Grant Shapps MP
Secretary of State for the Department for Energy Security and Net Zero
1 Victoria Street
London
W1H 0ET

24th March 2023

Dear Secretary of State,

Re: Responding to the Hydrogen Champion Report – risks for domestic heat decarbonisation

We are writing with regards to the recent Hydrogen Champion Report, led by Jane Toogood.[1] The report sets out recommendations for developing the UK's hydrogen economy. We welcome the call for a clear long-term vision for how and when hydrogen will scale-up, and for a plan for integrated energy infrastructure to deliver an optimal future energy system. Hydrogen will have a critical role to play in reaching net zero, and its development and deployment must be highly strategic to ensure it can add most value. We are therefore concerned by certain points made in the report with regards to the role of hydrogen for heating. Our key concerns are outlined below:

Using grid blending to shore up hydrogen demand creates unfair costs for consumers

We disagree with the report's recommendation to stimulate demand for hydrogen through blending and heating. This puts the early costs of building the hydrogen economy on the shoulders of consumers, who will bear the costs of higher energy bills and costs of conversion – on top of the proposed "hydrogen levy" set out in the Energy Bill.[2] As hydrogen is more expensive than the gas currently used to heat most UK homes, a 20% blend can only raise consumer prices.[3] Raising energy bills during a cost of living crisis is the wrong way to develop industrial demand for hydrogen.

Since hydrogen has a lower energy content per unit volume than natural gas, a 20% mix has only 86% of the heat output of natural gas.[4] Consumers will have to burn 16% more of the blended mix to create the same heat energy. This means that fuel prices will rise by at least 16% and that the savings in greenhouse gas emissions will be nowhere near 20% — but closer to 7%.[5] Blending could create greenwash as the public are told that "gas has gone green", when in fact "hydrogen-ready boilers" will continue to burn fossil fuels for decades to come. This could delay investment into genuinely zero carbon heating technologies.

Blending will not encourage strategic deployment of demand-side technologies in sectors like power generation, industrial processes, and aviation, where hydrogen could play a more cost-effective role

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[1] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1144529/hydrogen-champion-report.pdf

[2] https://www.e3g.org/publications/the-case-against-the-hydrogen-levy/

[3] A report found that blending in the EU gas grid could raise prices by 43% in industry and 16% in homes: https://www.researchgate.net/publication/358187483_THE_LIMITATIONS_OF_HYDROGEN_BLENDING_IN_THE_EUROPEAN_GAS_GRID_A_study_on_the_use_limitations_and_cost_of_hydrogen_blending_in_the_European_gas_grid_at_the_transport_and_distribution_level

[4] https://h2sciencecoalition.com/data-resources/

[5] https://www.researchgate.net/publication/348116004_The_Role_of_Green_and_Blue_Hydrogen_in_the_Energy_Transition_-_A_Technological_and_Geopolitical_Perspective

in meeting net zero. Without a strategic long-term vision for the hydrogen economy, blending could risk locking-in hydrogen for domestic heating at the expense of other sectors.

Misleading claims on heat electrification

The report makes claims about heat decarbonisation which are potentially misleading. There is a suggestion that heat pumps are not a viable solution for all properties *"such as hard-to-insulate properties*", but this claim has been disproven by the government-funded Electrification of Heat project, which found that there is no property type or architectural era that is unsuitable for a heat pump.[6] The latest stage of the Electrification of Heat trial found that the real-world performance of air source heat pumps has increased significantly compared to past trials, and that high-temperature heat pumps are a viable solution for less efficient homes, reducing the need for deeper retrofit.[7]

The report also claims that *"some whole system studies indicate that hydrogen heat pathways could be cheaper in certain circumstances".* The report does not cite any such study, and in fact the majority of independent reports suggest the opposite. Recent published whole system studies from Imperial College and Carbon Trust have found that hydrogen imposes significantly higher costs at a system and consumer level than electrification.[8] The House of Commons Science and Technology Select Committee has concluded hydrogen will have at most a limited role in heating homes.[9]

The report notes that *"Only after 2030 would hydrogen for heat have any meaningful role to play, but scale-up could be swift beyond 2030, with heating (for both domestic and commercial purposes) potentially accounting for up to around 40% of total hydrogen demand by 2050."* This 40% claim is highly disputable, and is much higher than the Climate Change Committee's scenarios.[10] Recent modelling for Shell suggested that hydrogen for heating will only represent 0.4% of the total hydrogen demand.[11] A high hydrogen for heating scenario does not represent a strategic use of a limited resource, and could detract from other sectors where hydrogen could play a vital role in meeting net zero, such as power, steel and aviation.

Recommendations that would undermine government heat pump targets

We encourage the government to reject the report's recommendation to create a loophole under the proposed market-based mechanism for low carbon heating, with *"hydrogen ready boilers excluded from these market share calculations… since they will produce zero carbon emissions when running on hydrogen."* Since the report itself recognises that hydrogen ready boilers are unlikely to run fully on hydrogen for decades to come, this recommendation will enable 'greenwashing' for fossil fuel boilers and prolong the impacts of heating on carbon emissions and air quality. This undermines the government's aim with the market-based mechanism in the Energy Bill.

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[6] https://es.catapult.org.uk/news/electrification-of-heat-trial-finds-heat-pumps-suitable-for-all-housing-types/
[7] https://es.catapult.org.uk/news/heat-pumps-shown-to-be-three-times-more-efficient-than-gas-boilers/
[8] https://ctprodstorageaccountp.blob.core.windows.net/prod-drupal-files/documents/resource/public/Flexibility_in_GB_final_report.pdf and https://www.sciencedirect.com/science/article/pii/S0196890422004459
[9] UK Parliament, 19 December 2022, Hydrogen is not a Panacea for reaching Net Zero, warn MPs
[10] https://www.theccc.org.uk/publication/sixth-carbon-budget/
[11] https://www.shell.com/energy-and-innovation/the-energy-future/scenarios/the-energy-security-scenarios.html

We encourage you to take these points into consideration in your review and response to the report, and when developing the UK's future hydrogen policies. We would be pleased to arrange a meeting to discuss this further. Please contact Juliet.Phillips@e3g.org to set up a time.

Yours sincerely,

E3G

Octopus Energy

UK Green Building Council

MCS Foundation

Nesta

The Kensa Group

ICAX

Ground Source Heat Pump Association

ep group

Friends of the Earth

Global Witness

Ambue

Heat Pump Federation

Greenpeace

Abigail Dombey CEng, Chair Hydrogen Sussex

Residents Against Whitby Hydrogen Village Trial

Fair Energy Campaign

Sustainability First

Positive Money

Fuel Poverty Action

Green Alliance

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