency in delivery
- Output delivery incentives: drive service improvement (reputational and financial incentives)
- 5 or 8 years

Innovation +

Innovation stimulus funding:
- NIC (now Strategic Innovation Fund) and Network Innovation Allowance etc.

Outputs

Clear contract to current and future consumers
- Maintain a safe and resilient network
- Meet the needs of consumers and network users
- Deliver an environmentally sustainable network

Bias towards capital spending addressed through "totex" allowances, which fixes the proportion of total expenditure – regardless of whether it is capital or operating costs – that is added to the regulated asset base.

A key objective of RIIO-2 is to prepare network companies to deliver **Net Zero** at lowest cost to the consumer, while maintaining world-class levels of system reliability.

Indicative materiality

Mechanism	Scope
Network Innovation Allowance	£93m allowance to enable smaller-scale innovation projects that relate to the energy system transition (and/or consumers in vulnerable situations).
Net Zero and Re-opener development UIOLI	£40m 'use it or lose it' allowance to enable Net Zero related development work and small value Net Zero facilitation projects to go ahead.
Net Zero Pre-construction and Small Projects re-opener	To fund more material design and preconstruction work and to progress Net Zero facilitation projects.
Strategic Innovation Fund	To enable a strategic approach to innovation funding that supports the achievement of Net Zero targets. Initially set at £450m across all sectors.
Heat Policy re-opener	To respond to specific policy development on the future of heat.
Net Zero Re-opener	To respond to policy and technology developments, with a Net Zero Advisory Group co-ordinating with key stakeholders.

What are the key Projects that we have funded

- H21 – NGN
  Packages of work covering safety of existing infrastructure and Hydrogen.

- Hydeploy – Cadent
  Investigation in to the optimum level of Hydrogen blending for safety in Natural Gas = 20%

- H100 – SGN
  New network designed and built for Hydrogen including converting properties.

What are the key Projects that we have funded

- LTS Futures – SGN

  Conversion of a high-pressure distribution pipeline to transport Hydrogen

- Future Grid – National Gas

  Range of projects investigating the suitability of the Gas Transmission system for Hydrogen

Project Title	Brief description	Current Phase / Status
HyNTS Compression	Demonstrating the repurposing potential for gas transmission system compression equipment to transport and store hydrogen	Beta
Velocity Design with Hydrogen	Testing and validation of hydrogen velocity models for erosion, vibration, noise, and particle transportation, to enable safe design velocity limits for gas networks.	Beta
Intelligent Gas Grid	Autonomous and intelligent monitoring and control for pressure management and operational planning & maintenance of gas networks.	Beta
HyNTS Deblending for Transport Applications	Design and development of a hydrogen deblending and refuelling system to support direct integration to the National Gas Transmission System	Beta
HyScale LOHC Phase 2b	Investigating how a liquid organic hydrogen carrier can be used for capturing, storing and releasing hydrogen into a gas network and to manage long-duration storage requirements	Alpha
Gas Network Evolution Simulator (GNES)	Agent Based Model to simulate complex interactions between stakeholders to optimise the transition away from natural gas	Discovery
Hydrogen Cost Reduction (HyCoRe)	Using advanced modelling to identify UK regions with strong potential for off-shore wind to gas network integration	Ended
Gas System of the Future – Digital Twin	Exploring the development of a digital twin of the gas system to support strategic decision making to optimise operations under different scenarios.	Ended
HyNTS Pipeline Dataset	Investigating datasets needed and developing processes to determine the state and capability of gas transmission pipelines to carry hydrogen	Ended
HyNTS Protection	Investigating internal coatings for gas pipes to assist with the deployment of hydrogen to the existing network	Ended
HyPark	Investigating potential gas grid integration for hydrogen fuel cell powered vehicles	Ended
B-Linepack+	Exploring feasibility of geological storage sites as an alternative to traditional linepacking which may decease with hydrogen	Ended
Digital Twins: Exploring the commercial, societal and operational benefits on green hydrogen projects	Will explore the commercial, societal and operational benefits that could be derived from the deployment of a digital twin on a green hydrogen use case	Ended
Carbon and Hydrogen transportation to SAF production facilities	Strategising effective transport and storage of sustainable aviation fuels through creation of a planning tool that takes into account gas network and hydrogen backbones in development	Ended
Green Hydrogen Injection into the NTS	Developing a strategic regime for injection of green hydrogen into the National Transmission System	Ended
Gas Networks Interoperable Digital Twin	Developing a strategy to utilise gas network digital twins	Ended
Hydrogen Barrier Coatings for Gas Network Assets	Exploring pipe coating technologies to enable the existing gas transmission network to supply hydrogen as a low carbon energy source	Ended

- Hydrogen Transport model
- Hydrogen Market Framework
- CCUS Regulation
- Innovation challenges
- West & East Coast Clusters
- Project Union
- Future of Gas Work