
Hy4Heat

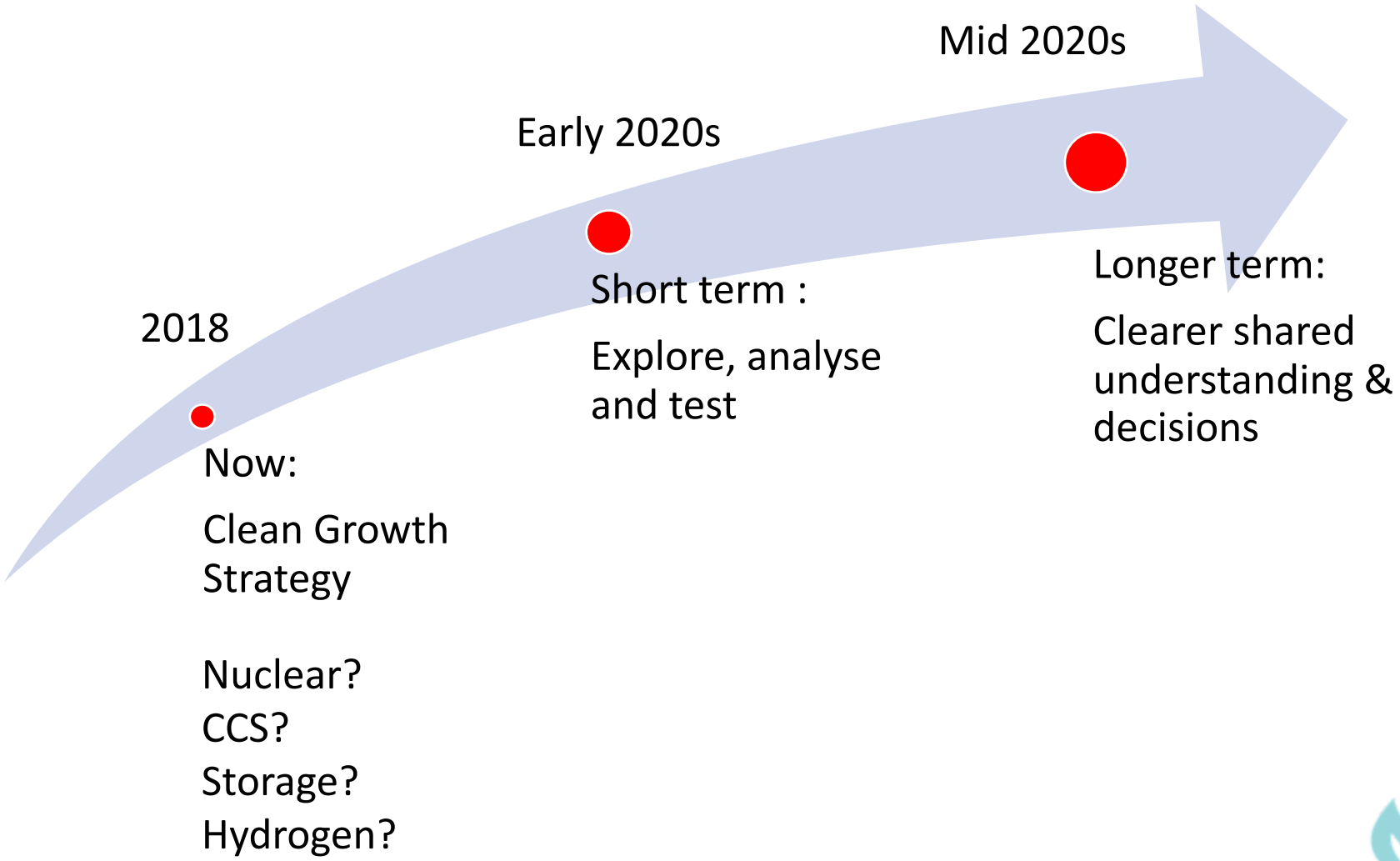
Welcome


Hy4Heat

Heidi Genoni

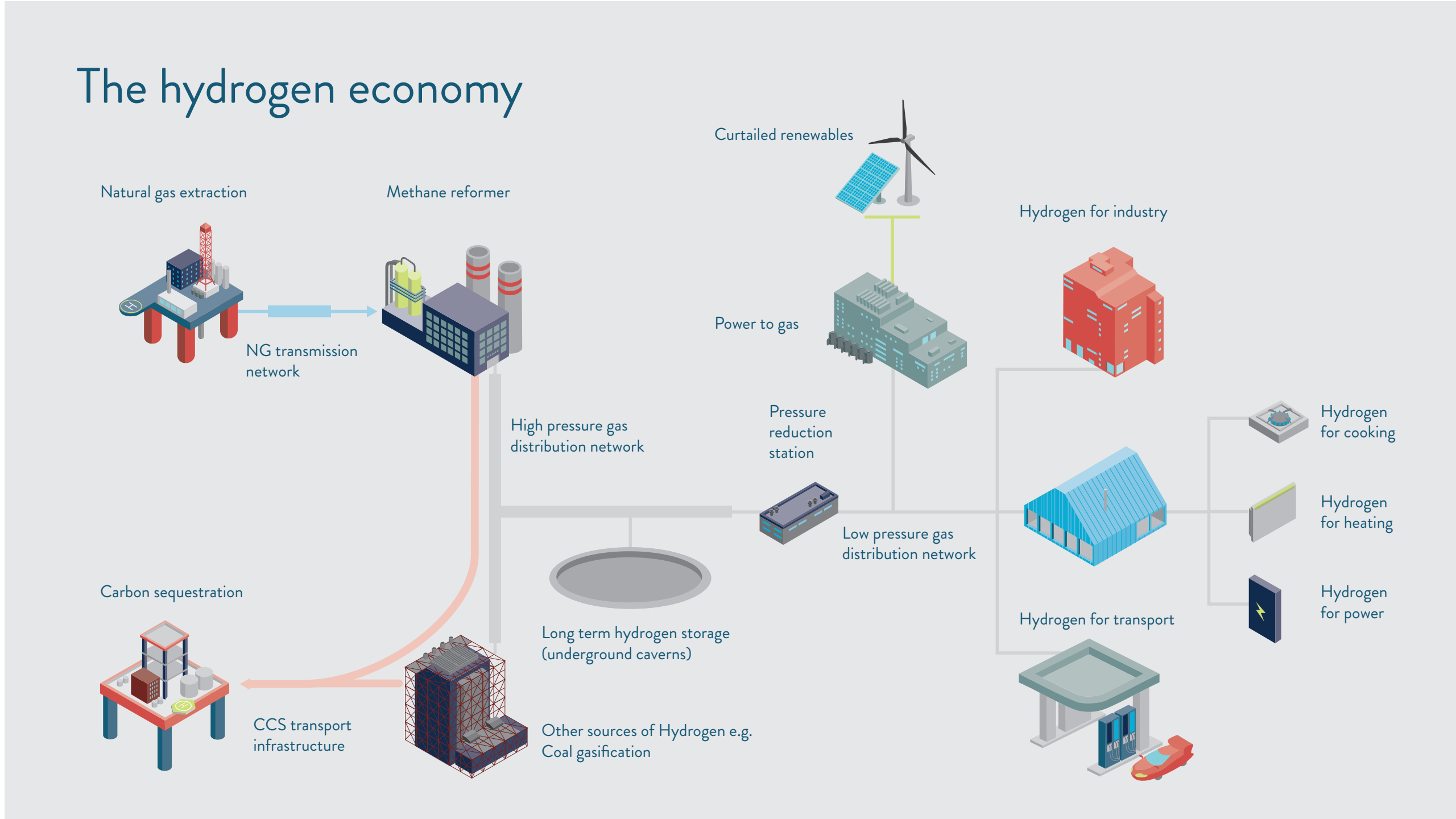
Hy4Heat Programme Manager

Heat Strategic context



Hy4Heat

The hydrogen economy



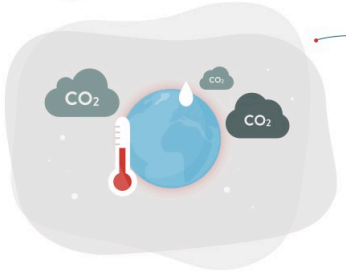
Hy4Heat Mission

To establish if it is technically possible, safe and convenient to replace methane with hydrogen in residential and commercial buildings and gas appliances. This will enable the government to determine whether to proceed to a community trial.

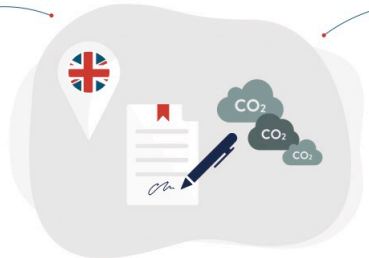
Hy4Heat

The Hy4Heat Programme

1 **Carbon Dioxide** is contributing to climate change and global warming

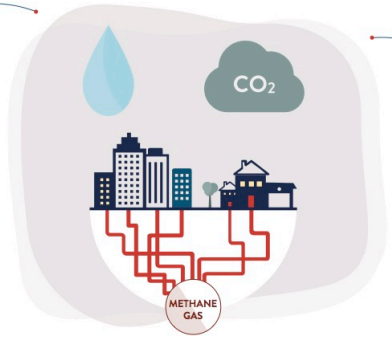


2 The UK government has a 2050 target to **reduce carbon emissions by 80%** of 1990 levels

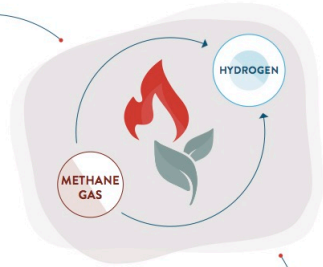


3 Heating and cooling UK homes is about **half all energy consumption and a third of carbon emissions**

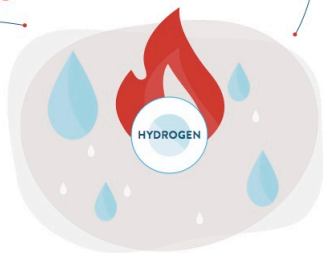
4 **80% of homes** use natural gas (methane). When used for heating and cooking, this releases water and carbon dioxide



5 **BEIS** (Department for Business, Energy & Industrial Strategy) is looking at ways of **decarbonising heat.** One of the options is replacing methane with hydrogen



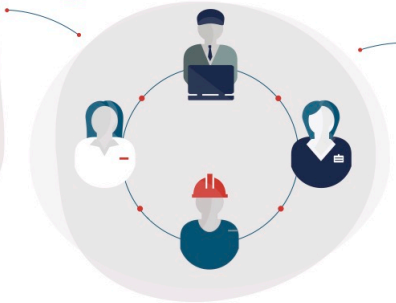
6 Hydrogen, when converted to heat **releases no carbon dioxide**



7 BEIS is considering everything: from **how hydrogen could be produced** sustainably, in bulk, with minimal carbon emissions...

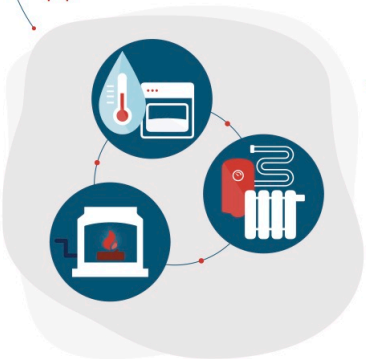
8 through to **how much a change might cost**

9 Hy4Heat is part of this work – and is a group of **industry partners and experts...**

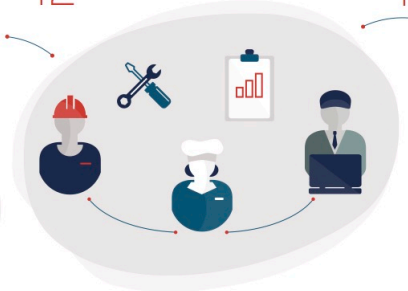


10 defining a hydrogen **quality standard...**

11 developing appliances for **use with hydrogen gas...**

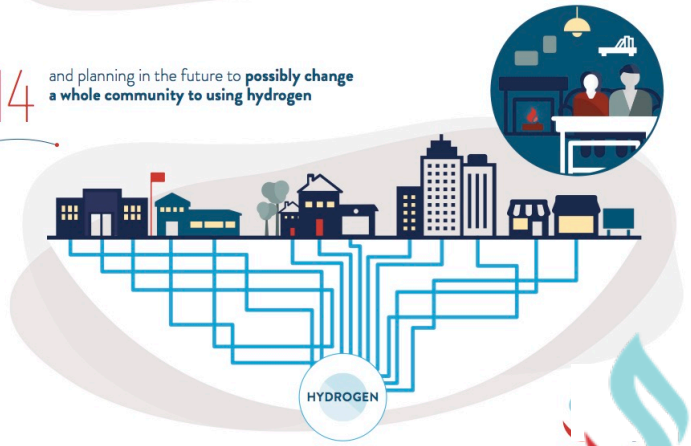


12 and **testing them** to make sure they're **safe, reliable and convenient**



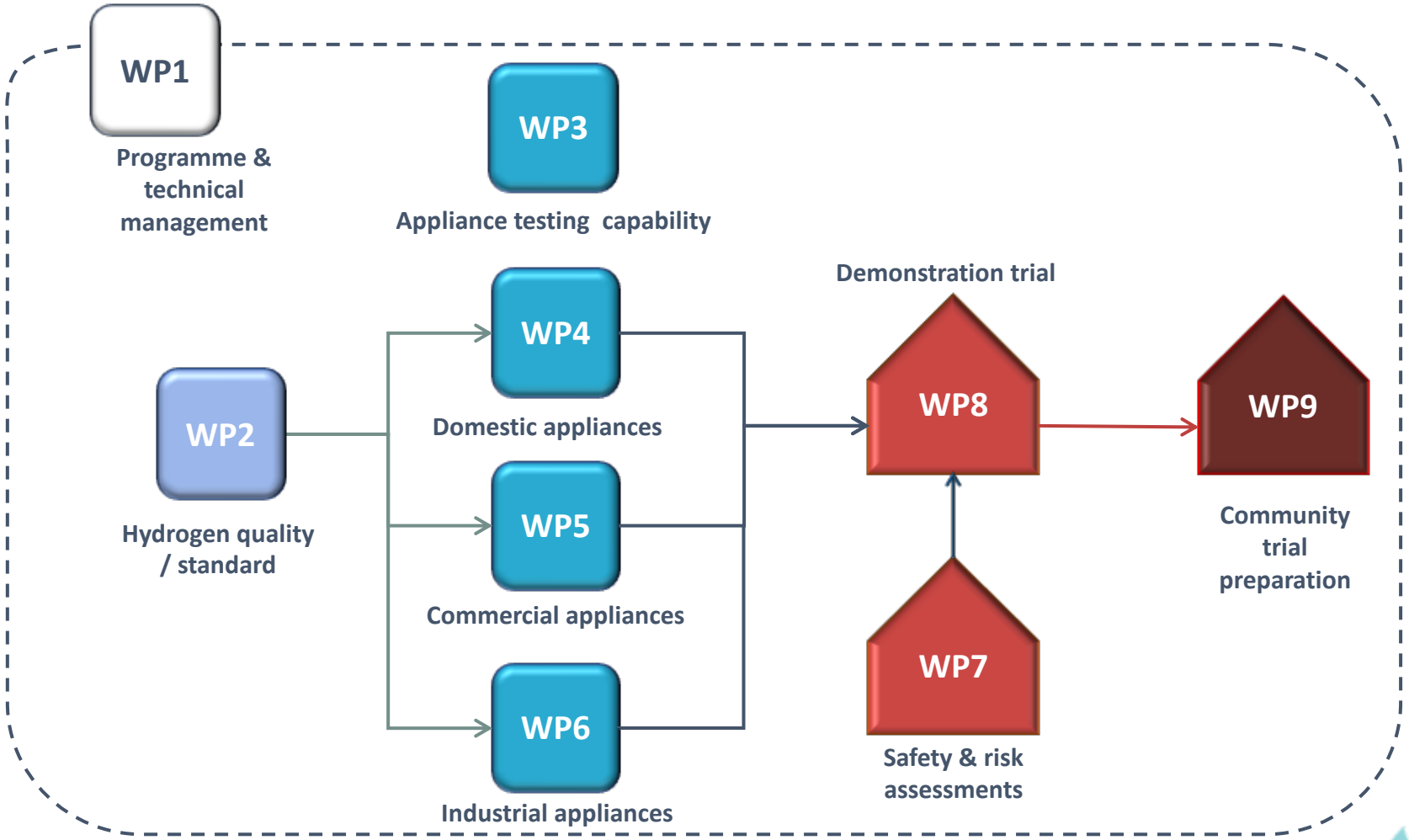
13 Creating demonstrations and **getting people's feedback...**

14 and planning in the future to **possibly change a whole community to using hydrogen**

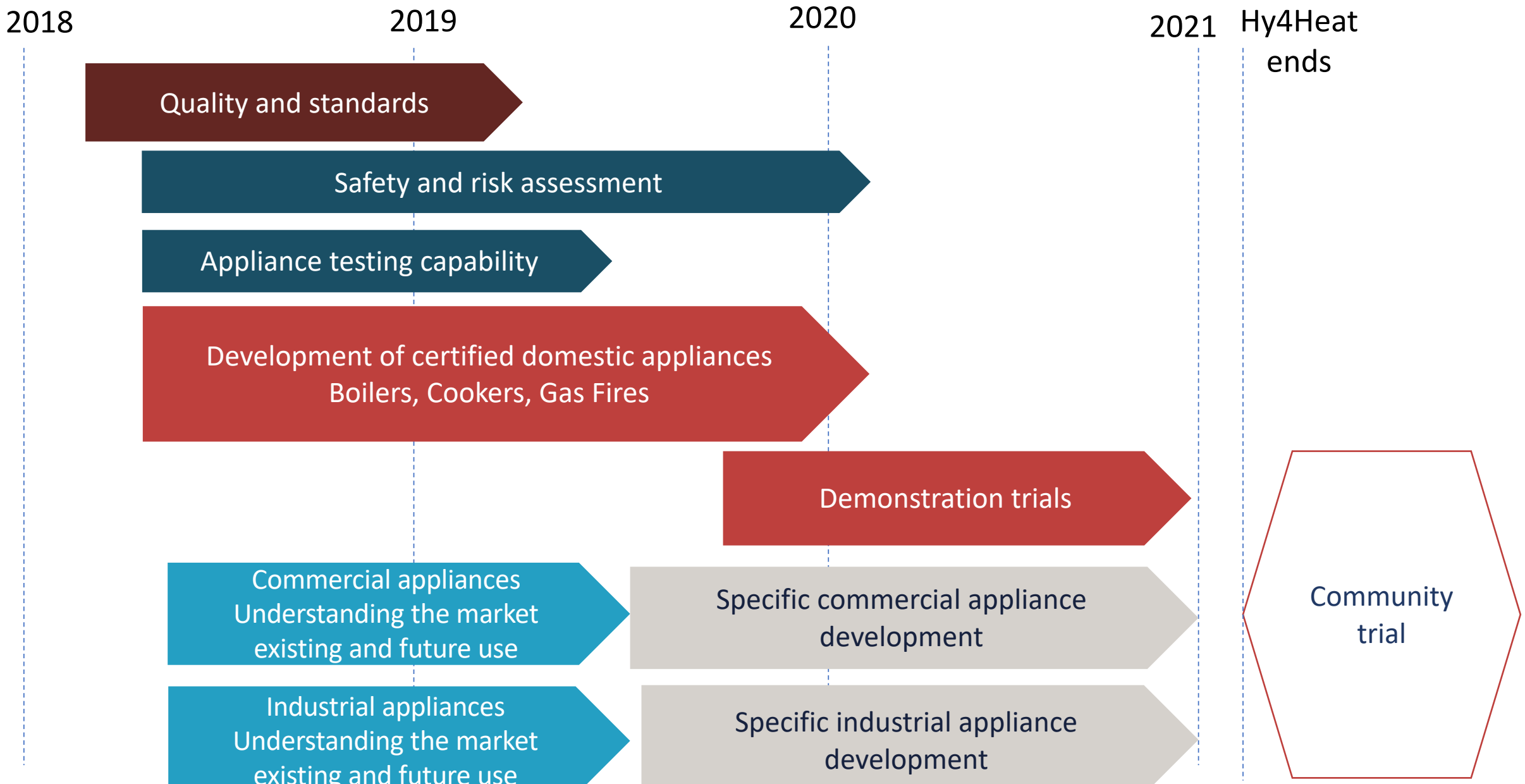


Hy4Heat

Programme Work Packages



Hy4Heat


2018
2019
2020
2021
Hy4Heat ends
Quality and standards
Safety and risk assessment
Appliance testing capability
Development of certified domestic appliances
Boilers, Cookers, Gas Fires
Demonstration trials
Commercial appliances
Understanding the market
existing and future use
Specific commercial appliance development
Industrial appliances
Understanding the market
existing and future use
Specific industrial appliance development
Community trial

WP2 Hydrogen Gas Quality

- Developing gas standards
- Assessing hydrogen purity
- Testing gas odorants
- Reviewing colourisation options

Hy4Heat


Hy4Heat

Gas Quality Standards

Jeremy Few

Hy4Heat Work Package Lead

Work Package 2 – Overview

- Developing gas standards
- Assessing hydrogen purity
- Testing gas odorants
- Reviewing colourisation options

Work Package 2 – Objectives

- Assess current gas standards and their suitability for adoption for hydrogen
- Develop a hydrogen gas standard (new or adoption of an existing standard)
- Develop and update the relevant IGEM standards for use with hydrogen
- Develop robust evidence through research and testing
- Obtain IGEM committee approval for the updated standards
- Communicate to the gas industry prior to commencing the trial.

Hy4Heat

Work Package 2 – Output

- To enable installers (supported by Gas Safe) to construct and commission the pipe work and appliances required
- Support an unoccupied trial and/or demonstration zone
- The procedures in place for a potential occupied trial

To produce a package of standards that provide a level of safety equivalent to that of natural gas.

Hy4Heat

Work Package 2 – IGEM

- Hy4Heat recognises the key role that IGEM standards have in achieving safe working practices in the gas industry
- Hy4Heat will work with IGEM to extend existing documentation
- Especially relating to gas purity, odorisation & colorant
- In collaboration with industry, including, H21, H100, the HHIC, BS installation committees and EN mirror committees, to produce holistic safety equivalent to natural gas

Hy4Heat

Procurement Lots

IGEM committee gas standards approval & adoption	To approve all updated IGEM standards that are relevant to hydrogen gas and Hy4Heat following the development (new or adoption) of a hydrogen gas quality standard

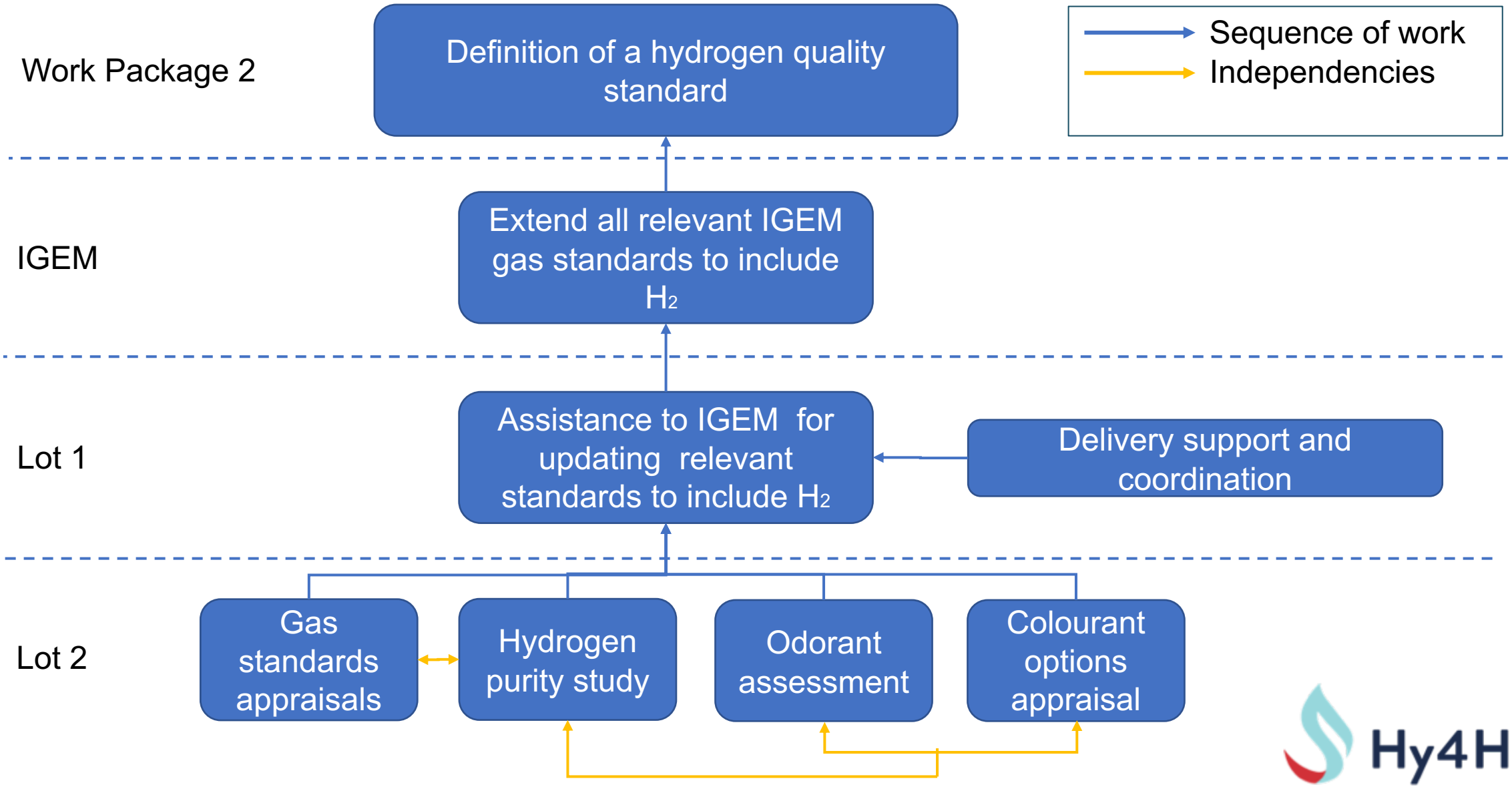
Work Package 2

Definition of a hydrogen quality standard

Lot	Procurement lots	Lot Description
1	Coordination and technical development of a hydrogen gas standard and IGEM gas standards	To support, coordinate and complete the updates to the IGEM gas standards in relation to hydrogen required for the Hy4Heat programme
2	Research and development of purity, odorant and colourant	Undertake research and testing studies to determine the optimum solutions for the key elements that need to be confirmed (purity, colourant, odorant)

Hy4Heat

Lot Interdependencies



Hy4Heat

Scope of works

IGEM gas standards approval and adoption

Description	Proposed scope
To approve all updated IGEM standards that are relevant to hydrogen gas and Hy4Heat following the development/modification to the proposed hydrogen gas standard required for a live trial	1. Prioritise the IGEM standards for relevance and importance in relation to Hy4Heat 2. Provide Hy4Heat with recommendations on the standards that need updating 3. Plan the estimated resource requirements to undertake updates 4. Identify any potential unknowns that will need to be addressed before the updated standards can be finalised 5. Identify any standards that are outside of the scope for Hy4heat but are required for other hydrogen programmes as enablers for Hy4Heat – i.e. upstream of the meter 6. Review, provide comment and approve IGEM standards once updated 7. Disseminate updated gas standards to the industry for adoption

Deliverables:
All IGEM standards related to Hy4Heat approved and adopted

Hy4Heat

Scope of works

Lot 1 – IGEM Gas Standards Updates

Technical development

Description	Proposed tender scope
To review all relevant existing gas standards which could be adopted/modified for the use with hydrogen and update all relevant IGEM standards in relation to hydrogen gas that are relevant to Hy4Heat	1. Review all relevant existing gas standards relevant to hydrogen for use in domestic and commercial properties relevant to Hy4Heat 2. Identify any key elements that need to be explored further e.g. moisture content, CO_2 limit etc. and document potential implications on Hy4Heat programme 3. Provide recommendations to IGEM for standards updates 4. Update standards following review/approval by IGEM

Deliverables:
All IGEM standards related to Hy4Heat updated for use with hydrogen

Hy4Heat

Scope of works

Lot 1 – IGEM Gas Standards Updates

Coordination and delivery support

Description	Proposed tender scope
To provide coordination and delivery support for the updates of the IGEM gas standards to ensure completion to meet the Hy4Heat programme milestones	1. Act as the Project Manager for the update of the gas standards for Hy4Heat & IGEM 2. Plan and coordinate the delivery of the gas standards updates 3. Set and agree key milestone targets and report on progress 4. Support IGEM committee progress meetings and working group sessions 5. Track, monitor and report on gas standard update progress 6. Identify issues and potential resolutions to resolving in order to maintain on schedule 7. Act to close out outstanding actions on standard approvals to ensure they are signed off by IGEM in a timely manner

Deliverables:
All IGEM standards related to Hy4Heat updated within the programme timescales required to meet trials

Hy4Heat

Scope of works

Lot 2 - Research and Development

Purity evaluation study

Description	Proposed tender scope
To provide an assessment on the options available for different hydrogen purities and determine their impact on the wider system	1. Document the hydrogen production methods and purity levels produced in the UK 2. Identify the type and quantity of impurities found in each method for each purity 3. Obtain data on the likely impurities that hydrogen will pick up through the gas network (methane and hydrogen) 4. The implications on the purity level recommended on all downstream applications 5. Recommend the optimum purity level for the industry to adopt 6. Feasibility of producing hydrogen that is suitably clean for fuel cells without clean up 7. A cost vs benefit analysis of the various hydrogen purity levels 8. The potential gas clean up technologies available to meet all end use requirements

Deliverables:
Options appraisal and recommendations paper on the hydrogen purity level and the associated gas standard to be adopted

Hy4Heat

Scope of works

Lot 2 - Research and Development

Odorant assessment study

Description	Proposed tender scope
To evaluate the suitability of using the existing odorant (mercaptan) with hydrogen and determine the precise concentration levels or a suitable "similar" alternative if found to be incompatible	1. Test and validate that the existing odorant is suitable for use with hydrogen gas to ensure it behaves as required to confirm effective leak detection 2. Perform rhinological tests using the odorant to confirm detection rates are equal to existing 3. Determine the precise numerical concentration required for hydrogen (if found to be suitable) 4. Identify alternative "similar*" odorants (if the existing odorant is deemed unsuitable) 5. Undertake tests and provide recommendations on the potential long-term odorant that might be used for a nationwide conversion

Deliverables:
A report documenting the behaviour, compatibility and quantity of odorant required for use with hydrogen as result of the testing undertaken.

Hy4Heat

Scope of works

Lot 2 - Research and Development

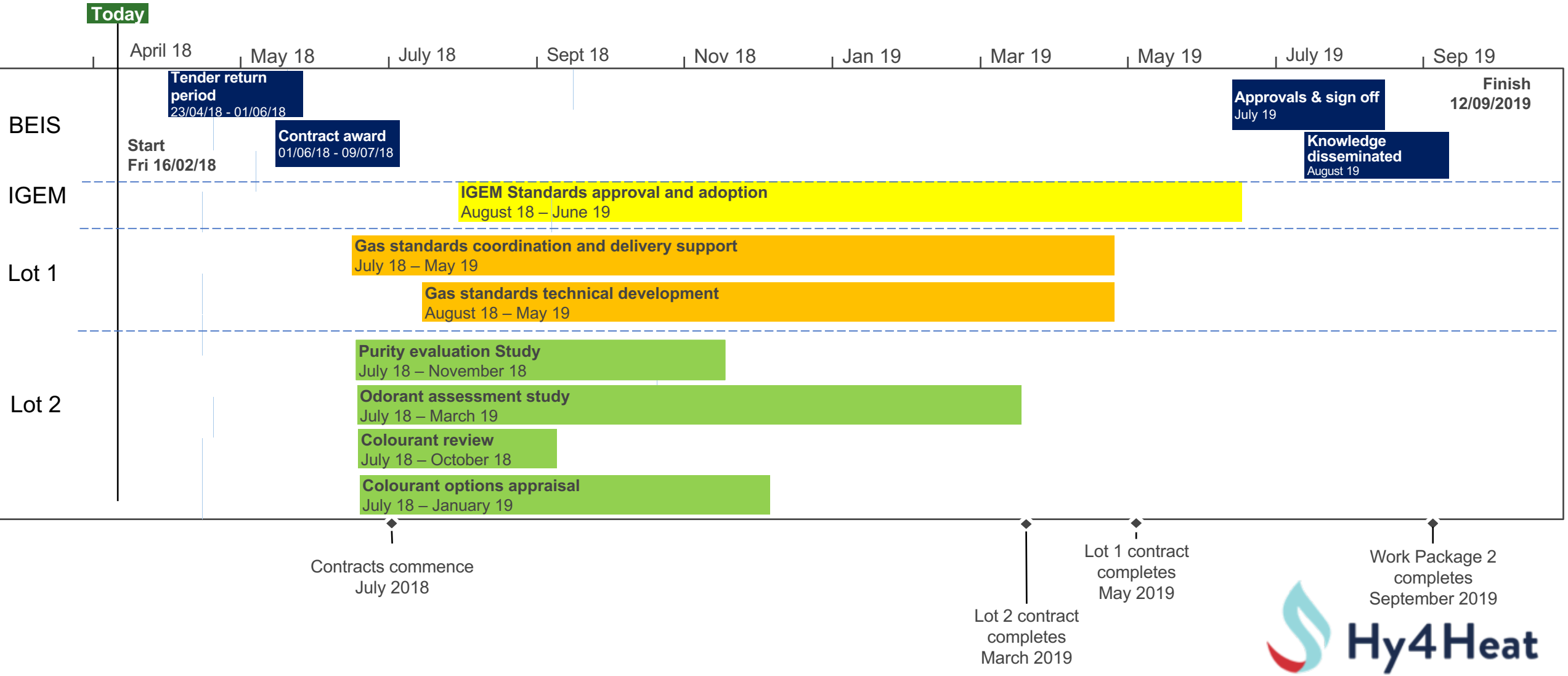
Colourant assessment study

Description	Proposed tender scope
To determine colourant requirements when using hydrogen and investigate the optimum solution if a colourant is required	1. Determine with manufacturers and industry stakeholders whether a colourant is required for each appliance type on both aesthetics and safety grounds 2. Determine with the GDNOs (and HSE) whether there is a requirement for a flame colour upstream of the meter i.e. outside of the house 3. Feasibility study of adding a colourant at distribution level or at appliance level 4. Document the key safety, potential chemical compounds, risks of toxicity, potential costs and expect appliance lifetime changes 5. Document the implications on downstream applications and the ease of adding any potential colourant chemicals identified 6. Recommend the most suitable colourant option for a hydrogen conversion

Deliverables:
A report on the options, recommendations and wider implications for colourising a hydrogen flame at different distribution locations compared against at appliance level.

Hy4Heat

Expected Delivery Timeline



Hy4Heat

Evaluation priorities*

Criterion		Description	Weighting	
			Lot 1	Lot 2
1	Skills and expertise	Experience/demonstration of relevant skills and supply a strong team of individuals with the capability to fulfil this project's objectives and required outputs	15%	25%
		A demonstration of the any relevant experience on previous project	10%	10%
2	Understanding of requirements	Demonstrate clear understanding of the tender requirements	10%	10%
3	Methodology	Effective proposed approach to deliver the project's objectives. Clear demonstration of the methodology to be used and demonstration of an ability to deliver robust evidence and recommendations required to support the delivery of a hydrogen gas standard	25%	20%
4	Management of delivery	Effective quality, relevance and breadth of management oversight including, planning, risk management/identification, effective working arrangements, information handling and quality assurance	15%	10%
5	Price	Price – price will be marked proportionately to the lowest tender	25%	25%
		TOTAL	**100%**	**100%**

Key Priorities

- Liaison with IGEM & its committees
- Ensuring standards produce holistic safety
- Robust, technically accurate evidence
- Meeting programme deadline

* Provisional evaluation criteria – subject to change

Hy4Heat


Hy4Heat

BEIS Procurement

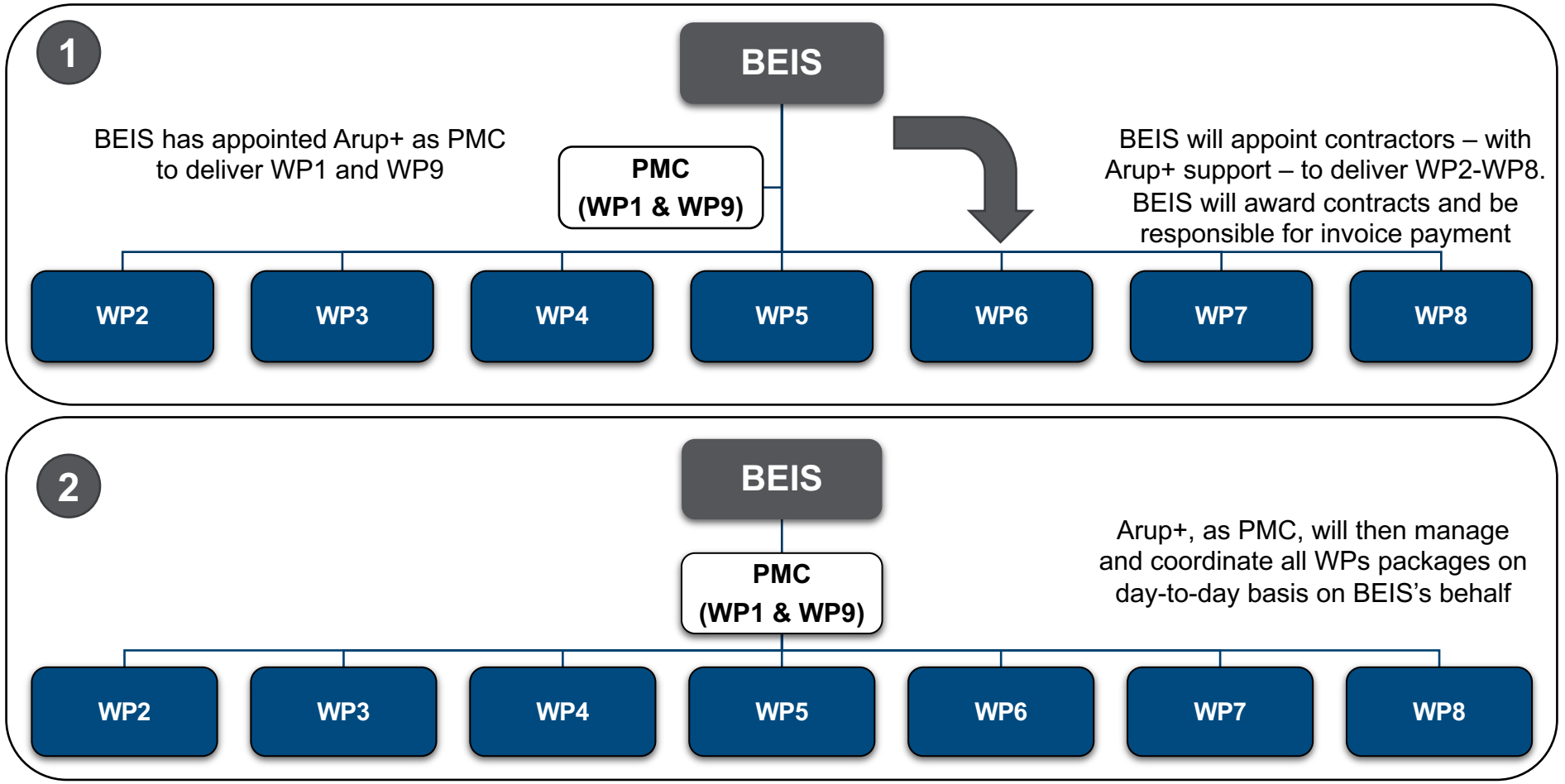
WP2: Hydrogen Standard

Hy4Heat Supplier Event

3 April 2018

Department for Business, Energy & Industrial Strategy

WP procurement and management



PMC procurement exclusion

**Arup+ proposal committed to abide by this exclusion …
therefore part of the contract with BEIS**

Invitation to Tender for Programme Management Contractor (PMC) for UK hydrogen for heat demonstration

Tender Reference Number: 1318/06/2017

C: Conflict of interest

The appointed programme management contractor for this ITT will undertake a central role in developing the detailed technical design and specification of subsequent work packages (WP2-WP8) and assisting with procurement and award procedures.

BEIS therefore considers that there is no means by which it can ensure compliance with the duty to treat economic operators equally in accordance with regulation 18(1) of the Public Contracts Regulations 2015 other than by excluding the company or consortium appointed to deliver the PMC role for this ITT from the procurement processes for subsequent work packages.

In their tender response, tenderers are required to give a commitment to abide by this exclusion unless they can prove that their involvement in preparing the procurement procedure for subsequent work packages is not capable of distorting competition.

Budgets and tenders

Hy4Heat
WP2: Hydrogen Standard

Indicative budget(s):

- Lot 1: £200,000 (ex VAT)
- Lot 2: £150,000 (ex VAT)

Nb. Bidders can bid for one or both lots

- Contractors to provide a full and detailed breakdown of costs
  - include staff / day rates against specific tasks
- Payments will be tied to deliverables / milestones
- Contractors will be invited to submit **electronic** tenders
  - 1 proposal per lot
    - ≤ 20 pages, excluding declarations
    - A4, minimum margins 2.5 cm, minimum single line spacing
    - Arial font, minimum 12 pt

Consortium bids

BEIS welcome bids from consortia / groups… as well as large(r) single entities

Some pointers:

- Single proposal
  - make clear the proposed role for each partner, the lead contact, the organisation and governance
  - set out how any sub-contractors will be managed and the % of the tendered activity (in terms of £) that will be sub-contracted
- Set out proposed arrangements, if a consortium is not proposing to form a corporate entity
  - BEIS reserves the right to require a successful consortium to form a single legal entity
- BEIS recognises that arrangements in relation to consortia may (within limits) be subject to future change
  - therefore respond in the light of the arrangements as currently envisaged
  - Notify BEIS of any future proposed change, so that a further assessment by applying the selection criteria to the new information provided can be made

Criteria – getting the balance right

Proposals are scored:

- using a range of weighted criteria
- cost / price is always a criterion

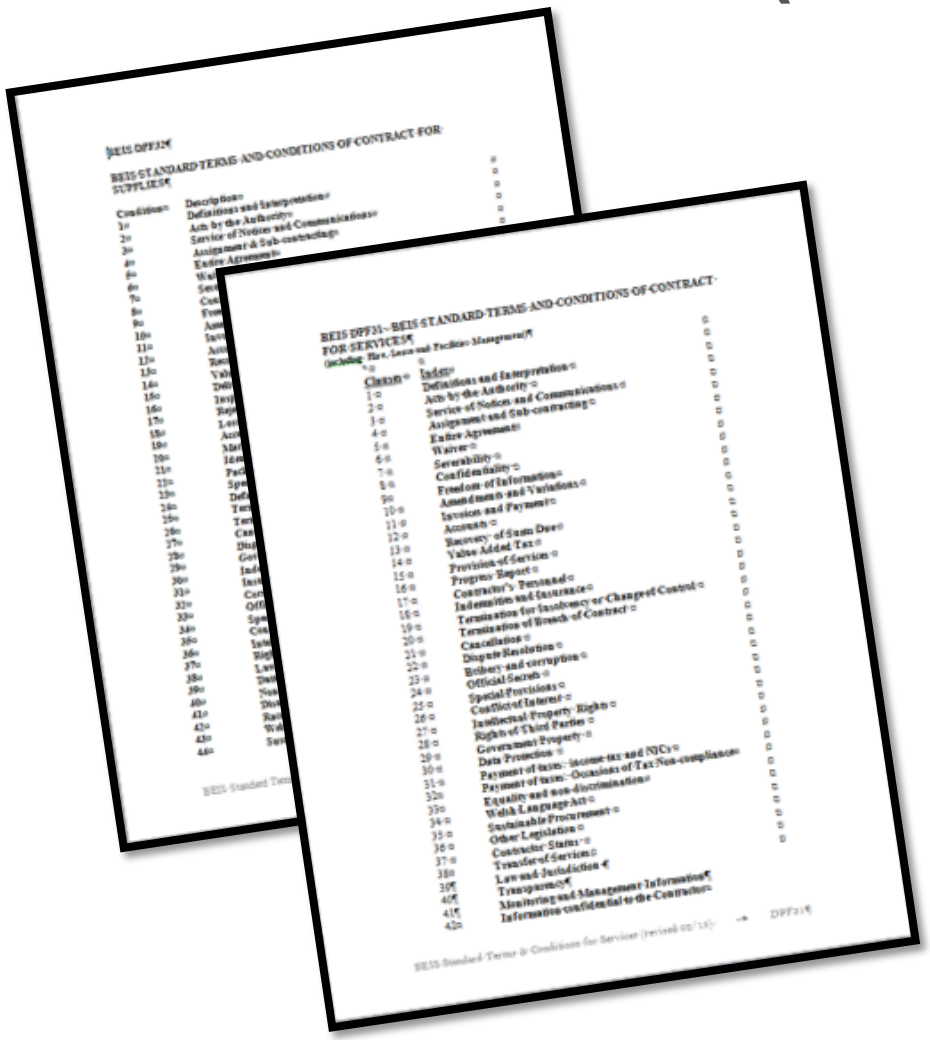
Full / final details are included in ITTs

BEIS reserves the right to award contract on written bid only

- Should interviews need to take place, the 3 suppliers with the highest marks will be invited

Nb. Contractors are strongly advised to structure their proposals to cover each of the criteria

Terms and conditions (Ts & Cs)



- BEIS standard Ts & Cs are expected to form the basis of any contract
- BEIS will publish the final version of the Ts & Cs at the time of any ITT
  - These will be final and any bids submitted on condition that Ts & Cs are amended will be effectively submitting a non-compliant bid
- BEIS are happy to share these documents

Transparency

- In the interests of fairness, today's information will be posted on the OJEU DELTA portal – for all potential bidders
  - Linked with the PIN notice
  - Including Q&A from panel session in an anonymised form

Procurement – indicative tender timeline

ITEM	DATE (subject to change)
Advert and full invitation to tender issued	Mid-April
Deadline for questions relating to the tender	End-April
Responses to questions published	Early-May
Deadline for receipt of tender	Mid-May
[If needed] contract clarification process	Late-May
All suppliers alerted of initial outcome	Late-May
10 day standstill period	Early-June
Contract award on signature by both parties	Early-July
Contract start date	Early-July

Q&A
and discussion


Hy4Heat