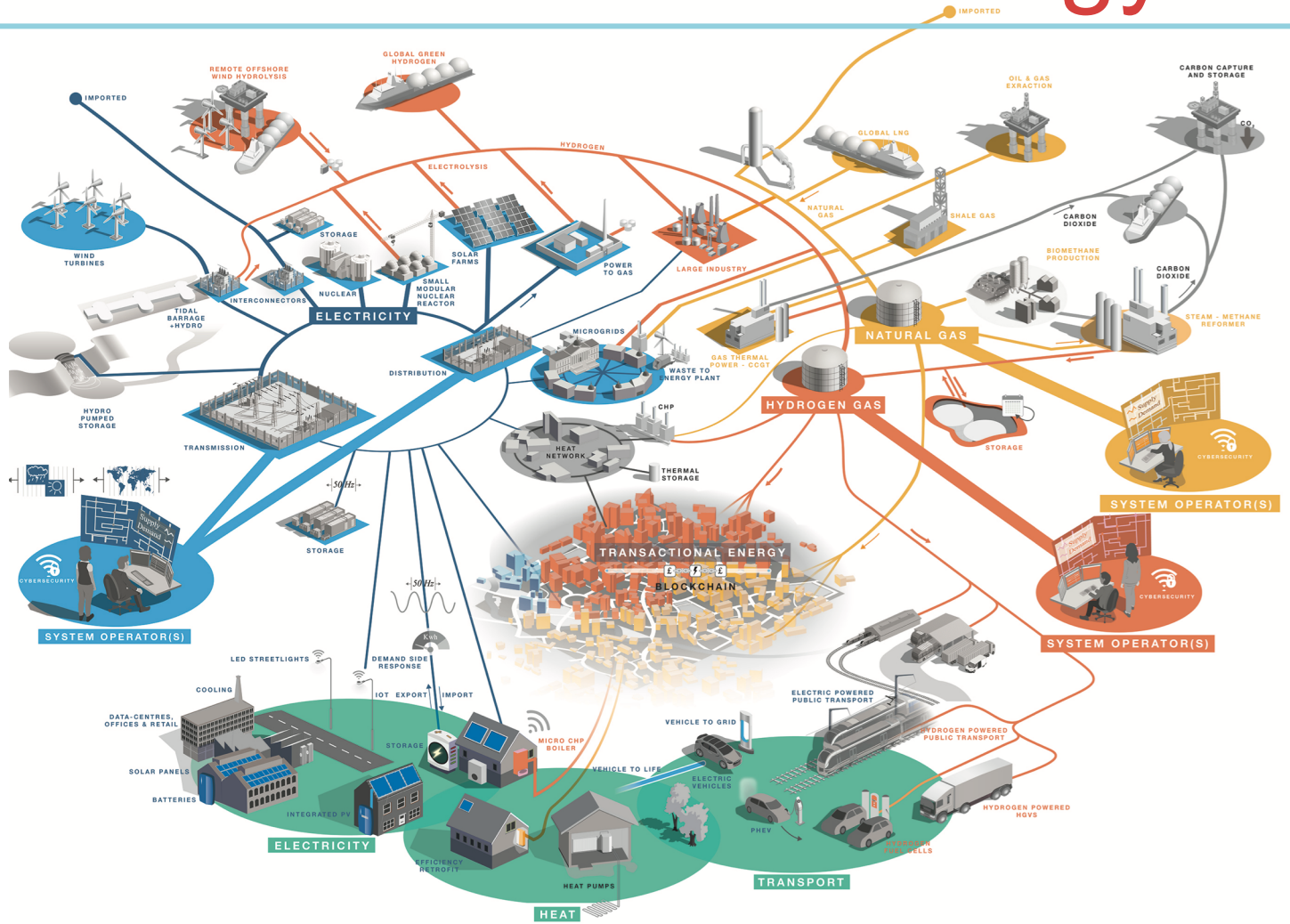
Hy4Heat

All Party Parliamentary Group: Hydrogen, 11 March 2019

Heidi Genoni, Arup, Hy4Heat Programme Manager

Arup works across the energy sector



Department for Business, Energy & Industrial Strategy

Hy4Heat

Policy is set out in two key documents

Clean Growth Innovation Challenges

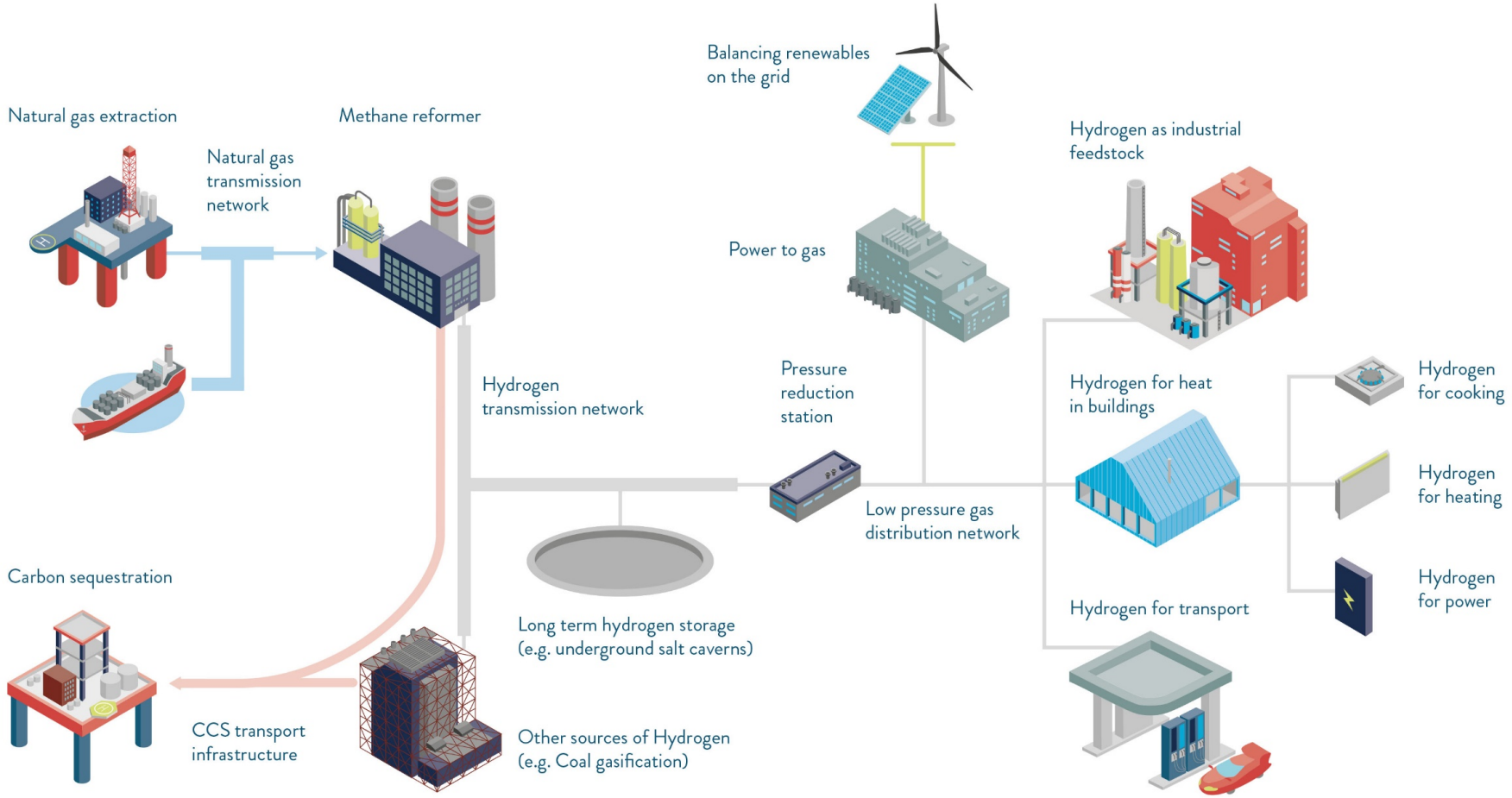
"Clean fuels such as hydrogen and bioenergy could be used for transport, industry, and to heat our homes and businesses. We need to test how they work in the existing gas network, whether they can fire industrial processes, and how they could be used in domestic appliances."

Clean Growth Innovation Challenges - Clean Growth Strategy

Decarbonisation pathways

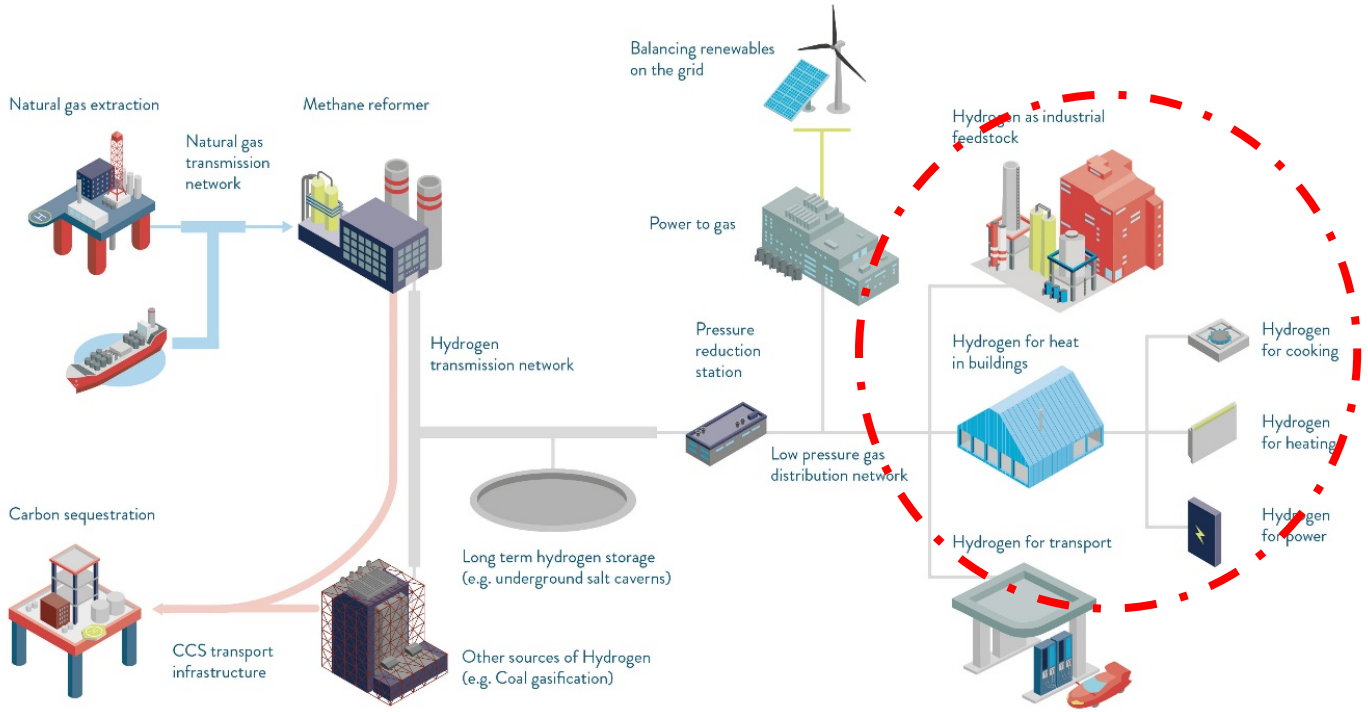
- Renewables
- Nuclear
- Carbon capture and storage
- Hydrogen as a replacement for methane

Conceptual view of a hydrogen system

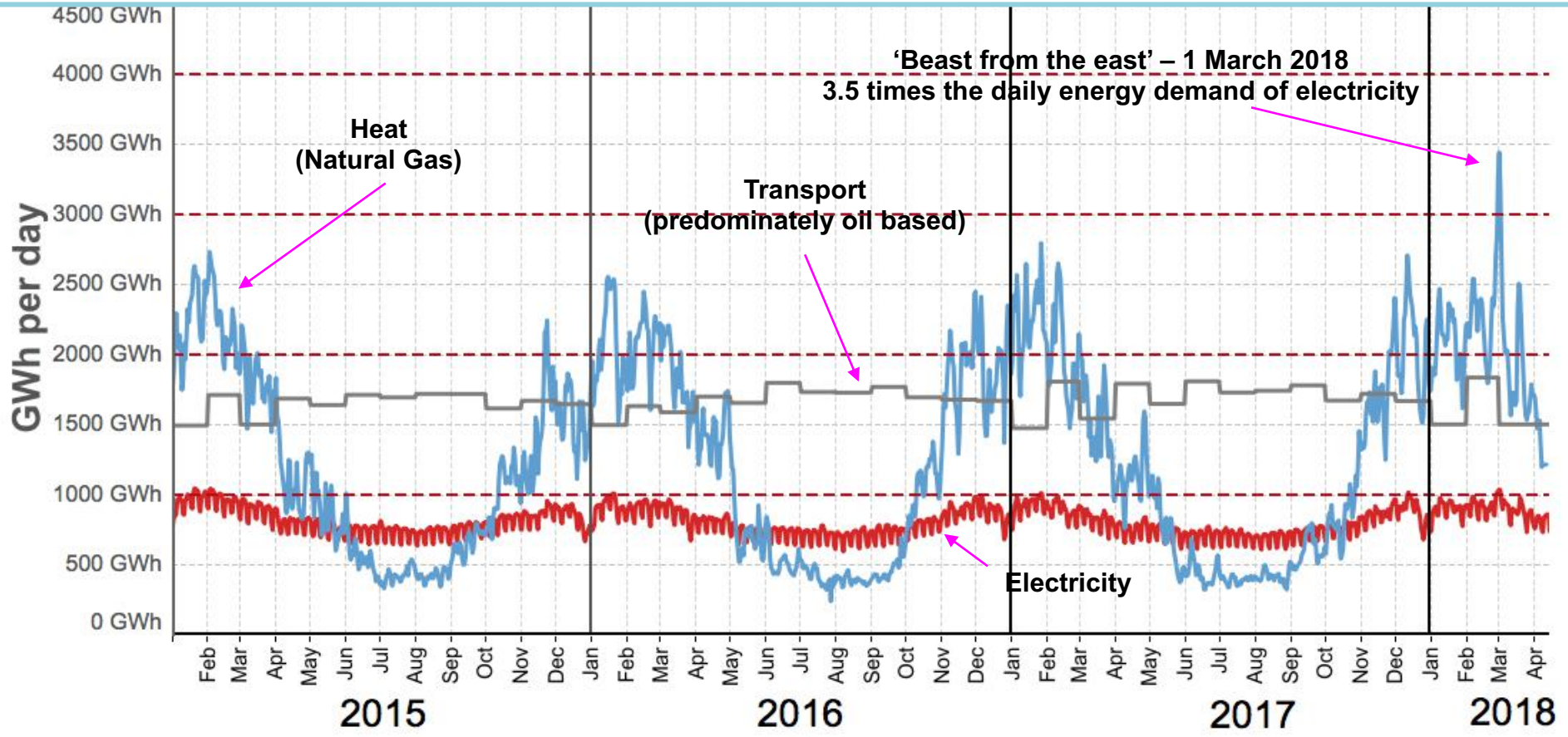


Hydrogen innovation programmes

- **BEIS Hy4Heat – Hydrogen end use**
- H21 – 100% hydrogen in the distribution network
- HyNet – End to end demonstration
- H21 – North of England feasibility study
- HyDeploy – Hydrogen blending 20%
- H100 – Hydrogen end use (new build)
- DfT – Hydrogen for transport
- BEIS – Industrial fuel switching



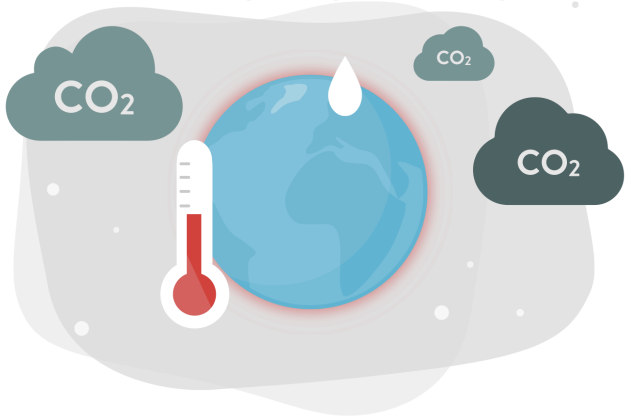
The challenge – UK energy demand



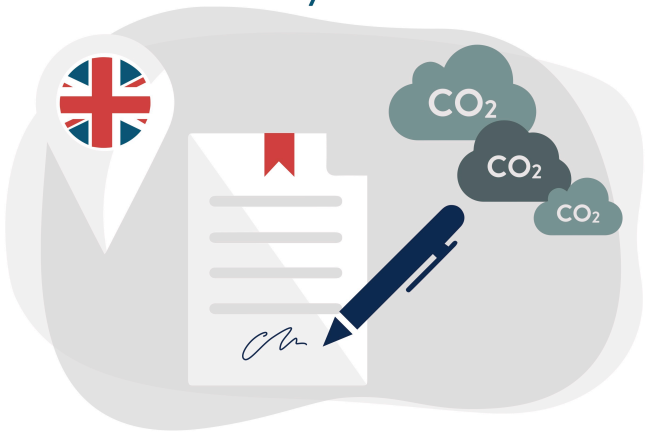
Charts can be downloaded from http://bit.ly/energycharts

by Dr Grant Wilson grant.wilson@sheffield.ac.uk

Carbon Dioxide is contributing to climate change and global warming

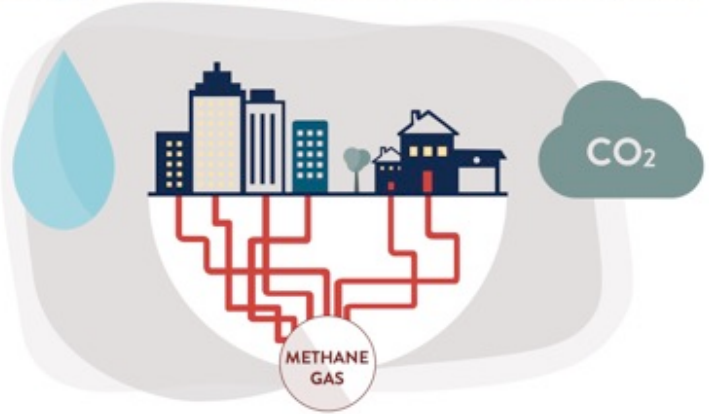


The UK government has a 2050 target to **reduce carbon emissions by 80%** of 1990 levels



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

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



Department for Business, Energy & Industrial Strategy

Hy4Heat

Hy4Heat mission

To establish if it is technically possible, safe and convenient to replace natural gas (methane) with hydrogen in residential and commercial buildings and gas appliances

This will help enable the government to determine whether to proceed to a community trial of hydrogen

ARUP+

KIWA | EMBERS | YOENERGY
PROGRESSIVE ENERGY

Department for
Business, Energy
& Industrial Strategy

Hy4Heat

Photo: Roger Wollstadt

Communications example from circa 1960, Towns Gas conversion to Natural Gas (methane)

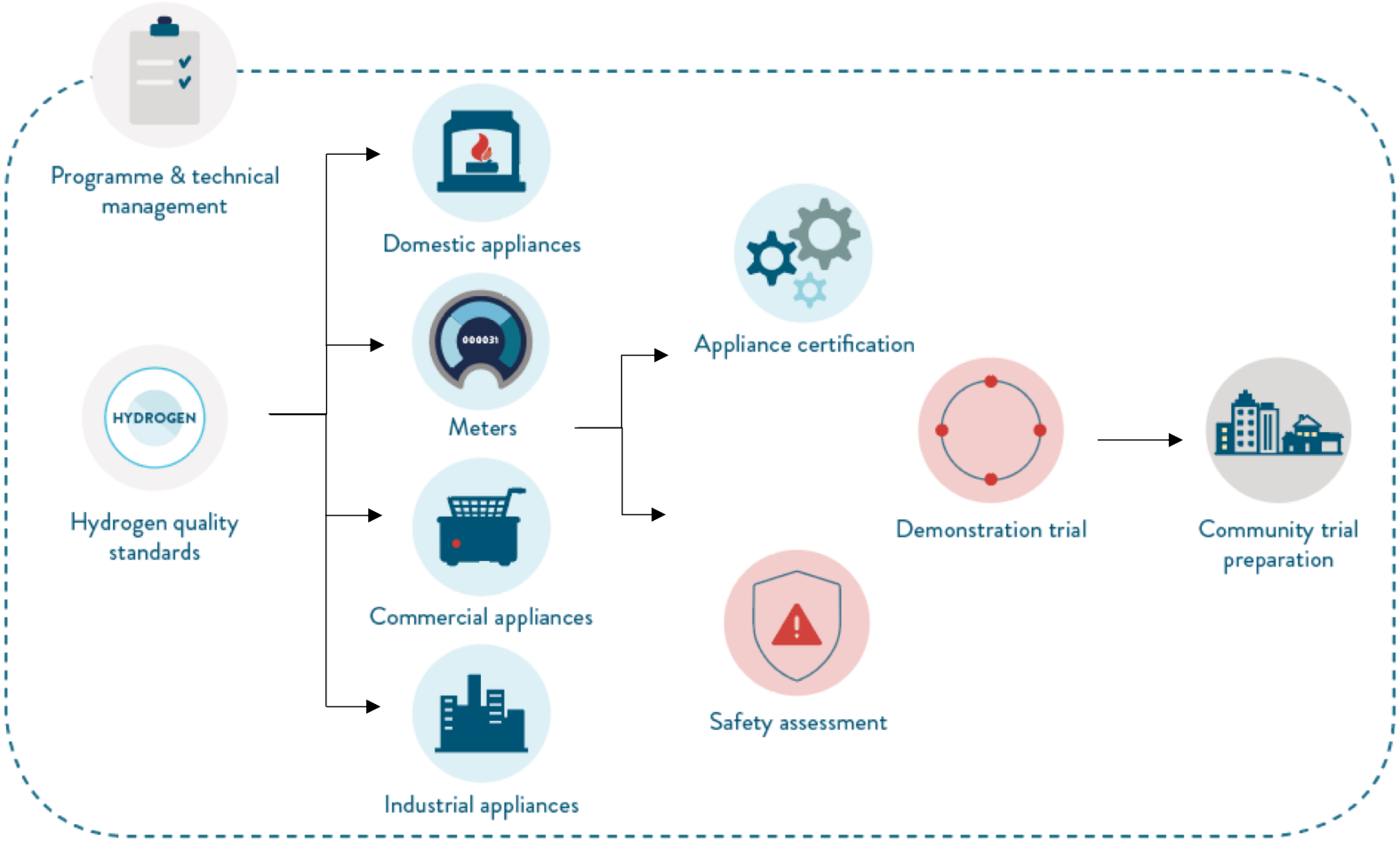
Will it cost me anything?

Will it be inconvenient?

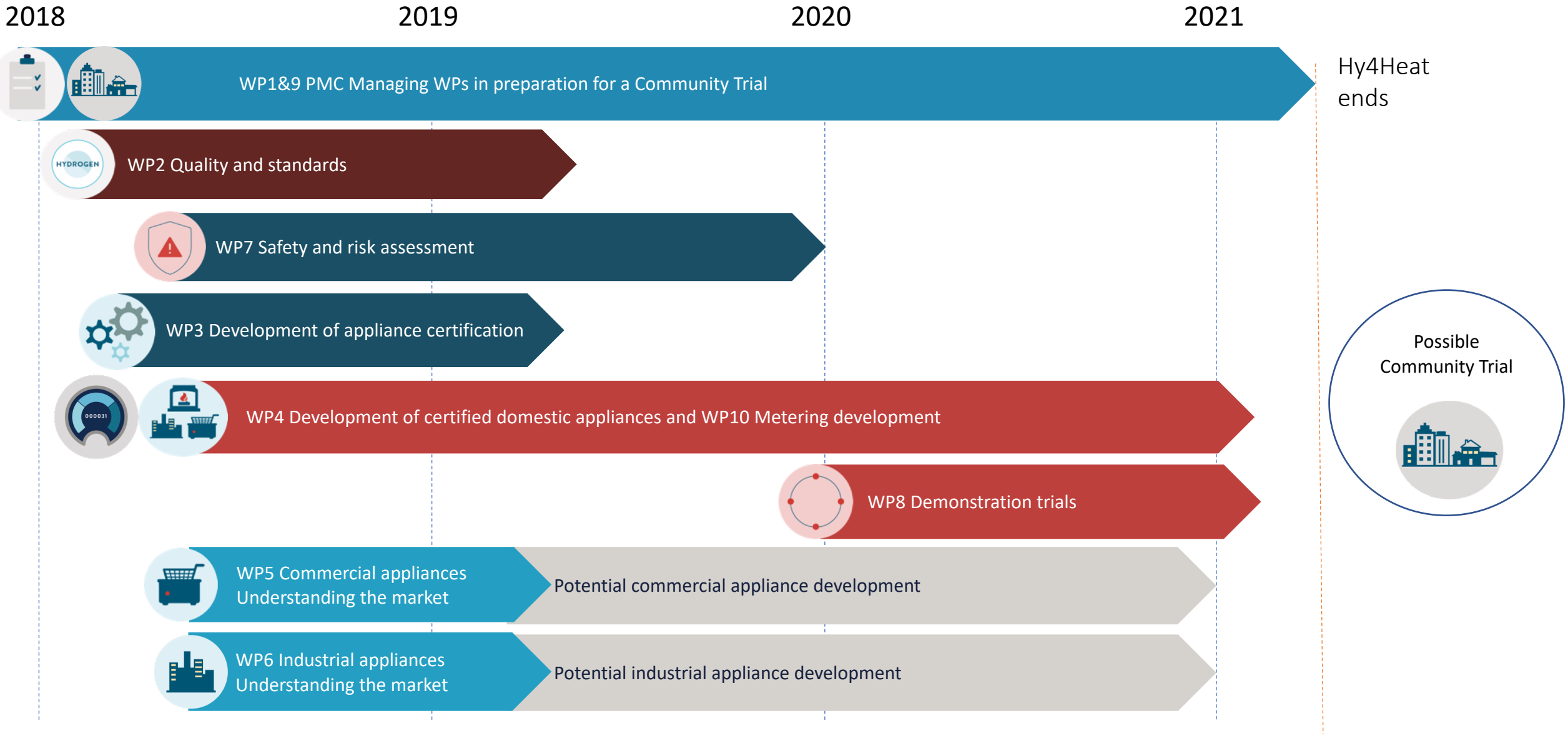
How long will it take?

North Western Gas Board

Hy4Heat programme work packages



Hy4Heat programme timeline overview



Hydrogen quality & standards (WP2)

- IGEM review and revise existing relevant standards:
  - Materials
  - Leakage rates
  - Ventilation
  - Installation
  - Air supply, etc.
- DNV GL - Purity & Colourant
- NPL - Odorant

IGEM
Institution of
Gas Engineers & Managers

NPL

DNV·GL

Hydrogen appliance certification (WP3)

- Hydrogen appliances to be certified under GAR (Gas Appliance Regulation)
- BSI (British Standards Institute) developing PAS 4444

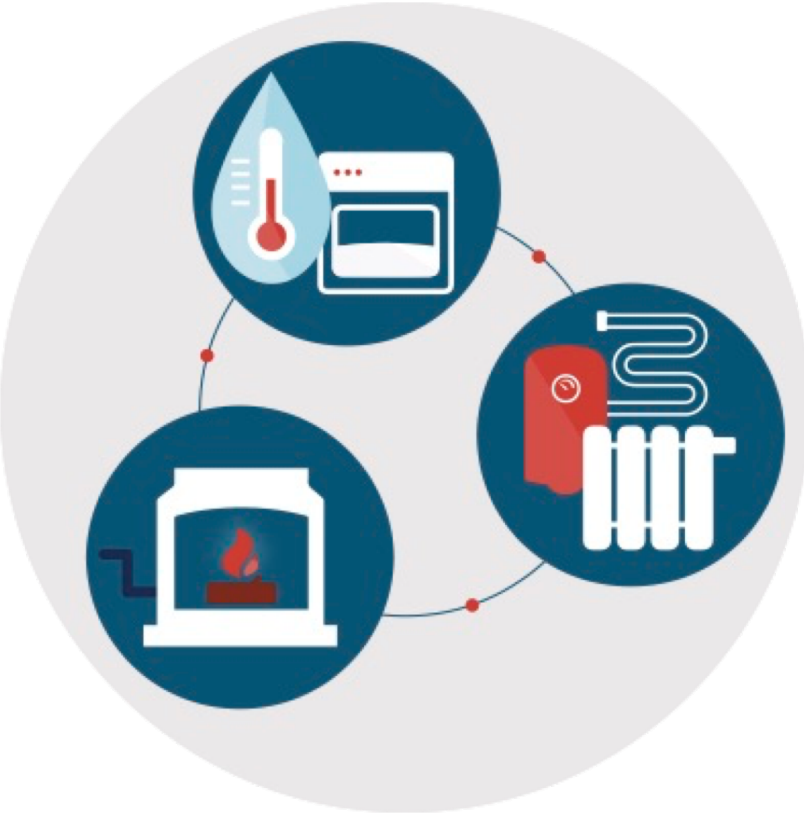
bsi.

Safety assessment (WP7)

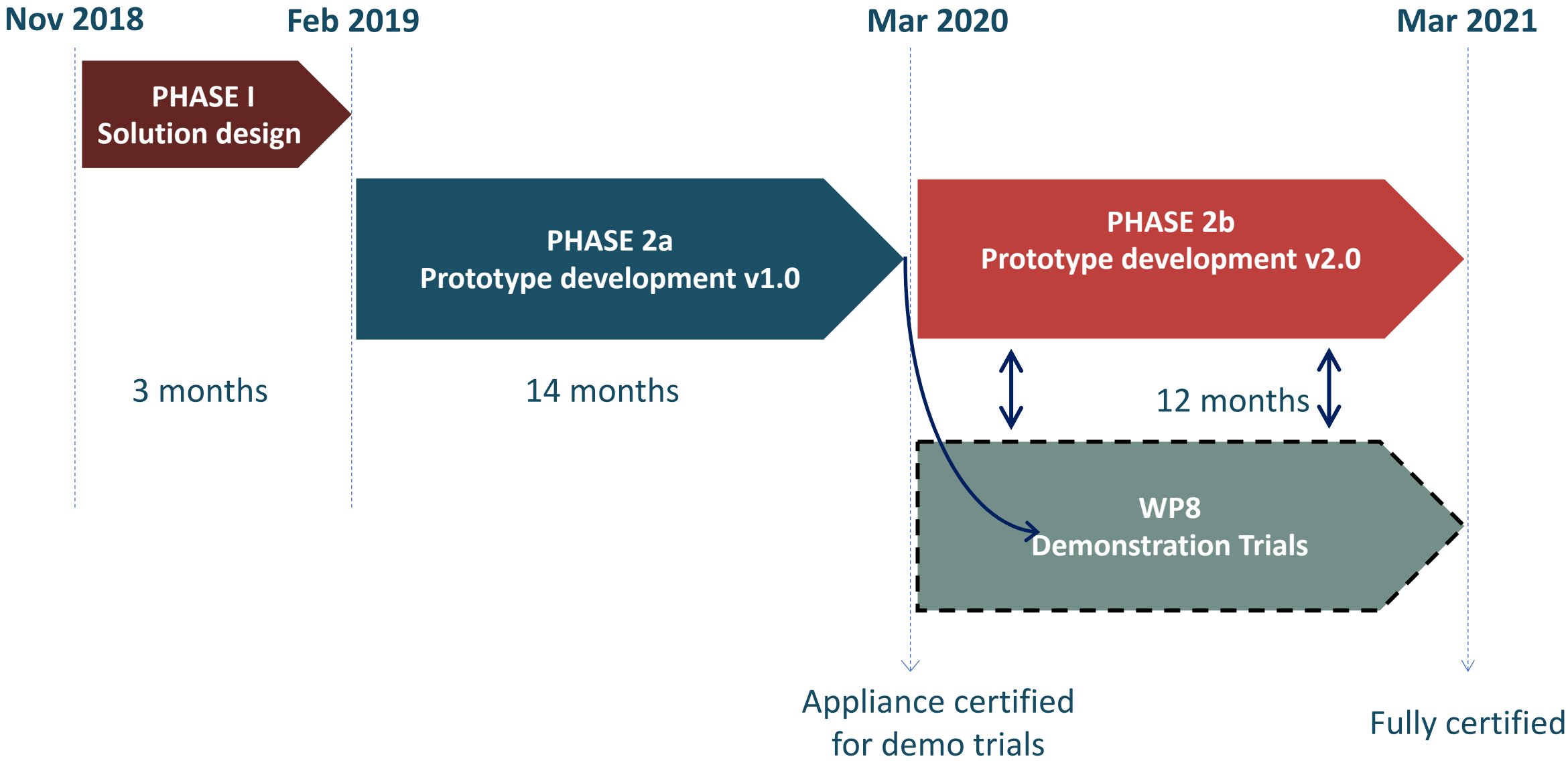
- Comparing hydrogen with natural gas
- Building on knowledge and evidence that exists already e.g. collaborating with the GDNO's
- OJEU procurement underway further experimental testing
- HSE engagement

Domestic hydrogen appliances (WP4)

- Need to develop appliances to enable hydrogen end use:
  - gas boilers
  - gas cookers
  - gas fires
  - innovative hydrogen appliances
- Approach broadly ‘like for like’ and ‘hydrogen ready’ replacement
- SBRI Pre-Commercial Procurement innovation competition currently underway



Phased competition structure – Domestic Appliances



Hydrogen meters (WP10)

- Need to develop hydrogen meters to enable hydrogen end use
- Fiscal and smart enabled meters
- Approach broadly ‘like for like’ and ‘hydrogen ready’ replacement
- OJEU Innovation Partnership procurement currently underway

Commercial / Industrial appliances & equipment (WP5 / WP6)

- Market study into commercial and industrial sectors
- Contracts awarded to:
  - ERM (WP5)
  - Element Energy (WP6)
- Reports by spring 2019

ERM

elementenergy

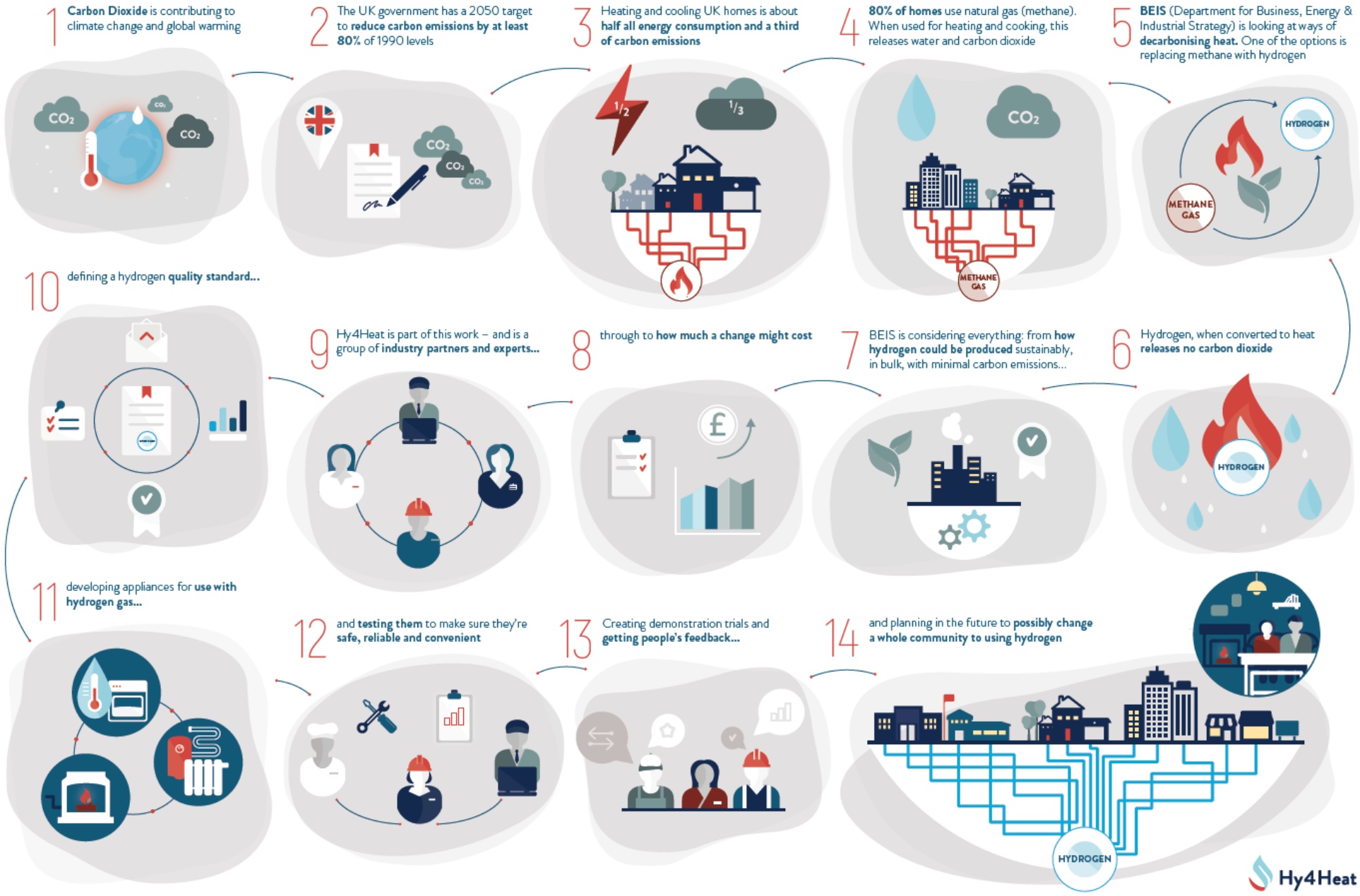
Demonstration trial (WP8)

- Unoccupied demonstration trial
- Using prototypes developed in work package 4 & 10

Potential community trial (WP9)

- Planning and preparation necessary for a potential community trial
- Proposed to run from 2021 onwards

The Hy4Heat Programme



www.hy4heat.info

@Hy4Heat

Summary

- Decarbonising heat is arguably the greatest challenge in meeting UK climate change targets
- There are a range of practical programmes and projects underway to provide evidence required
- It’s difficult to envisage a whole energy system solution that wouldn't involve hydrogen in some areas