Response ID ANON-UC1U-KPZ5-8

Submitted to Exploring the role of alternative clean heating solutions
Submitted on 2026-02-09 17:18:29

About you

What is your name?

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Are you responding on behalf of an organisation? If so, which organisation?

No

Organisation:

We usually publish a summary of all responses, but sometimes we are asked to publish the individual responses too. Would you be happy for your response to be published in full?

Yes

How did you hear about this consultation?

How did you hear about this consultation?:
Email from elsewhere

Other (please specify):

Consultation questions

1 Do you agree that electric boilers should play a limited role in decarbonising heat, given their comparatively low efficiency and limited ability to load shift, leading to high running costs for consumers?

Yes

Please enter your response below:

When I considered an electric boiler to replace my failing gas combi (given the limited expected life-time of my house due to redevelopment of the estate it is on), one practical issue that became apparent was the shortage of individuals with both electrical and heating/plumbing skills, adding to complexity and costs of installation. In the end I opted for a heat pump.

More details: https://www.earth.org.uk/note-on-combi-replacement-dilemma.html

2 Do you agree that (a) thermal energy storage systems and (b) electrical energy generation and storage (solar PV and batteries) can enable electric boilers to become a more efficient and cost effective option to decarbonise heat?

Yes

Please enter your response below:

Yes: I have spent some years now testing thermal and electrical storage in conjunction with a gas combi, solar PV diversion and a heat pump.

Storage and diversion can shift load, but also shift spill-to-grid away from summer noons when it is least useful to DNOs.

For a heat pump these days I would suggest pairing it with PV and electric storage to maximise overall (exergy) efficiency, since for example each kWh of battery storage capacity is multiplied by the heat-pump CoP in effective stored heat, and the stored energy can be used for non-heat tasks too.

With electric resistance heating, simple thermal storage, such as phase change, continues to to be a sensible choice, eg on cost and safety grounds.

More details: https://www.earth.org.uk/energy-systems-diagrams.html

3 Do you have any evidence or views on the role infrared heating could play in decarbonising heat?

Please enter your response below:

As suggested many years ago with the then DECC CSA, a combination of IR 'instant' initial occupancy-triggered heating in conjunction with slower-response but more efficient (eg heat pump) heating may still have a useful part to play in intermittently and/or irregulalrly-occupied spaces such as community halls, per your example, to provide an overall combination of quick and efficient warmth at low extra CAPEX.

4 Do you agree that panel heaters and electric radiators should play a smaller role in decarbonising heat, given their comparatively lower efficiency (than heat pumps) and limited ability to load shift, leading to high running costs for consumers? Please provide any evidence or views to explain your answer.

Yes

Please enter your response below:

5 In what circumstances, if any, would panel heaters or electric radiators be more suitable than heat pumps, thermal energy storage systems, biomass heating systems or hybrid heat pumps? Please provide any evidence or views to explain your answers.

Please enter your response below:

Places with low overall demand, eg sunny small mid-level flats in the south of the UK, or lightly-used community spaces such as mentioned above.

6 Do you agree that high temperature heat pumps could play a key role in decarbonising heating of buildings?

Yes

Please enter your response below:

7 What are the key barriers that are preventing the installation of high temperature heat pumps in (a) domestic properties and (b) non-domestic buildings? How could these barriers be removed?

Please enter your response below:

8 Do you agree that air-to-air heat pumps could play a key role in decarbonising heating of buildings without wet central heating systems?

Yes

Please enter your response below:

9 What are the key barriers that are preventing the installation of air-to-air heat pumps in (a) domestic properties and (b) non-domestic buildings? How could these barriers be removed?

Please enter your response below:

The limitation on external fan unit count under GDPOs (and BUS grant rules) means that for example incremental (and thus risk/worry reducing) upgrade of an existing fossil-driven heat-only system to multiple A2A units for mixed cooling/heating is hampered as a route to decarbonising and overheating mitigation.

10 Do you have any evidence or views on the potential for air-to-air heat pumps to use alternative refrigerants?

Please enter your response below:

11 Please provide any evidence or views on a) the promotion of passive cooling measures to increase their uptake, so that active cooling is only used when and where needed, and b) local network impacts during extreme weather events.

Please enter your response below:

It would help to ensure that there is minimal red-tape and other barriers involved in adding temporary or permanent solar awnings to (south/west especially) facing windows in dwellings, including for rental properties and those in (eg) conservation areas. I have seem some smart inexpensive potential designs.

12 Do you agree that networked heat pumps may have a key role to play for buildings with limited outdoor space for individual heat pumps per dwelling?

Yes

Please enter your response below:

Requring gas distribution companies (and other utilities with suitable rights) to provide parallel or replacement under-pavement or under-road heat collection loops in urban areas could be one tool, eg:

Geothermal pavements: A city-scale investigation on providing sustainable heating for the city of Cardiff, UK

DOI: 10.1016/j.renene.2023.119248

13 Do you have any evidence or views on a) which business models would be most effective at bringing forward networked heat pumps, where appropriate, and b) what steps would be necessary to support the development of such business models?

Please enter your response below:

Rather than renewing gas mains as has just happened around me as buildings were being torn down, mandate replacement with collectors as in the answer to Q12.

14 Do you have any evidence or views on a) the public appetite to make use of clean heat solutions relying on shared infrastructure, b) where clean heat solutions that rely on shared infrastructure have been implemented, and c) what steps have been most effective at persuading households to participate in projects?

Please enter your response below :

15 Do you have any evidence or views on the role exhaust air heat pumps could play in decarbonising heat?

Please enter your response below:

I do not have hard quantitative evidence.

Anecdotally, over many years participating in self-build forums and similar, I do not recall any good outcomes for UK homes with exhaust air heat pumps, ie good user experience.

16 Do you have any views on whether exhaust air heat pumps should be targeted primarily at buildings with a) limited outdoor space b) a higher risk of air-tightness c) lower heat demand d) new-builds? Please provide any evidence to explain your answer.

Please enter your response below :

17 Do you have any evidence or views on the role heat batteries could play in decarbonising heat?

Please enter your response below :

18 Do you have any views on what further criteria, in addition to existing scheme criteria (e.g. MCS certification and SAP-eligibility), should be required for heat batteries that are supported through government grant schemes to prevent systems from drawing energy at peak times?

Please enter your response below:

19 Do you have any evidence or views on how future developments in the thermal energy storage market might help reduce strain on the electricity grid and how this could work with other technologies (like heat pumps or electric boilers) to become more cost effective?

Please enter your response below :

I have made my (DHW) thermal storage responsive to grid carbon intensity, frequency and (local) voltage, thus providing some positive 'services' to the grid, eg I drop PV diversion and/or charging from grid within about a minute while any of those indicators is bad. This could be done in reverse to soak up extra energy eg with high grid frequency, and the scale of space heat storage potentially makes for an attractive virtual power plant (VPP) to be built from such units. Some of this does not even need network comms, and should be considered along with other SSES / ESA / EHA baked-in grid friendly behaviour.

20 Do you have any evidence or views on the role storage heaters could play in decarbonising heat?

Please enter your response below :

I agree that these can be suitable for low-demand dwellings, for which the low CAPEX is beneficial in minimising Total Cost of Ownership (TCO).

I suggest that at least frequency response could be mandated for storage heating (per Q19 response) as it needs no extra comms, setup, etc.

21 Do you have any views on what further criteria, in addition to existing scheme criteria (e.g. SAP-eligibility), should be required for high heat retention storage heaters that are supported through government grant schemes, to prevent systems from drawing energy at peak times?

Please enter your response below :

22 Do you have any evidence on any other types of electric heating that could play a significant role in decarbonising heat?

Please enter your response below :

23 Do you have any evidence or views on the role solid biomass boilers could play in decarbonising heat?

Please enter your response below:

I agree that (solid) biomass burners should be limited to rural (low-population-density) areas, and further suggest that they should be limited to areas reasonably close to the source of the biomass, and where particulates and combustion products are unlikely to be trapped by local geography and weather patterns, and should be kept away from schools also, for health reasons.

24 Do you have any evidence on the types and/or characteristics of properties which would not be suitable for a heat pump or a heat network, but would be suitable for a biomass boiler?

Please enter your response below :

Off-grid (or with poor/weak/unreliable grid) properties such as farms, including their remote sheds, barns, etc.

25 Do you have any further evidence or views on the sustainable implementation potential for renewable liquid heating fuel production in the UK?

Please enter your response below:

26 Do you have any further evidence or views on the cost at which renewable liquid heating fuels – produced from sustainable feedstocks - could be made available to UK consumers?

Please enter your response below :

27 Do you have any evidence or views on the potential of renewable liquid fuels to be used in certain housing types where other low carbon solutions may not be the best solution?

Please enter your response below :

28 Do you have any evidence or views on the practical implications that may arise if some off-grid consumers start using renewable liquid heating fuels?

Please enter your response below :

29 Do you have any evidence or views – especially on cost and availability of sustainable feedstock - to demonstrate that a possible initial blend approach could be increased to a 100% renewable liquid fuel solution for consumers?

Please enter your response below :

30 Do you have any evidence or views on the role that hybrid heat pumps, comprising of a heat pump and an appliance using 100% renewable liquid fuels, could play in decarbonising heat?

Please enter your response below :

31 Are there any other alternative low-carbon heat sources not discussed in this consultation which you consider could offer further benefits if installed as part of a hybrid heat pump system compatible with net zero? Please provide an explanation and evidence to support your answer.

Please provide your response below :

32 Do you have any evidence or views that could help inform future decisions on whether to implement a Renewable Liquid Heating Fuel Obligation, and if so, how?

Please enter your response below :

In general land is very much better used to generate electricity via PV or wind than create biofuels (eg ~70x more EV miles driven per m^2 of ground vs biofuels used in ICE vehicles), and this is likely to apply to heatling applications to some degree, so creating such an obligation may be bad for the climate and economy it at any sigficant scale.

33 Do you agree that evidence of affordability to consumers, and availability at scale of sustainable feedstock are key factors in determining if the government should pursue the implementation of a Renewable Liquid Heating Fuel Obligation? If not, what other factors do you think are significant and why? Please provide your views and evidence to support this answer.

Please enter your answer below :

34 Do you have any views on what other steps government or industry could take to develop the market for renewable liquid heating fuels, ahead of making a decision on whether to implement a Renewable Liquid Heating Fuel Obligation?

Please enter your response below:

35 Do you have any views on whether the introduction of the Renewable Liquid Heating Fuel Obligation would be an effective tool in fully decarbonising oil heated homes or whether it is a transitional solution to decarbonisation (if either)?

Please enter your response below :

RLHFO is likely to be a poor use of land at least, per Q32 response.

36 Do you have any evidence or views on the role other low carbon heating systems, not discussed in this consultation, could play in decarbonising heat?

Please enter your response below:

37 Do you have any evidence or views on what steps the government could be taking to support the development of early-stage heating technologies that have legitimate potential in decarbonising properties?

Please enter your response below :

38 Do you have any additional evidence on how people with protected characteristics under the Equality Act 2010 may be affected by the installation of any of the alternative heating technologies included in this consultation?

Please enter your response below :

39 Please upload any further evidence below

File upload :
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