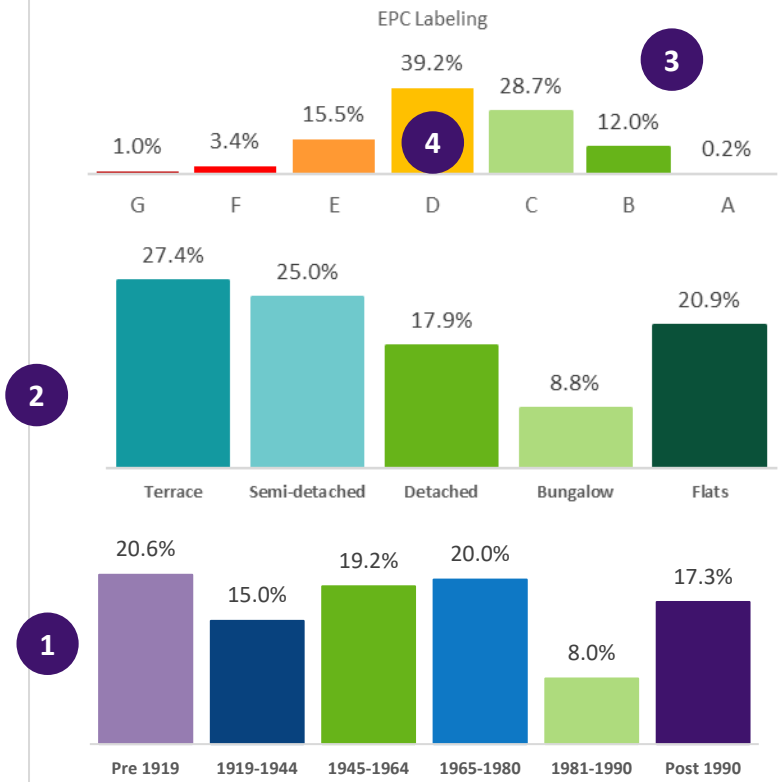
The challenges for the housing sector and how low carbon technology can help

Alex Thomas – Key Account Director, Worcester Bosch

New Technologies Impact

UK Housing Stock

Housing Stock overview Existing Build UK



Ministry of Housing, Communities & Local Government

5

- **Renovation**:
  - RHI
  - Clean Homes Grant
  - Regional/Local initiatives
- **New Build**
  - Future Homes Standard

KEY TAKE AWAYS

1. UK has a relatively old housing stock with an average size of 95m2
2. Over half of the houses are Terraced houses or Semi-detached houses
3. Looking at the EPC, only 40.9% has ABC labeling and therefore currently have HP potential.
4. A large D section in housing suggests a potential exists for Hybrid HP
5. Change in legislation & Grants drive HP sales. Future Homes Standard in 2025 for NB main driver

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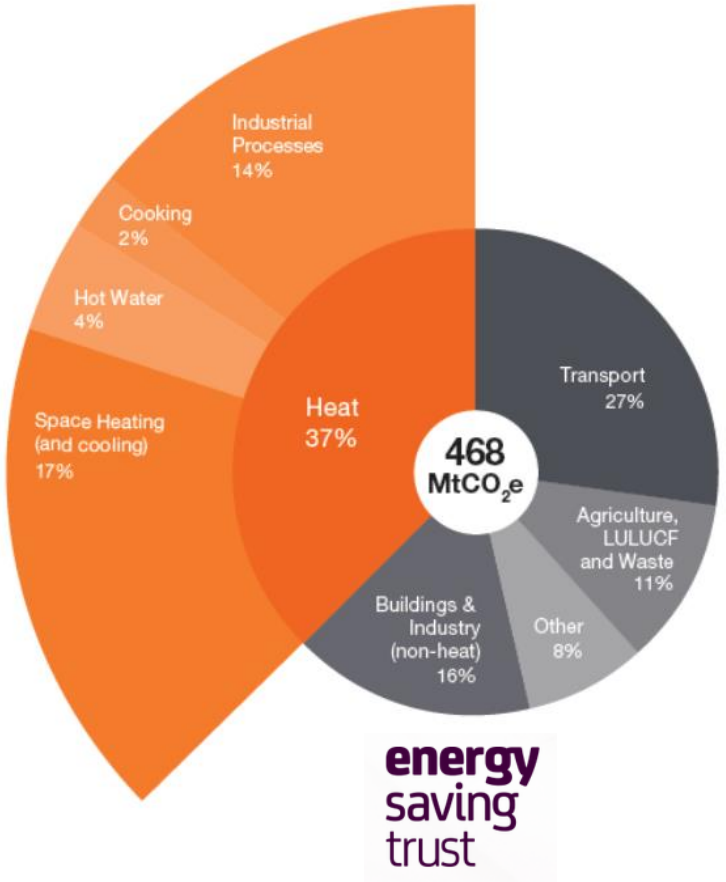
UK Energy Mix

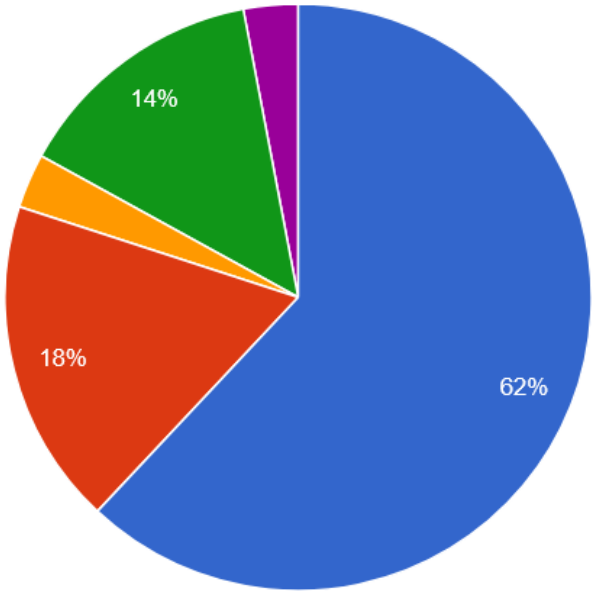
The Carbon Challenge



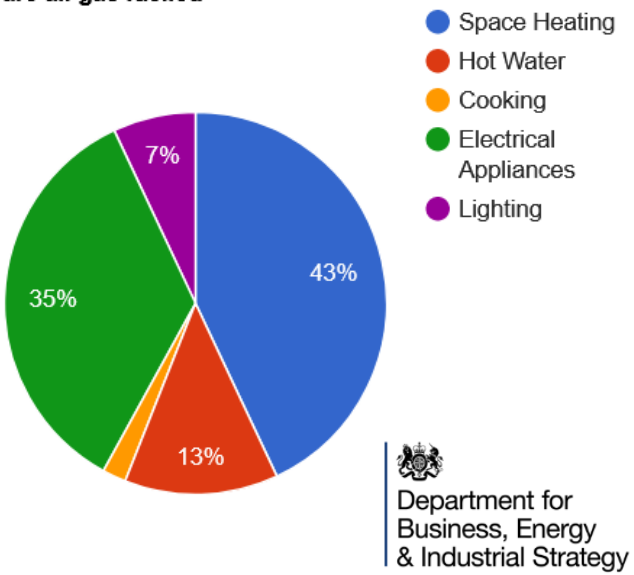
energy saving trust

Department for Business, Energy & Industrial Strategy

Energy use in the average UK Household



Energy cost assuming heating, hotwater and cooking are all gas fuelled



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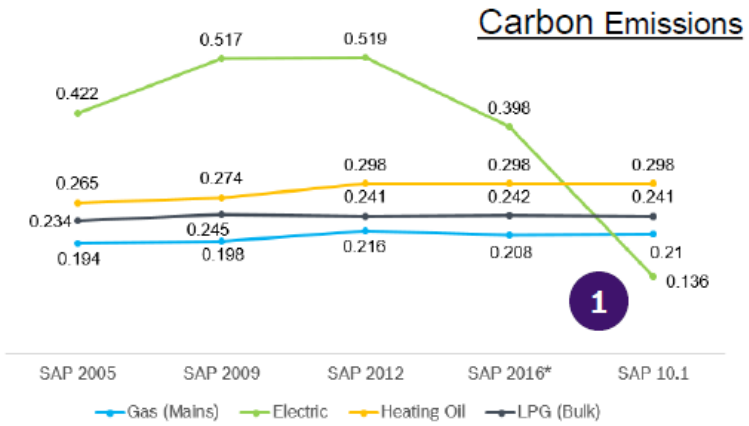
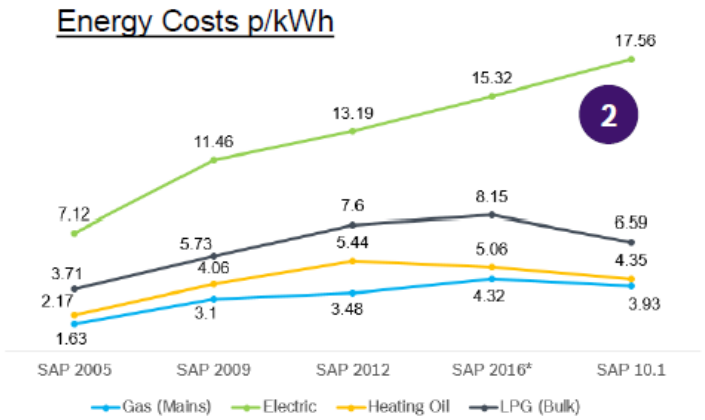
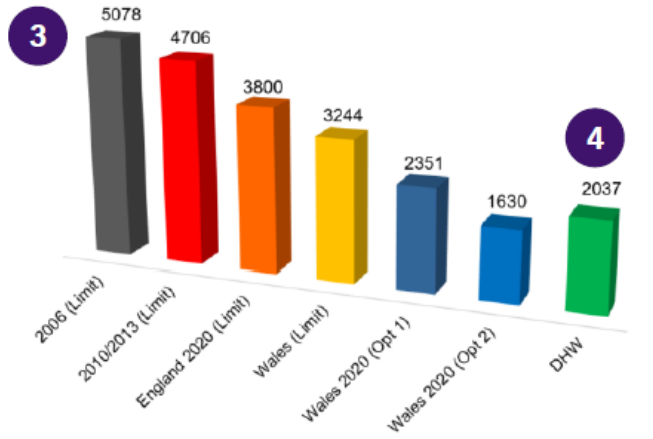
Carbon Emissions (SAP) & Energy cost







Space Heating Requirement (kWh/year)

KEY TAKE AWAYS

1. The carbon emission factor for electricity will fall significantly in the new version of SAP
2. However the energy cost of electricity will still be much more expensive than natural gas
3. Fabric improvements will result in reduced space heating demand in dwellings
4. In some cases DHW energy requirements could become greater than the space heating

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Heat and Buildings Strategy Oct 2021

Department for Business, Energy & Industrial Strategy

The Government sets out its ambition that all new heating systems installed from 2035 will be low carbon

- 30m buildings repsonsible for 30% of emissions.
- 5 principles for decarbonisation of heat
- Ambition to end Fossil fuel boilers by 2035
- Heat Pump first approach
- Boiler upgrade scheme - £450m or £5000 per private install
- 600,000 Heat Pumps every year from 2028 in UK
- Market based mechanism consultation – 12th Jan
- Biomass Update
- Hydrogen investment – seeking 9000 jobs for improved economy?

NET ZERO EFFORTS

INNOVATION

£ FAIR & AFFORDABLE

BESPOKE NEEDS

WAIT ON HYDROGEN

BOSCH

Delivering our 600,000 heat pumps per year by 2028 target

We will need to **grow heat pump deployment to 600k** per year by 2028 to remain on track for net zero. To support this, we are:

- **Futureproofing new buildings** through the Future Homes Standard and Future Buildings Standard
- **Supporting households** who want to make the switch through the Boiler Upgrade Scheme from 2022
- **Ensure heat pumps are no more expensive to buy and run** than gas boilers through energy price rebalancing and upfront cost reduction
- Supporting technology improvement, through the **Heat Pump Ready innovation programme**
- Encouraging **UK manufacture** and **installer upskilling**
- Working with key stakeholders to **ready the electricity network**

Through this long term policy mix we aim to:

- Drive sustainable long term **growth** in clean heat supply chains and lay the groundwork for further heat pump market growth
- **Reduce the upfront cost** of installing a heat pump by 25-50% by 2025 and to parity with gas boilers by 2030 at the latest
- Support **new jobs** and create **~£2bn Gross Value Added** to UK economy
- Aiming for 30 fold increase in heat pumps are **manufactured in the UK** by 2028
- **Save nearly 200 MtCO2e** by 2037 in Carbon Budgets 5 and 6

Department for Business, Energy & Industrial Strategy

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BEYOND “NATURAL” GAS

The Guardian

Ban new gas boilers in UK from 2025 or risk missing net zero target, says CBI

Industry group says Britain's climate goals may be doomed without heating overhaul

The Telegraph

Gas boilers could be banned from all homes to ensure the UK meets carbon neutral target by 2050

Government to publish White Paper setting out 'bigger decisions' that UK has to make to meet the target

THE TIMES

Gas boiler ban: how much will it cost me for an eco-friendly alternative?

Everything you need to know about solar panels, heat pumps and hydrogen replacements

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Decarbonisation

A “Technology Neutral” approach

Hydrogen Ready Boilers

Heat Pumps

Hybrids

Heat Interface Units

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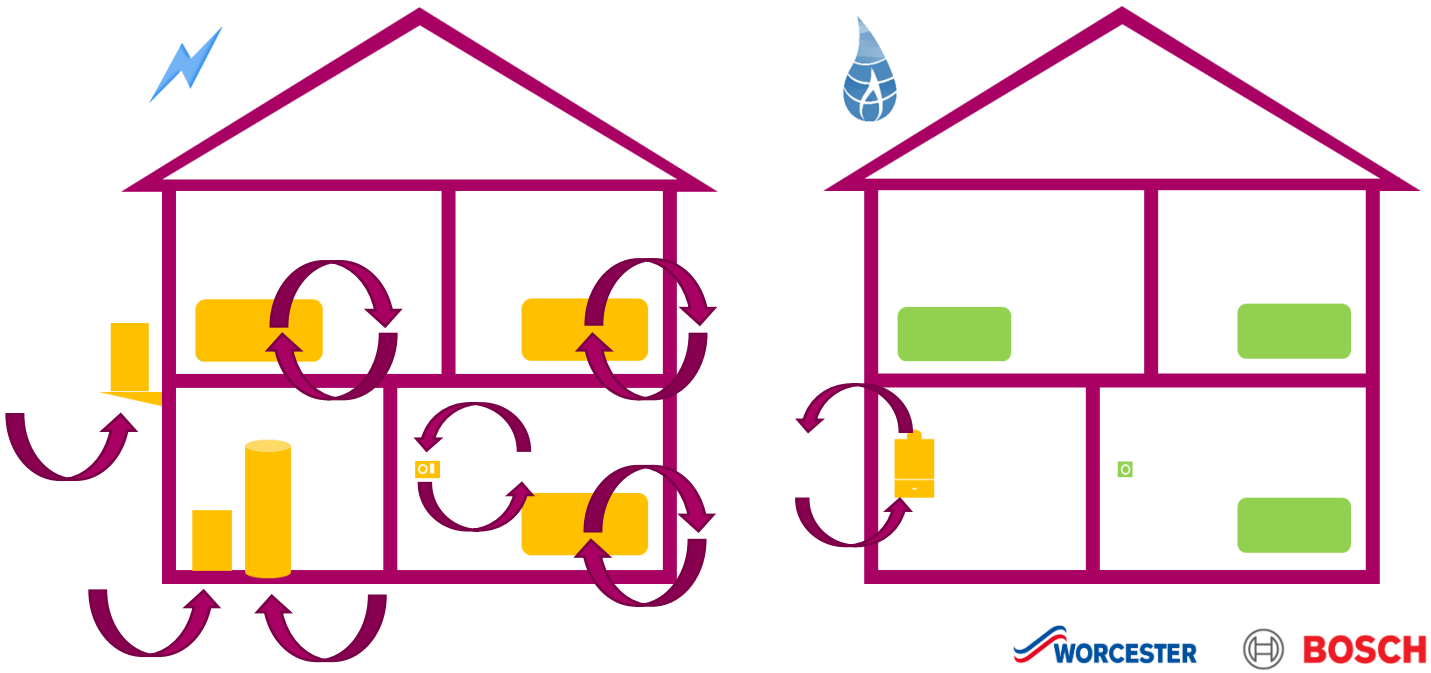
Hydrogen Ready
Zero-Carbon Boiler
WORCESTER
Bosch Group

Practical considerations for the Heating Industry

Why does the UK love boilers so much?

- Consider largest market segment – replacement
- Electrification (air-source heat pump) requires:
  - Fabric improvement
  - New indoor appliance
  - New outdoor unit
  - Reinstatement of water tank
  - Possible New heat emitters (radiators)
  - New control (adapted behaviour)
- Gas requires:
  - New like-for-like indoor appliance



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Hydrogen

Hydrogen Heat Projects

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Hydrogen Heat Projects

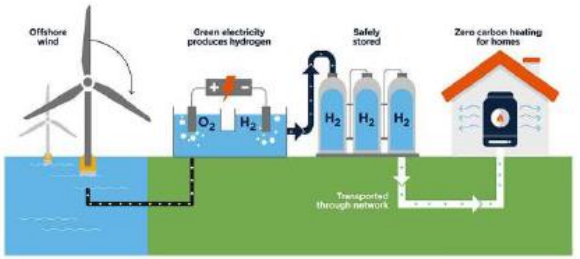
Hydrogen investment.
What is Hydrogen Blend?

Hydrogen blend ready

GAS GOES GREEN

Hydrogen Trials With Government (20% & 100% Mix)

HyDeploy: UK Gas Grid Injection of Hydrogen in Full Operation



20% H

TONNES OF CARBON

"BEIS IS COMMITTED TO WORKING WITH THE HEALTH AND SAFETY EXECUTIVE

"TO ENABLE UP TO 20 PER CENT HYDROGEN BLENDING ON THE DISTRIBUTION NETWORKS BY 2023."

BEIS ENERGY WHITE PAPER"

THE EQUIVALENT TO

2.5M CARS OFF THE ROAD

1. www.energynetworks.org/newsroom/hydrogen-blending-what-is-it-and-why-does-it-matter

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Hydrogen Home - Gateshead

Manufacturers Days throughout 2022

Hydrogen Home

Northern Gas Networks

Cadent
Your Gas Network

Department for Business, Energy & Industrial Strategy

GAS GOES GREEN


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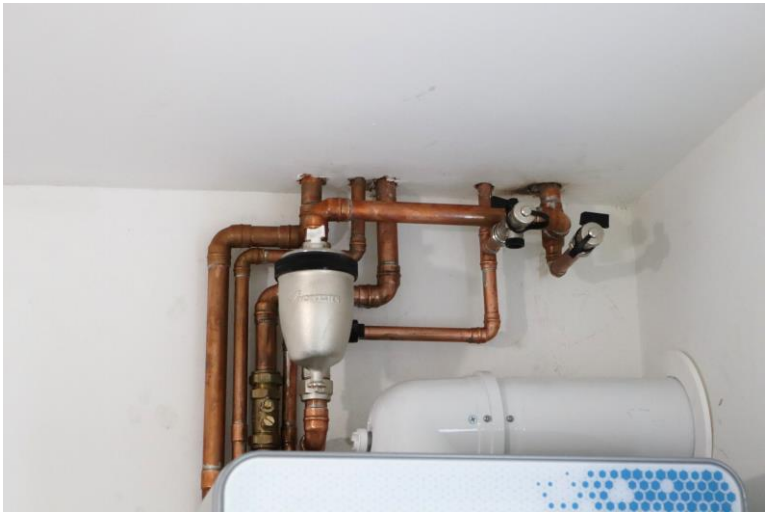
Hydrogen Ready
Zero-Carbon Boiler




Boiler status
Boiler 17:42 23.09.2020
80.0 °C
On
eco
Pressure:5.2bar
ok

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Heat Pump units – Air to Water

COP efficiency

CS7001iAW 5 ORE-S

Flow Temperature	SCOP (equivalent to SPF_3 SEPEMO SH only)
35	4.41
36	4.35
37	4.29
38	4.23
39	4.17
40	4.10
41	4.04
42	3.98
43	3.92
44	3.86
45	3.80
46	3.74
47	3.68
48	3.62
49	3.57
50	3.51
51	3.45
52	3.39
53	3.34
54	3.28
55	3.22

CS7001iAW 7 ORE-S

Flow Temperature	SCOP (equivalent to SPF_3 SEPEMO SH only)
35	4.77
36	4.70
37	4.64
38	4.57
39	4.51
40	4.45
41	4.38
42	4.32
43	4.25
44	4.19
45	4.12
46	4.05
47	3.98
48	3.91
49	3.85
50	3.78
51	3.71
52	3.64
53	3.57
54	3.50
55	3.43

CS7001iAW 9 ORE-S

Flow Temperature	SCOP (equivalent to SPF_3 SEPEMO SH only)
35	4.57
36	4.53
37	4.48
38	4.43
39	4.39
40	4.34
41	4.29
42	4.25
43	4.20
44	4.15
45	4.10
46	4.04
47	3.97
48	3.90
49	3.84
50	3.77
51	3.70
52	3.64
53	3.57
54	3.50
55	3.44

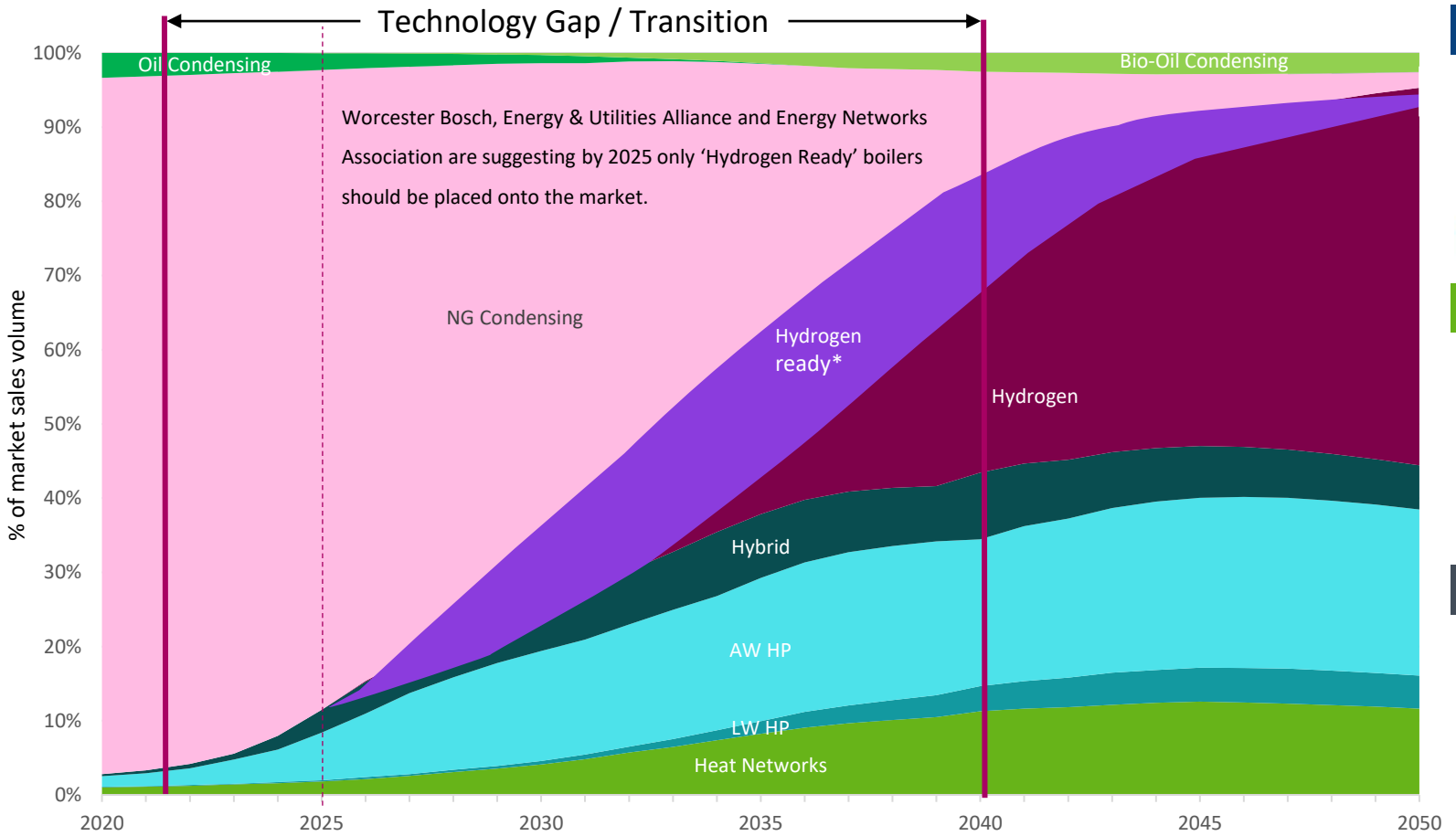
CS7001iAW 13 ORE-S

Flow Temperature	SCOP (equivalent to SPF_3 SEPEMO SH only)
35	4.60
36	4.53
37	4.46
38	4.40
39	4.33
40	4.27
41	4.20
42	4.13
43	4.07
44	4.00
45	3.93
46	3.88
47	3.82
48	3.77
49	3.71
50	3.65
51	3.60
52	3.54
53	3.49
54	3.43
55	3.38

New Technologies

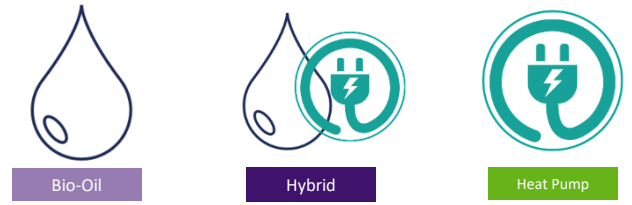
Primary Heating Technology Gap/Transition - UK

* Hydrogen Ready = NG Condensing boilers prepared for simple conversion to Hydrogen

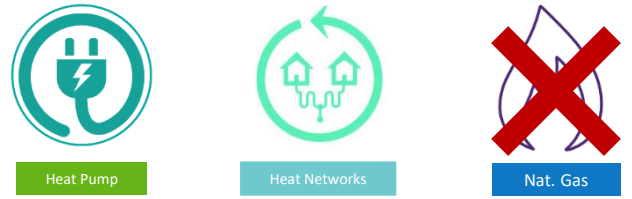


Replacement ON-Mains Gas

Replacement OFF-Mains Gas



New Build



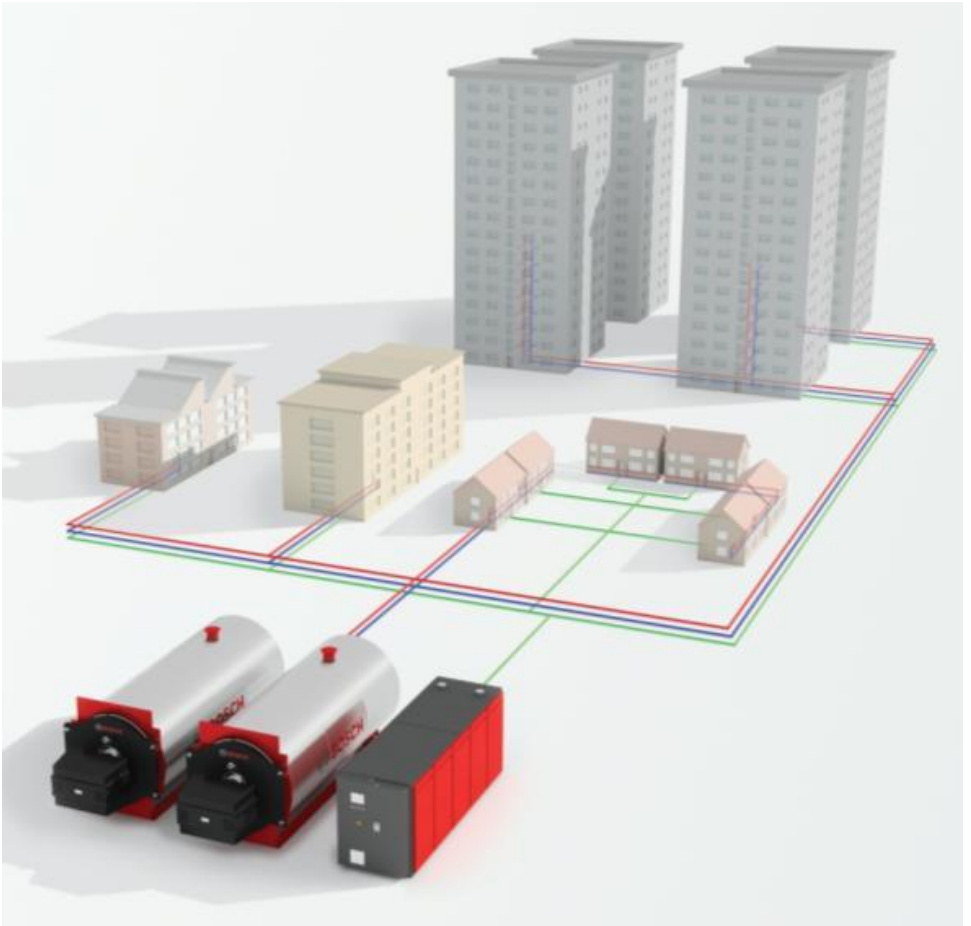
UK TECHNOLOGY MIX TO DIVERSIFY AS DECARBONISATION TAKES HOLD

MARKET VALUE TO INCREASE AS MARKET DECARBONISES

Heat Networks and HIU’s

High density heating

Government ambition to achieve the target set by the CCC of 18% of UK heating demand to be met by district heating by 2050.



BESA BUILDING ENGINEERING SERVICES ASSOCIATION

Manufactured in the UK

Heat Interface Units (HIU)

The future of district heating

BOSCH Invented for life

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Challenges

Government Commitment

Supply chain partners and their role with Gov and industry.

Beyond “Natural” Gas

Bosch thermotechnology “White Paper”

A balanced sensible approach with bespoke options.

Meet the team

Worcester Bosch's R&D team have a history of developing innovative technology and products.

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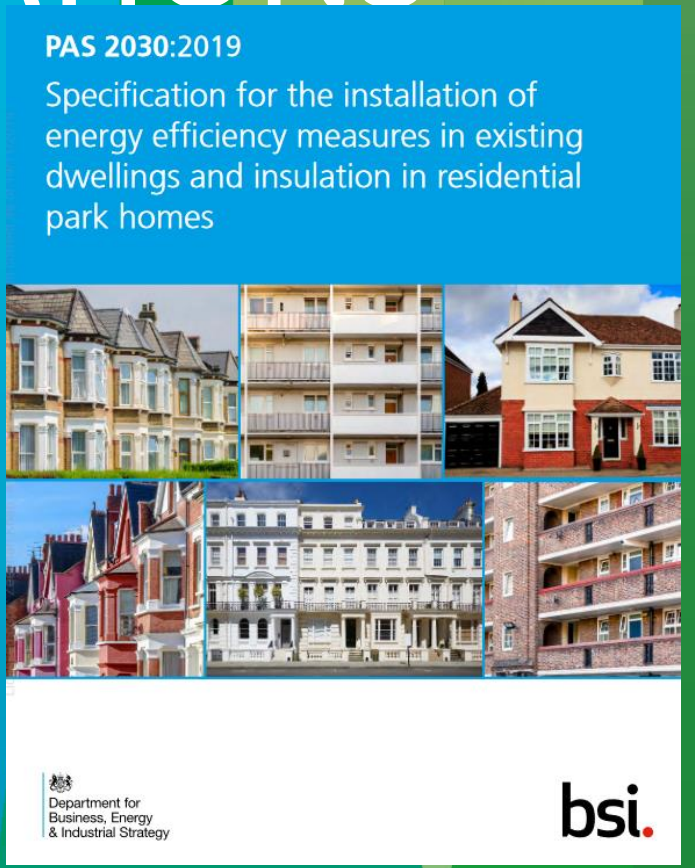
New Technologies – What Next? An agnostic approach

SKILLS AND QUALIFICATIONS

MCS CERTIFIED

FIND A CONTRACTOR



TRUSTMARK
Government Endorsed Quality

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Skills and Qualifications - Next Generation Engineers

UK Profile (2017)

22.5m approx. **Gas** Heated Homes in UK

74k Companies on Gas Safe Register

128,000 Engineers

84% work in the Domestic sector

Each Gas Safe Engineer:

16 Boiler Installations per year

199 Services per year

TT/SGB-

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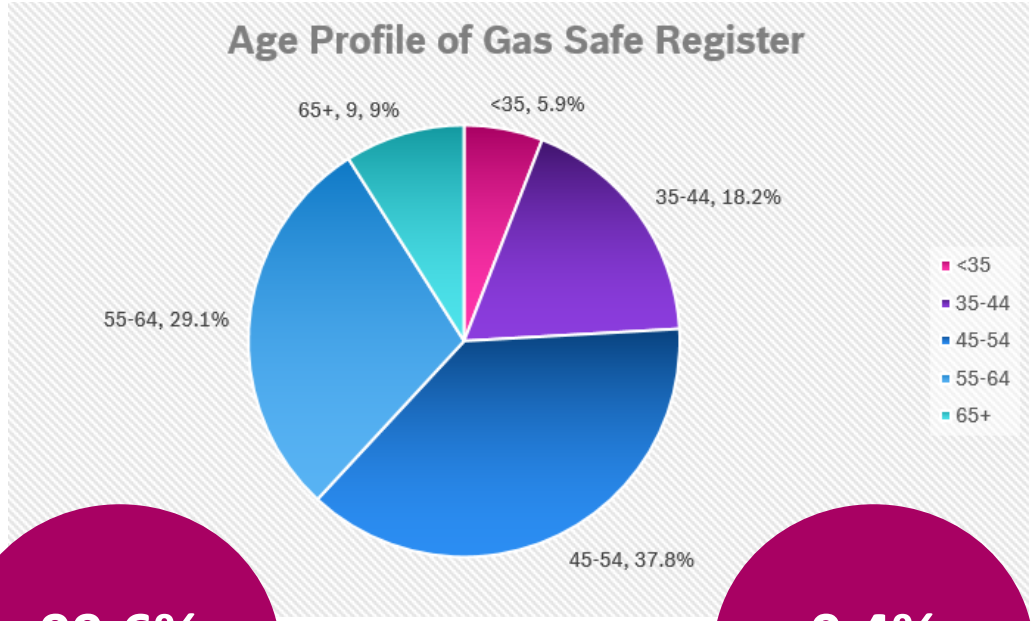
Next Generation Engineers

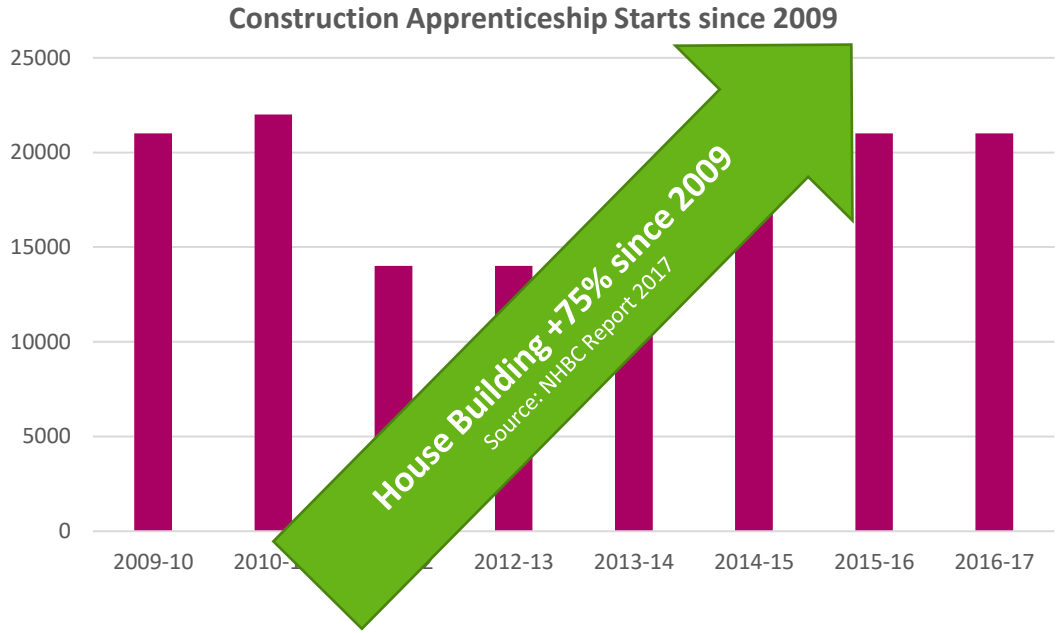
Current Engineer Profile



99.6% Male

0.4% Female

Source: Gas Safe - Decade Review, Nov 2017

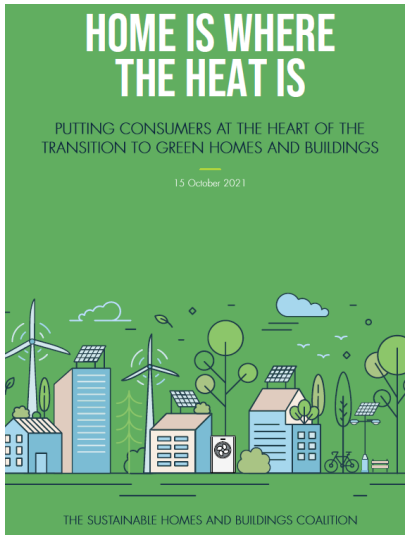


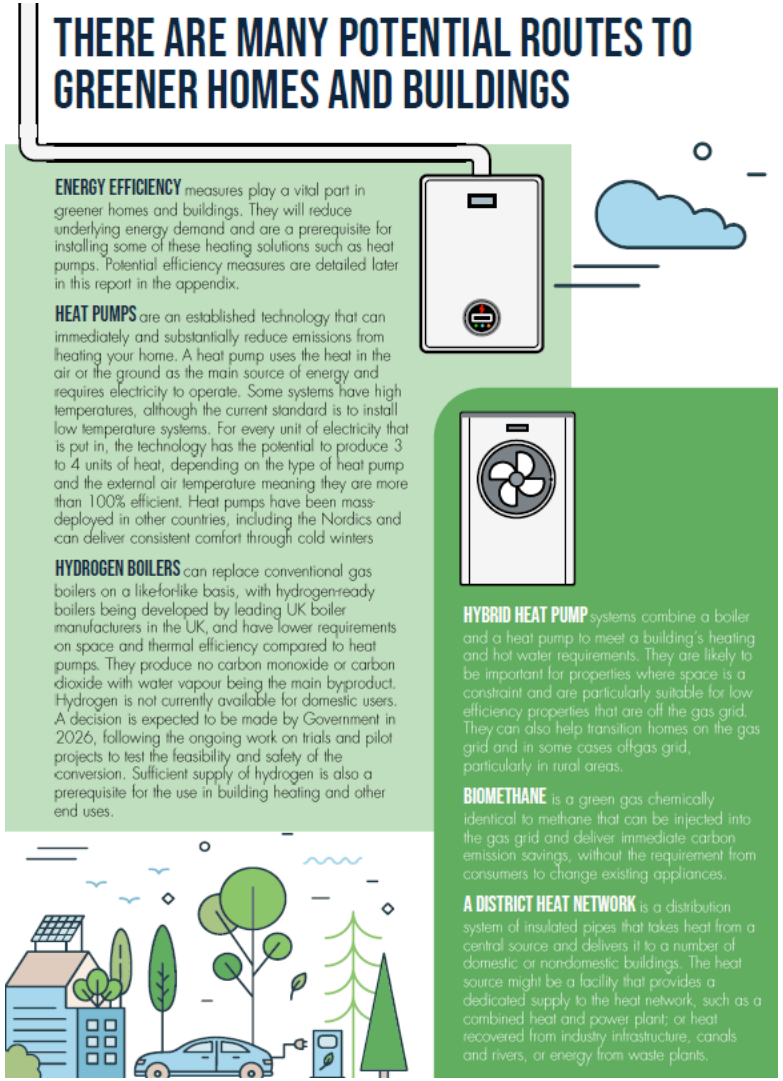
Source: House of Commons – Apprenticeship Statistics, July 2018

Consumer Report

Home is where the heat is.

- Technology Type
- Building type and age
- Opportunity to educate & engage
- Consumer behaviour
- Consumer personas & their journeys
- Gov, industry & value chain
- Working Together





THANK YOU

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