

# Social barriers to the domestic hydrogen transition: Gauging public preferences for UK policymaking

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## Introduction

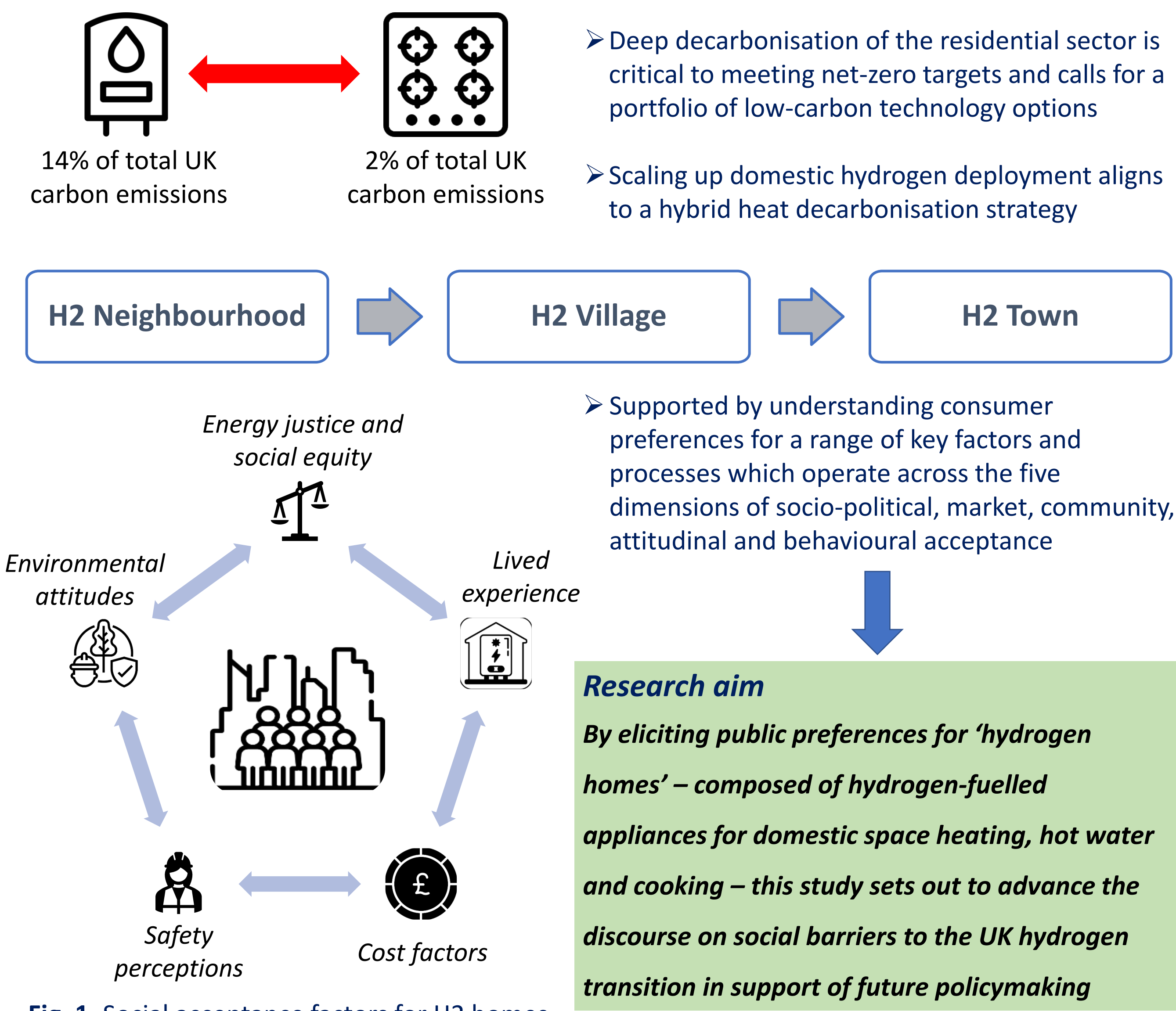
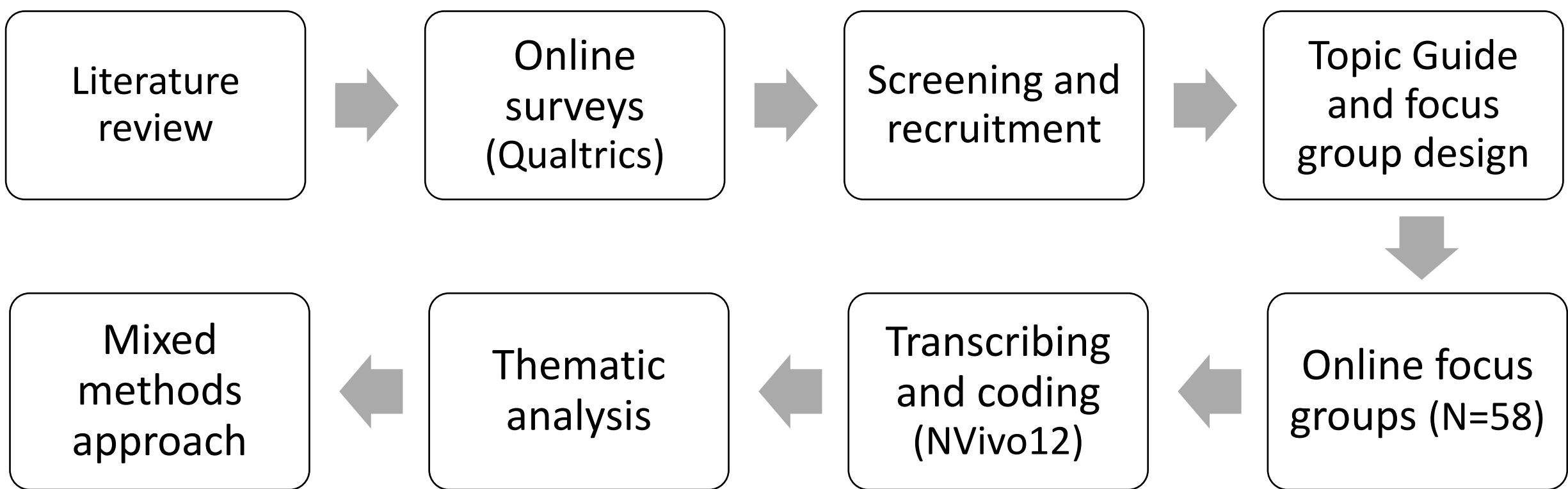


Fig. 1. Social acceptance factors for H2 homes

## Research design



Focus Group category and sample size
Moderate interest in renewable energy (RE) and some willingness to join a RE community <b>N=5 (Pilot group)</b>
Strong interest in RE and desire to join a RE community <b>N=6</b>
Owners of solar PV panels and smart devices <b>N=11</b>
Engaged in environmental issues <b>N=12</b>
Living in industrial cities/towns <b>N=5</b>
Facing fuel poverty or high levels of fuel stress <b>N=13</b>
Baseline group <b>N=6</b>

Table 1. Focus group category and sample size

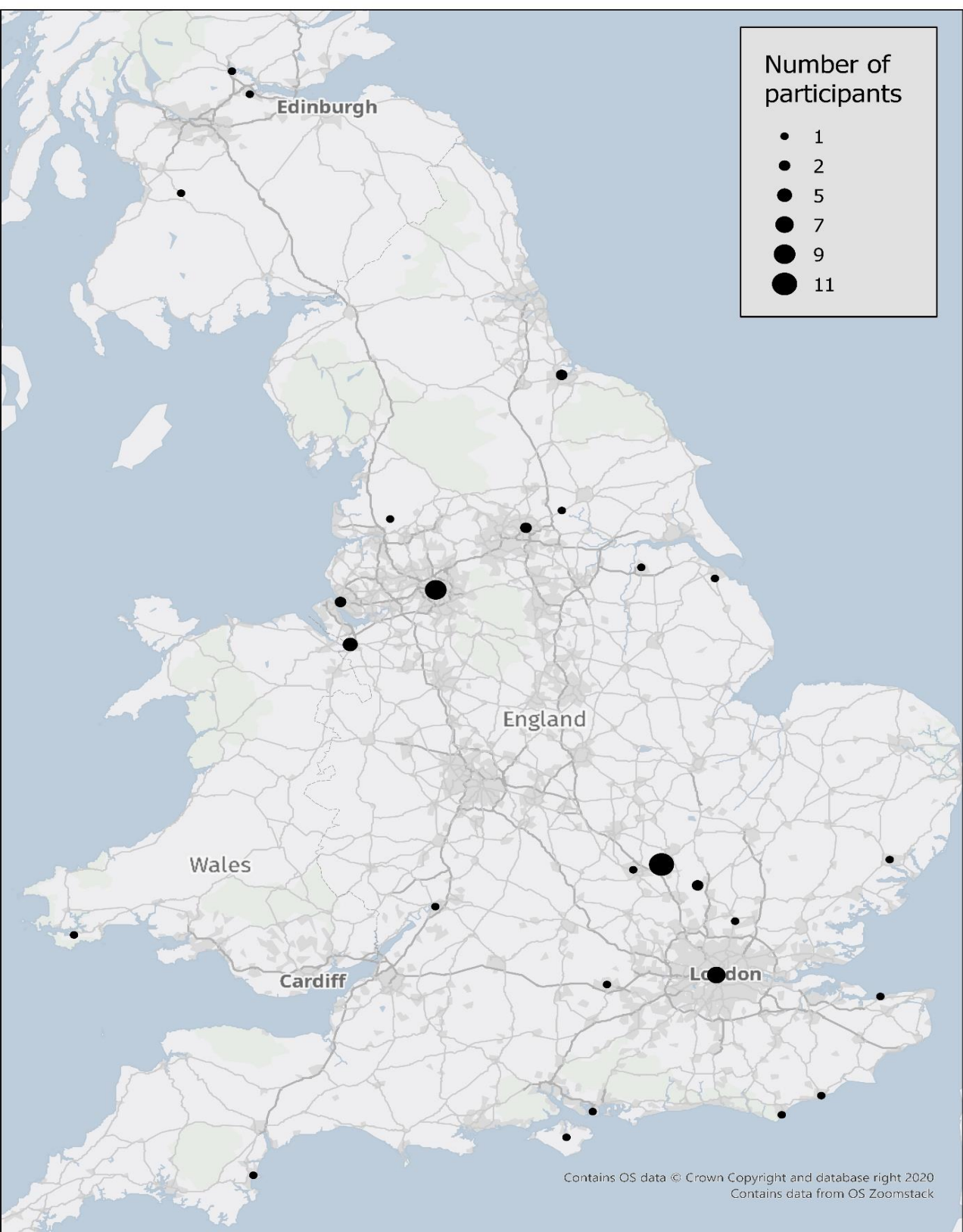


Fig. 2. Distribution of focus group participants (N=58)

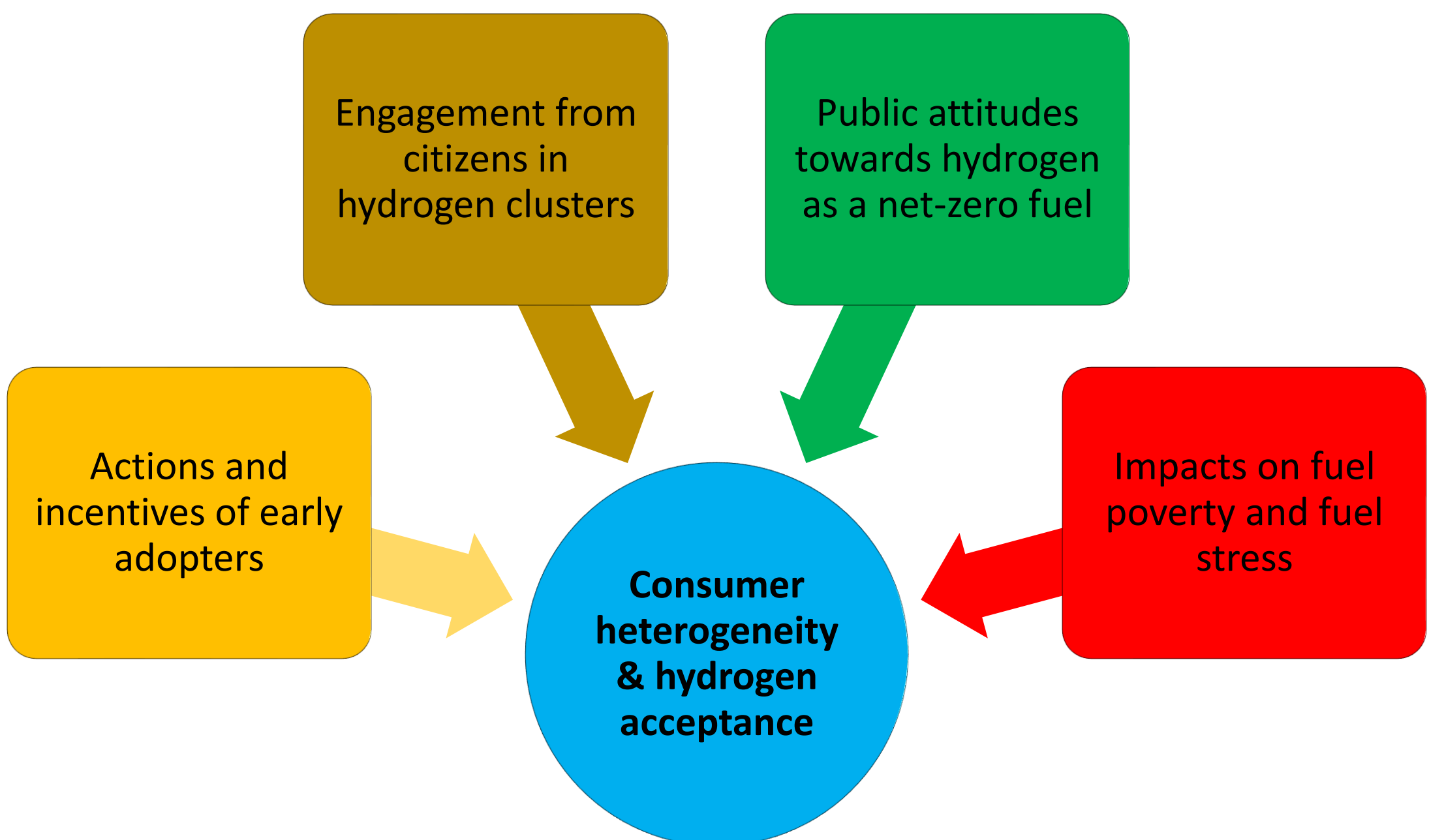


Fig. 3. Multi-group approach to hydrogen acceptance

- ✓ Accounts for the impacts of consumer heterogeneity on hydrogen acceptance
- ✓ Adds richness to examining the influence of key socio-structural variables
- ✓ Unpacks the 'social acceptance matrix' for hydrogen homes across key dimensions

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## Results

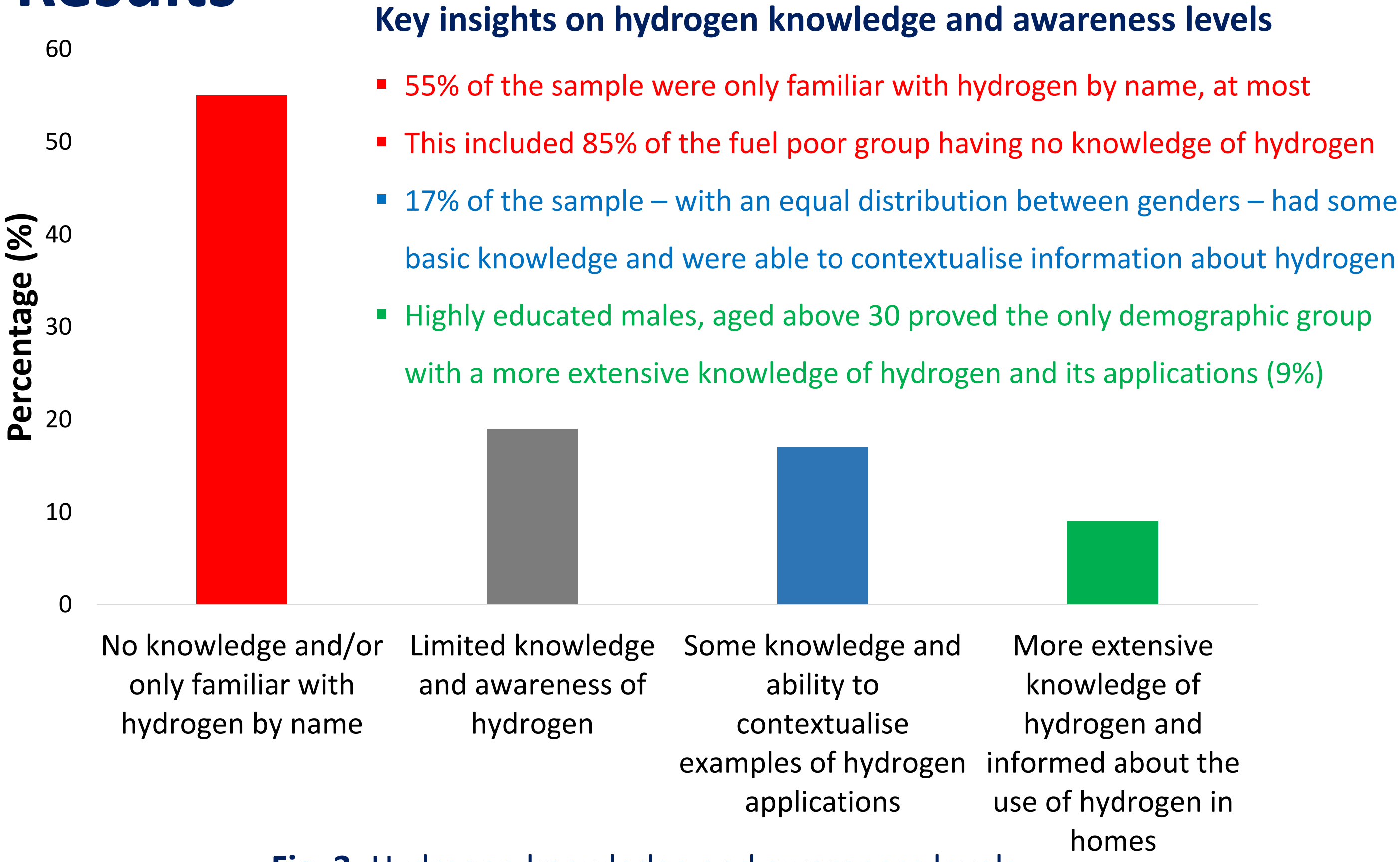


Fig. 3. Hydrogen knowledge and awareness levels

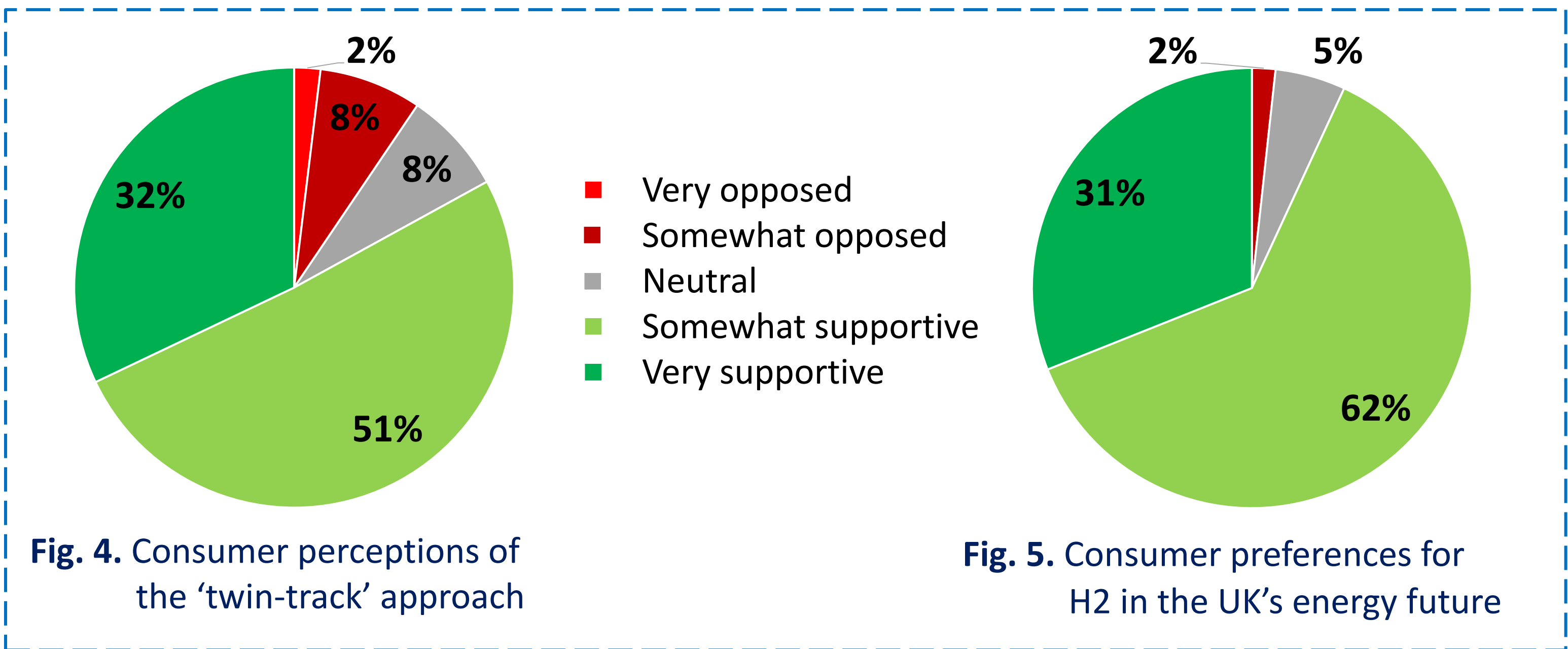


Fig. 4. Consumer perceptions of the 'twin-track' approach

Fig. 5. Consumer preferences for H2 in the UK's energy future

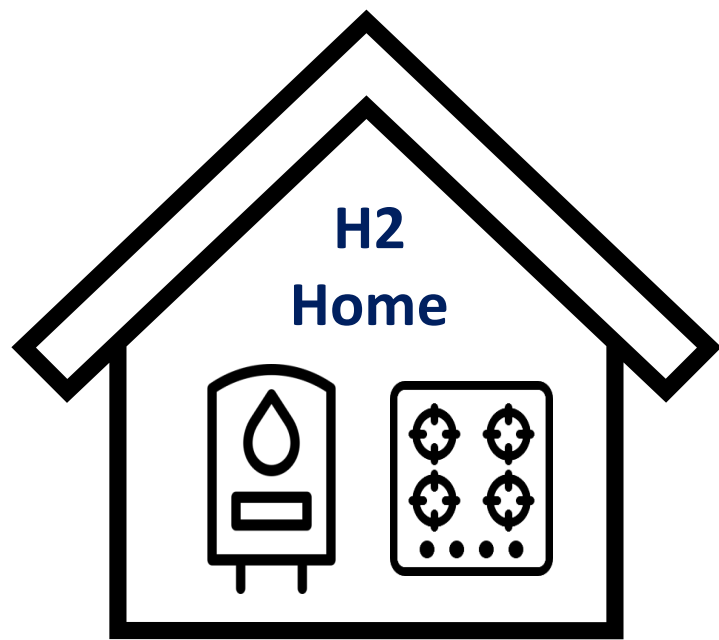
<b>Technology engaged group</b>	Hydrogen (both blue and green) was seen as a positive step in advancing the net-zero agenda (25% very supportive, 55% somewhat supportive)
<b>Fuel poverty group</b>	Hydrogen was associated with hopeful visions for improving the environment and lowering energy costs in the long-term (60% very supportive, 40% somewhat supportive)
<b>Environmentally engaged group</b>	Comparatively lower levels of overall support (~64%) Neutral (~18%) and negative perceptions (~18%) largely attributed to skepticism or disapproval concerning the inclusion of blue hydrogen as a decarbonization pathway
<b>Industrial towns and baseline group</b>	Overall, 75% of participants from the industrial towns group and the baseline group converged around being somewhat supportive, with stronger support from the industrial group

Table 2. Perceptions of the twin-track approach across groups

## Discussion

**Scenario:** Imagining a future where you have to choose about using hydrogen, what would you like to know most of all before making a final decision?...What would be your one key message?

- Is it sustainable and what are the impacts on the future carbon footprint?
- Is it a secure long-term plan with full government backing?
- Will it improve energy security?
- Will we be able to test hydrogen homes appliances first-hand?



- Will the quality of gas be the same?
- Can you wait until your existing boiler is worn out before changing over?
- What are the cost implications, both short-term and long-term...?
- Will it be cost-effective? And who is going to pay for it!?

"It has to start at the ground roots level...often people are afraid of what they don't know, and everybody kind of knows that burning gas is bad...but that's what they're familiar with and some people would fight tooth and nail for that" (FG9:2).

"A lot more needs to be shown, with honesty and the correct information...be clear and give reliable information and have a website set-up where people can ask questions and find out more accurate information. It needs to be clear-cut" (FG10:3).

"Easy information for people to access which shows a comparison between natural gas and hydrogen: here is the initial cost, how much could save, and the carbon footprint reduction...something more visual for people so they can see the impact it would have" (FG5:1).

## Conclusions and policy implications

- Hydrogen awareness is yet to enter the public consciousness in a meaningful way
- Cost factors and disruptive impacts are the 'make or break' factors for most consumers
- On average, households will tolerate disconnection from the gas grid for up to 2 days
- Public trust in the government, gas industry and energy suppliers needs significant bolstering
- Sustained public acceptance for the twin-track strategy rests on narratives around blue hydrogen
- Consumer acceptance is sensitive to socio-structural and socio-spatial variables
- Sufficient resources must be dedicated to 'moving the dial' on hydrogen knowledge and awareness
- Information campaigns should ensure greater transparency regarding benefits, costs, and risks, with clearer communication on the timeline of the potential roll-out and emissions reduction
- To alleviate skepticism and concerns, hydrogen should be diffused into the public consciousness in alignment to the energy security, fuel poverty and net-zero agendas, thereby elevating social acceptance
- Consumer heterogeneity must be internalised into policymaking for residential decarbonization

**References** – Gordon, J.A., Balta-Ozkan, N. and Nabavi, S.A., 2022. Homes of the future: Unpacking public perceptions to power the domestic hydrogen transition. *Renewable and Sustainable Energy Reviews*, 164, p.112481.  
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