Consultation Response
Monday, 30 January 2017

ICOM Response to Heat in Buildings: The Future of Heat - Non-domestic buildings - Call for Evidence

1. About ICOM

The Industrial and Commercial Energy Association (ICOM) is a not-for-profit trade association, representing and promoting the interests of the non-domestic heating sector since 1933. By working closely with governments, professional bodies and associations at National and European level, our work generates tangible benefits for members and is instrumental in the development of product and installation standards.

3. ICOM Response

1. What are your views on how we can maximise the potential to reduce energy consumption and reduce carbon emissions, including through decarbonising the heating supply in non-domestic buildings? Consider in your answer what existing statutory or voluntary standards are most effective and why.

The most straightforward way to decarbonise heat in non-domestic buildings is to decarbonise the heat itself.

Currently the majority of non-domestic buildings will be heated by gas. Either through gas boilers or by a CHP system. Replacing these for electric equivalents will not be feasible due to the cost and demand profiles required by the building's occupants.

Therefore decarbonisation will require the gas itself to be decarbonised.

This process has already started with anaerobic digesters producing biomethane that is being injected into the existing gas grid.

We fully expect this to expand with synthetic natural gas, produced from waste, to also be injected.

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The attraction of decarbonising gas is that it does not require the heating appliances themselves to be changed. Whilst we would encourage businesses to invest in more efficient appliances if their existing ones are old and inefficient, this would be far cheaper and easier than trying to replace the heating system for one fuelled by electricity.

This also means government can then focus their efforts on trying to improve the fabric performance of non-domestic buildings. In our view this will be very challenging due to non-uniform nature of non-domestic buildings and counter intuitive energy demand. Unlike with domestic properties, the measures required will not always be predictable or directly comparable.

For this reason we recommend government focus their efforts on supporting businesses improve the fabric through insulation and other methods. If the gas is greened the system will automatically see carbon reductions without any actual decision to change being made.

However this would require Government to commit to greening gas grid and to signal that the national grid has a long term future beyond 2050. It would also require BEIS to develop policies to remove barriers to the production of green gas. This would involve cross departmental working, as access to waste policy would feature heavily.

Another benefit to retaining gas as a heating fuel is to ensure the UK does not lose many of the manufacturing companies operating here today. Many industrial processes require high grade heat that can only be produced through combustion. A move to electric heating and the removal of the gas network could mean many of these companies would have to relocate. A move to electric heating would also increase prices making UK manufacturing uncompetitive globally. In a post Brexit Britain and in light of the recently published Industrial Strategy Green Paper, this consideration is vital as we will need to ensure we remain a competitive and attractive place for businesses.

A quick win would be to target businesses with old, inefficient heating appliances and encouraging to move to at least the next lowest cost option that would be a condensing gas boiler. Also all systems, new and old should be properly maintained and cleaned to remove and minimise system sludge. Unclean water is a major contributor to appliance failure and

reductions in system efficiency. ICOM will be publishing a guide shortly on water treatment and commercial heating systems.

2. Do you agree that these are the key considerations for heat and cooling in nondomestic buildings? What drives decisions about heat sources and cooling systems in non-domestic buildings? For example how do building characteristics, use and location impact on the decisions about the technology or technologies which are used?

Businesses seek to minimise costs, take advantage of any incentive schemes and have access to reliable systems.

It is for this reason that most buildings will use some form of gas heating. It remains the cheapest heating fuel, it is an established technology and therefore is reliable and solutions are readily available. CHP is also mostly gas fuelled.

However it is clear that non-domestic heat is not a uniform issue. Each business probably has a different attitude to heating their building and what costs are acceptable. In general it is viewed that intense and high users discuss heating issues at board room level as it is a major item on their bottom line. However for most other businesses the cost is not high enough to warrant high level attention and will be dealt with as part of facilities management.

There is then the very fragmented nature of non-domestic heating systems. Not only at an appliance level but at a system level. There are a wide variety of emitter types from radiators to radiant fans. Often replacing these systems would require fabric wide changes, which would be too expensive for many companies.

Another issue complicating the choice of heating system is the fact that many non-domestic properties are rented. There is therefore less incentive for either party to invest in energy efficiency, especially if the overall costs for heating are not high enough to become a business priority. Mandating changes to improve energy efficiency could lead to high implementation costs that would be borne by business therefore increasing their costs, possibly greater than the energy cost saving.

Tied to this are situations when a premises has a change in use which may radically change the consumption of energy and systems needed. It may be that an appliance installed that could cope with low heat demand but not high then becomes problematic. This reinforces our view that retention of gas heating is vital as it is much more flexible than electric heating.

There are new technologies being developed that may be flexible enough and cost effective enough to make a meaningful change. CHP systems are becoming more developed and efficient, gas absorption heat pumps are now commercially available in the UK and have the potential to dramatically increase the efficiency of gas heated premises. Finally demand side management and smart networks tied to storage, either thermal or battery, could dramatically change the non-domestic heating landscape.

ICOM would welcome discussing future technological developments with BEIS and perhaps arranging them to visit some of our more innovative member companies.

3. Should there be a further tightening of building performance standards? If so, what level should the standards be set at and over what timeframe should they be introduced so that they are manageable?

We were disappointed when the “Nearly Zero Energy” policy was scrapped as we had done considerable work with CIBSE to propose changes to the Building Regulations in preparation for that policy. The proposals were mainly to improve the use and effectiveness of controls as well as looking at the calculation methods and building fabric. It was generally agreed that there were enough types of product available which had acceptable efficiencies that these sections of the regulations would be left, as increasing the levels would have small gains. We do believe that changing the Building Regulations to include more on controls and building fabric would be beneficial.

We believe more needs to be done to reduce the ‘performance gap’. As outlined by the Zero Carbon Hub in 2014[1], too many buildings suffer from a gap between designed performance and actual. We believe that tightening this gap would be more effective than new building

[1] http://www.zerocarbonhub.org/current-projects/performance-gap

regulations. New regulations that are blighted by this performance gap would not actually deliver energy efficiency savings.

This would require a more comprehensive review of energy assessment, construction and refurbishments skills and industry best practice. However this would be a worthwhile exercise if it ensure buildings meet existing regulations. This would also be less controversial than trying to bring in new regulations that may further increase costs to businesses which would run counter to the recently published Industrial Strategy Green Paper.

4. Please provide any further information to support your answers to questions 2-3. In answering please note any current or planned work being driven by industry that may have a bearing. Examples or case studies on meeting the different standards and approaches would be welcome.

5. What action should Government take to reduce the use of coal and oil in buildings? Over what period of time should the transition occur? Which levers should be deployed to support buildings that are harder to heat? Is there a fuel use connection in off gas grid non-domestic buildings between heat required for processes and for heating?

6. What other innovative solutions or opportunities exist that may have a tangible impact on emissions from heat in buildings, either in the next two Carbon Budgets or out to 2050? Please provide any supporting evidence.

ICOM believes that 'Green Gas' is the innovative energy solution that will have the potential to transform the energy debate in this country and the one technology that can allow us to actually meet our 2050 decarbonisation targets.

Currently the most recognisable form of Green Gas is biomethane. This is the gas captured from waste processing, typically anaerobic digestion. The technology is proven, it has worked for years. Anaerobic digesters are increasingly commonplace in rural areas as the farming industry uses the non-domestic Renewable Heat Incentive to support generation of biomethane. The gas generated is then used locally, often to generate electricity which can be fed into the grid. Companies like Severn Trent have taken a further step, and clean up the biomethane to inject the "green" methane into the gas grid at their sewerage works in

Minworth, on the outskirts of Birmingham. By the end of 2015, some 2TWh/annum was injected into the gas network.

Rural premises have often been seen as the obvious target for alternative energy sources. But industry has responded by developing biopropane as an alternative to LPG used in around 170,000 UK homes and businesses that are off the gas grid. The biopropane is made from a waste product, hence its “green” qualification and it requires no change to either the boiler or heating system as the gas is identical in its composition. Calor plan to start marketing biopropane in 2017 to their LPG customers. EUA have calculated that carbon emissions could be cut by 83 per cent if consumers switch from LPG to biopropane.

A development on from biomethane, is Synthetic (or Substitute) Natural Gas (SNG). This is a methane-based gas, created artificially rather than being extracted from the ground. It achieves “green” status because it uses waste materials, usually sent to landfill or incineration, to create the gas. The process is technically complex, it involves Advanced Plasma technology in effect heating the waste to very high temperatures, generating gas that is then captured for use. Ofgem have recently awarded National Grid funding to develop a commercial scale plant in Swindon, having seen the success of smaller trials of the technology. The alternative use of waste gives the gas its “green” credentials. The Swindon plant envisages supplying gas for HGVs but there is nothing to stop it being fed into the gas grid for everyday use once it is blended to reach the gas quality standards required.

Studies by National Grid suggest up to a third of current UK domestic demand for gas can be met from bioSNG, around 100TWh/annum. If progress towards greater energy efficiency in our homes and workplaces continues, they suggest by 2050 a 30 per cent reduction in gas demand could be achieved. This leaves around a third of current UK demand to be met from natural gas, but by 2050, this means half the UK’s domestic gas supply could be green gas.

A typical bioSNG plant is around half the size of an incinerator, for the same volume of waste is uses. Its emissions are cleaner; it will last 25 years and create around 100 jobs in the construction phase and permanently employ around fifty skilled engineers to run it. It provides for more jobs than landfilling does and the UK would be using its waste and not in some cases exporting it.

Work undertaken by the Future Energy Scenario team at National Grid, suggests that any outstanding requirement for natural gas to meet domestic demand would meet our 2050 climate change obligation of an 80 per cent reduction in greenhouse gases.

The other Green Gas that is increasingly talked about is Hydrogen. It is currently produced from natural gas using Steam Methane Reforming, where the carbon can then be captured. The benefit of using hydrogen is that when the gas is combusted it does not give off carbon dioxide. It is the ultimate green gas. What's more, it can be produced using the process of electrolysis, from excess wind power at a time the electricity grid does not require its use. Hydrogen can be transported through existing PPE pipes, currently used in our gas network, and only minor modifications required to appliances.

At the moment within existing gas quality guidelines, we can mix up to 2 per cent of hydrogen into the blend that flows through the gas grid. Some studies suggest that up to 20 per cent might be feasible – this makes the overall mix of gas "greener". However, Northern Gas Networks are conducting a feasibility study into 100 per cent hydrogen through the gas grid. Their Leeds 21 study is arousing considerable interest within the industry on the basis that it envisages using the existing gas grid, but in a completely carbon free way. The way in which the gas grid grew up from localised supply to a national infrastructure enables the potential switch to be made in an organised manner. Similar to the 1960s switch from towns to natural gas. Already appliance manufacturers are discussing the implications for their products. It could well be that swapping a central heating boiler's burner, in each building, is an affordable option compared to other means of tackling the trilemma.

All Green Gases offer a cost effective and effective way to meet our 2050 carbon reduction targets. Biomethane and BioSNG would not require wholesale replacements of heating appliances unlike the electrification of heat pathway. Hydrogen conversion would require more planning and long term thinking, but could still be delivered cheaper than the all electric pathway and would not require businesses to radically change their behaviours and appliances.

4. Contact Details

ICOM would be very pleased to discuss any of the issues raised in this submission with DECC, please contact Ross Anderson, ICOM Director on ross.anderson@icom.org.uk 01926 513748.

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ICOM is a division of the Energy and Utilities Alliance (EUA)