Written evidence submitted by EUA (CGE0031)

1. The Energy and Utilities Alliance (EUA) provides a leading industry voice helping shape the future policy direction within the sector. Using its wealth of expertise and over 100 years of experience, it acts to further the best interests of its members and the wider community in working towards a sustainable, energy secure and efficient future. EUA has eight organisational divisions - Utility Networks (UN), the Heating and Hotwater Industry Council (HHIC), the Industrial & Commercial Energy Association (ICOM), the Hot Water Association (HWA), the Manufacturers' Association of Radiators and Convectors (MARC), the Natural Gas Vehicles Network (NGV Network), Manufacturers of Equipment for Heat Networks Association (MEHNA) and the British Energy Efficiency Federation (BEEF).

2. The Energy and Utilities Alliance (EUA) is a company limited by guarantee and registered in England. Company number: 10461234, VAT number: 254 3805 07, registered address: Camden House, 201 Warwick Road, Kenilworth, Warwickshire, CV8 1TH.

3. EUA believes that action on decarbonisation is needed in two key sectors, heat in transport. These have been widely identified as having made little progress in overall carbon emissions, especially in comparison to power. The two actions that EUA recommends to make significant cost effective progress in these areas is utilisation of green gas for heating and heavy good transport.

4. A future energy system will involve a gas network which will be transporting a low carbon fuel such as green gas or hydrogen which will be the only credible way to decarbonise domestic and commercial heating.

5. The Clean Growth Plan outlined that hydrogen or green gas could be a cost effective way for the future decarbonisation of heat. As a result a number of projects have been initiated looking at how hydrogen could be used for decarbonised heating. Hydrogen requires a modern and invested in gas network. Therefore the gas network should not be seen as having a fixed lifespan.

6. This is further supported by the recent ECO 3 consultation by BEIS which indicates that first time central heating is one of the most cost effective ways to take people out of fuel poverty and they are promoting is take up. This coupled with Ofgem's own fuel poor network extension scheme shows that the number of people connected to the gas grid is growing and not decreasing and so the gas network remains a critical and invaluable part of our energy network.

7. This is further supported by a series of reports that demonstrate this point. Academically it is widely accepted that the gas grid will have an important role to play for decarbonisation.

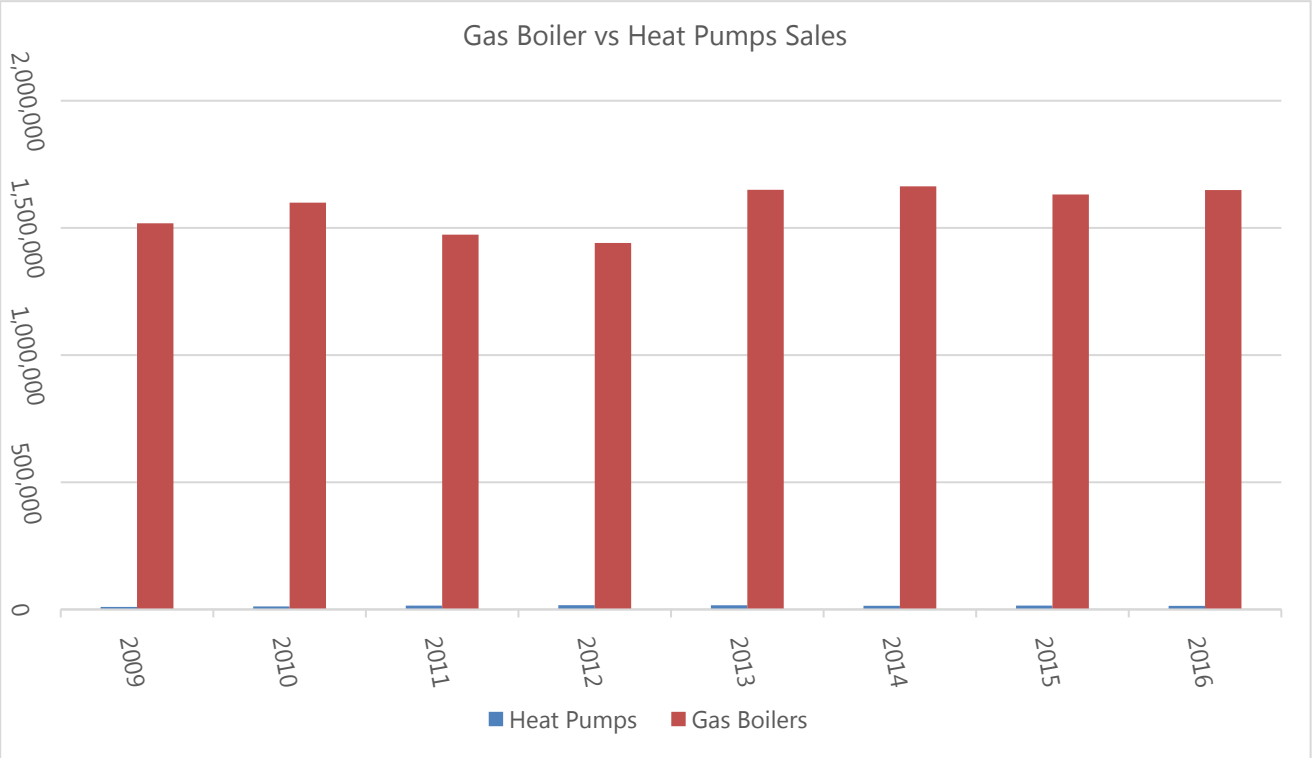
    - Too Hot to Handle https://policyexchange.org.uk/publication/too-hot-to-handle/
    - Future Heat Series Part 2 - Policy for Heat http://www.policyconnect.org.uk/cc/research/report-future-heat-series-part-2-policy-heat
    - 2050 Energy Scenarios http://www.energynetworks.org/assets/files/gas/futures/KPMG%20Future%20of%20Gas%20Main%20report%20plus%20appendices%20FINAL.pdf
    - The future of heating in UK buildings https://www.theccc.org.uk/2016/10/13/infographic-the-future-of-heating-in-uk-buildings/
    - Future Energy Scenarios http://fes.nationalgrid.com/media/1253/final-fes-2017-updated-interactive-pdf-44-amended.pdf
    - Fuelling the future: what is the role of hydrogen in the low carbon economy? https://policyexchange.org.uk/wp-content/uploads/2018/09/Fuelling-the-Future.pdf

8. The gas pipe network will also be a key function of future non-methane pathways. Therefore even if the network is reutilised in a manner that is not currently its principal use, the need for a safe and modern gas pipe network will be critical.

9. For these reasons, unlike with disruptive electricity systems, the gas system does not have the same uncertainty for its asset and stranding is not a credible risk.

10. RIIO-1 allowed for the continued iron mains replacement programme, this is due to be completed in 2032. This is being delivered in an orderly and cost effective manner, unlike some other mandated energy system upgrades. This is being costed on the basis of a long term depreciation of the gas network as an asset. This also keeps costs to consumers low. This programme means that the gas grid will be able to transport other gasses such as hydrogen in the future.

11. Through EUA's domestic heating trade association we know that the sale of gas boilers has increased incrementally since the introduction of condensing boilers

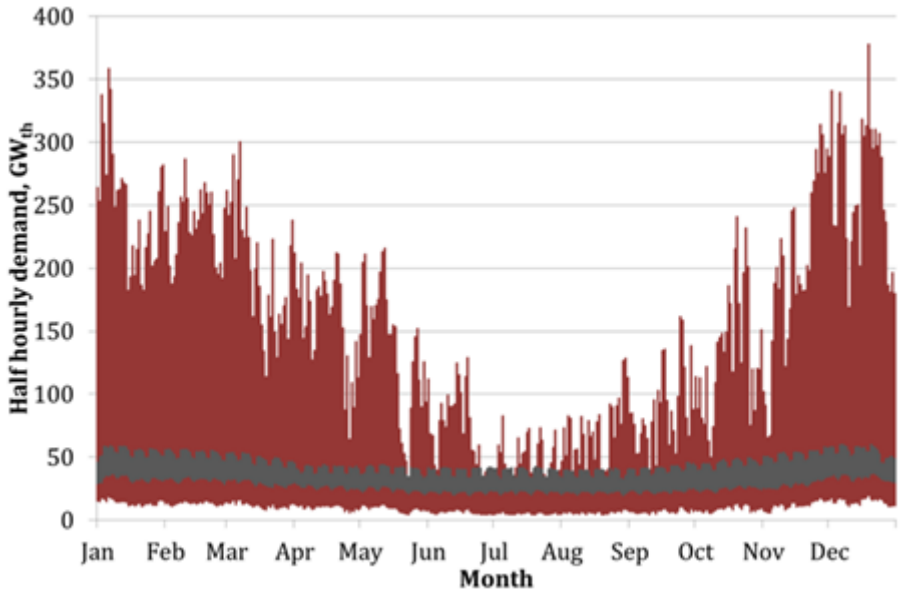


12. At the time it was widely believed that gas heating may be phased out and that by the end of the 2010's gas boiler sales would be significantly lower. However as illustrated this is not the case. Other heating products have not gained traction and the RHI for domestic heating has been a widely regarded failure. Therefore there is far less uncertainty now over the future of gas heating. The complexity is that gas heating remains a cheap and reliable option, increasingly difficult to replicate or replace.

13. A recent report prepared by Vivid Economics for BEIS on the International Comparisons of Heating, Cooling and Heat Decarbonisation Policies[1] found that no country has been able to make a successful move away from the gas grid despite significant policy efforts. Mostly because it is a cheap and reliable energy source. This is why green gas and hydrogen is being investigated by many, including the Netherlands, Germany and Japan to overcome the decarbonisation dilemma. It would be reckless at this stage to reduce support for the network.

[1] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/699674/050218_International_Comparisons_Study_MainReport_CLEAN.pdf

14. EUA does not believe that electrification of heat is a viable option. This graph helps illustrate why:



Synthesised national half hourly heat demand (red) for 2010 and actual half hourly national electricity demand (grey). Source: Dr Robert Sansom

15. Gas and petroleum currently account for majority of final energy consumption in the UK electricity accounts for just 20%. The vast majority of this gas is used for space heating, while petroleum is mostly used in the transport sector. To electrify this energy demand would require a huge expansion in the UK's generational capacity, at the same time as necessitating a wholesale change in the stock of heating appliances and vehicles. Given that we are currently struggling to build new power plants to meet existing demands, it would be extremely injudicious to add to this struggle when less problematic solutions exist. Furthermore, gas demand is highly seasonal. Electrifying heat demand would either require vast amounts of electricity storage or increased generational capacity that would be unused for much of the year.

16. So, EUA does not believe that wholesale electrification of heat is a viable approach to meeting our carbon reduction targets.

17. Gas currently meets the primary heating needs of 86% of English homes and around 80% of homes in Scotland and Wales. Just to change the appliance would cost each home upwards of £8,000, not including other costs such as redecoration and new heating products such as radiators to enable these new appliances to operate efficiently. On top of that, increased electrical demand would require further expenditure on grid reinforcement and new power plant.

18. Making this change on a large scale will simply not happen. The progress of the RHI and Hinkley point C is a testament to this.

19. Instead, the simpler, cheaper and most effective solution would be to decarbonise the gas grid with biogases and gradually increase hydrogen concentration. This would mean decarbonising all the homes on the gas grid without homeowners having to replace any equipment. This would mitigate the need for new power plant to meet the extra demand.

20. Boiler manufacturers in the UK are currently developing hydrogen boilers. One example is Worcester Bosch[2] who have developed a working hydrogen boiler that could be deployed seamlessly into UK homes. Ideally these would be hydrogen ready boilers that could be installed ahead of a 'gas switchover' and then automatically detect the gas that is being burnt to adapt the

[2] https://www.worcester-bosch.co.uk/img/documents/hydrogen/The_Future_of_Fuel.pdf

boiler burner accordingly. This would reduce any upfront cost of switching to hydrogen. There are a number of pilot schemes running to test how these would work in the real world.

21. We also have to be mindful of other pressures on energy demand. The Government has committed to no new petrol or diesel cars by 2040. This will inevitably increase demand for electricity, no matter how smart the charging systems are. As we plan to decarbonise power generation, it is EUA's view that we should focus on decarbonising power for current electricity demand and light road transport. Once we have successfully delivered this, and it will be a complex challenge, then we can assess what options are available for heat decarbonisation.

22. At this point it is likely that hydrogen will have moved beyond the trial stage and will be being used either in certain domestic locations, being blended in the grid or being used in industry. Bio-SNG and Biomethane will be reducing the carbon intensity of main gas, and so the challenge for heat decarbonisation will look very different.

23. For the UK is to meet its climate change targets then the current biggest contributor to greenhouse gas emissions, transport, needs immediate attention. Compared to 1990 (the baseline for the 80 per cent reduction) the UK has reduced its overall emissions by 41 per cent; transport emissions in that time have fallen by just 2 per cent. Transport is now the largest emitting sector of the UK's greenhouse gas emissions, comprising some 26 per cent of the total, compared to energy supply (electricity) 25 per cent.

24. Road transport is the most significant source of emissions in the sector, with greater numbers of vehicles on our roads outweighing any improvements in fuel efficiency. Whilst passenger vehicles make the biggest overall contribution, due to the sheer volume of vehicles, the biggest contributor is unsurprisingly HGVs, buses and coaches. They total 2 per cent of vehicles on the road, travel just 6 per cent of road miles yet emit 16 per cent of transport greenhouse gas emissions. They also account for 21 per cent of roadside nitrous oxide emissions. So on grounds of climate change and air quality, the heavy end of road transport demands urgent attention.

25. The importance of tackling HGV emissions was recognised in DfT's "The Road to Zero" which stated that a voluntary target for industry is now in place to reduce HGV emissions by 15% by 2025.

26. The powertrain required for these vehicles means that alternatives to diesel, such as batteries, are simply not capable of pulling the loads. Gas-powered engines are an alternative to diesel and are suitable for use in the UK. In 2013, the Chancellor recognised this and lowered the fuel duty on gas compared to diesel. At the time, this decision was a nudge to encourage a switch to gas-diesel hybrid HGVs. The industry however, recognised that these vehicles are not as effective as dedicated gas-powered HGVs.

27. The LowCVP[3] found that compared to even the newest diesel Euro VI HGVs, a gas-powered equivalent reduces NO2 emissions by 74% over a variety of cycles, total NOX emissions by 41% and particulate emissions by 96%. By looking at the entire picture, we can also identify significant CO2 savings on a well-to-tank basis. This can be as much as 100 tonnes per vehicle if renewable biomethane is used. Running HGVs on natural gas gives around a 12-15% GHG saving according to the Element Energy study or according to the ETI study, the best case scenario indicates that the potential for emissions savings is very significant at 21-22% for LNG and 26-29% for CNG compared to the diesel reference. When running on biomethane, the Element Energy study quantified the savings at 84%. A recent study by Cadent[4] quantifies the theoretical potential for biomethane at over 100TWh per year, an amount which could cater for the entire HGV fleet.

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[3] *Emissions Testing of Gas-Powered Commercial Vehicles*, Low CVP, January 2017.

[4] https://cadentgas.com/About-us/The-future-role-of-gas/Renewable-gas-potential

28. For lighter freight vehicles such as vans and taxis, Calor has rolled out a number of successful projects to demonstrate the value of switching to LPG. Independent testing of a TX4 taxi (a typical Black Cab) repowered to run on LPG revealed that after conversion the taxi emitted 99% less PM, 80% less NOx, and 7% less CO2. It also saved the taxi drivers money as LPG is approximately half the price of diesel. LPG recently benefited from having its fuel duty escalator removed at the recent budget, a signal that government sees a role for LPG in helping to clean up air quality in cities.

29. These studies make up a convincing body of evidence about the GHG savings that could be made from encouraging the uptake of gas HGVs and taxis.

30. Modelling conducted by Frontier Economics shows that increasing duty on gas would narrow the spread between diesel and natural gas, increasing payback periods faced by fleet managers. This would stifle investment and slow down progress towards the 2025 emissions target and endanger the transition to lower carbon HGVs.

31. The Government's Renewable Transport Fuel Obligation, runs to 2032, and is designed to run alongside the fuel duty differential. In an ideal world, the duty reduction should have the same timetable as the RTFO, running up to 2032. At worst, the duty differential should continue its planned timetable, running to 2021.

32. Fuel costs represent up a third of operating costs for fleet managers and fuel duty represents over 60% of the retail fuel price. As such it is a key driver in investment decisions of fleet managers. Maintaining the duty differential between natural gas and diesel is very important to enable switching in the near term.

33. Fleet managers interviewed by Frontier Economics indicated that fuel duty is a key factor in the business case for converting to natural gas vehicles.

34. There are a number of other structural and regulatory barriers that need to be overcome in order to facilitate the development of gas vehicles. Currently, the technology for gas HGVs exists; however, manufacturers are not going to produce them in bulk until the demand exists. Once demand is sufficient, economies of scale in manufacturing will occur, bringing the cost down. Fleet managers are then not able to buy gas HGVs because they are not being made available. This initial 'chicken and egg' scenario needs government intervention to help remedy this.

35. NGVN realise that decarbonising transport is complex and will take time. However, the pressure to reach 10% of renewable transport by 2020 is going to push inappropriate technologies whilst sacrificing development of technologies that would have a real impact in reducing overall carbon. For road haulage and heavy vehicles, the best solution is natural gas vehicles. The technology is ready, the UK has an extensive and world class gas infrastructure and it is simply the most appropriate solution for this sector. We urge the DfT and BEIS work to further encourage and support development for this product.

36. EUA would welcome the opportunity to present our evidence to the committee.

October 2018