EUA response to the 2020 renewable heat and transport targets inquiry

This submission is from the Energy and Utilities Alliance (EUA) a not for profit trade association that provides a leading industry voice to help shape the future policy direction within the energy and utilities sector. Our association comprises 5 associations: Utility Networks, Heating and Hotwater Industry Council, Hot Water Association, Manufacturers of Radiators and Convectors and the Industrial & Commercial Energy Association.

Does the Government have the right policies in place to meet its 2020 renewable energy targets in the heat and transport sectors, and if not where are policies missing or inadequate?

EUA does not believe the 2020 renewable energy target is an appropriate target for the greater aim of reducing emissions to the levels needed to mitigate climate change.

However, the 2020 target is a legal requirement and, therefore, we believe that the government should aim to reach the 12% from heat in the most cost effective way.

There are a number of policies in place that are helping to achieve this.

Non Domestic RHI

Between November 2011 and February 2016, the Non Domestic RHI has resulted in the generation of approximately 6,800 GWh of renewable heat. This roughly corresponds to the amount of energy needed to heat 340,000 typical UK homes for one year – just 1% of the UK's housing stock. This is being achieved at an estimated annual cost of £450 million annually. This is due to the proliferation of Biomass Heating systems and biogas. Biomass is effective at heating large buildings, something which Heat Pumps struggle to do for the same costs. We have seen a number of Stately Homes and other similar rural properties benefit from this technology. EUA has some concerns that Biomass heating is being deployed in on gas areas or inner cities which may not be the most sustainable or effective use, but in the correct circumstances, this technology can be an effective tool.

Also supported by the Non Domestic RHI is biogas and biomethane through Anaerobic Digestion (AD). Biogases are an effective tool for maximising the effectiveness of renewable

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heat delivery. To date, biogas and biomethane have provided 15% of non-domestic renewable heat.

The benefit of biogas is that it can be injected into the gas grid at or near to the point of manufacture. This dilutes the carbon emissions of the gas in the grid and means that homes are inadvertently burning less carbon. Biogas does not require that homes have new heating equipment; there are no upfront costs for the consumer. This means that if delivered on scale all homes connected to the gas grid could actually be made more renewable without any action required by the home owner.

RIIO

RIIO has been very effective at driving innovation in the gas distribution market. The targets that the Distribution Networks have to achieve means that considerable resources are being spent on ensuring better and more efficient delivery of gas. One of the most interesting developments has been around creating new green gases. A recent example is the Ofgem, DfT and National Grid collaboration project at Swindon to create a Bio-SNG plant. Bio-SNG is created by burning at extremely high temperatures municipal and other waste to create gas. The methane not produced by the rotting waste, or by incineration means the gas is carbon neutral and so renewable in the same way biomass and AD products are.

As stated above, biogases should be considered the most appropriate way to roll out renewable heat in a cost effective and efficient manner. Estimates by National Grid in their paper “The Future of Gas” show that around 50% energy demand for heat could be met by biogases by 2050. This in effect could provide renewable heat to all homes on the gas grid.

These are the type of policies that the Government should be pursuing. They are cost effective, innovative and provide the best coverage for the cost. They also do not close other energy vectors. By producing green gas this does not mean we cannot move to heat pumps or another electric product at a future date. It could be combined with hybrid heat pumps or Micro CHP. Electrification of heat, on the other hand, would close off future options. It would make the extensive gas grid infrastructure a stranded asset which could then no longer be used for future technologies like Hydrogen or even as energy storage.

On the negative side, there are current policies that are harming our effort to decarbonise heat.

Domestic RHI

The domestic RHI is not a negative policy in itself. However, it has proved to be an inflexible policy that has not promoted sustainable and innovative products that could make a difference in the future.

The current consultation is seeking to limit the proliferation of small biomass. This is in response to the budget being consumed by this technology.

EUA's latest paper will be published shortly looking at the RHI budget and focus. However, early findings from our research show that small biomass in the domestic sector is expected to represent 72% of expenditure on the domestic scheme in the next 12 months, despite only accounting for a quarter of installations. Our research estimates that – based on current trends continuing – the domestic RHI will lead to the installation of an additional 75,000 appliances by 2021, which will contribute a further 4,400 GWh of renewable heat.

This will cost the taxpayer £1.15 billion in 2020/2021. EUA understands the rationale for a domestic RHI, but we believe that the budget to date has not been allocated wisely. It should have led to learning and supplier development. We do not believe that this has happened. Instead, we now have small biomass in built up areas that could be contributing to the increasing air quality concerns and serious questions about long-term sustainability.

We are also concerned that the RHI has operated as a closed shop. No new technologies have been admitted into the scheme since its inception in 2013. EUA's paper on Biopropane demonstrated that this technology would be a cost effective solution for properties that are currently heated using LPG. By simply switching fuels, these homes could vastly reduce their carbon emissions. The only support that biopropane suppliers would need is a small tariff in the region of 2p/kWh in order to eliminate the cost differential between biopropane and its fossil fuel analogue.

Other technologies such as Gas Absorption Heat Pumps have also been ignored, despite previous DECC assurances that they would be included and DECC reports showing they would be beneficial to the scheme.

The industry has now lost faith with the domestic RHI and 2015 saw a record number of gas boilers installed. The message is clear that current policies are not working and that we need to look at our existing infrastructures first before we try and create new ones.

The policies we believe need to be explored are ones that look at the longer term future rather than the immediate 2020 one. In order to ensure there is enough waste to be

transformed into renewable gas, we need local authorities to commission Bio-SNG plant instead of standard incinerators. Bio-SNG plant are cheaper and smaller than incinerators but local authorities work on 25-year life cycles for their plant and every incineration plant commissioned now will mean 25 years of lost opportunity. DECC, DEFRA and DCLG should be working in collaboration to ensure this does not happen.

DECC also need to bring forward their new heat strategy. The industry needs clarity and wider planning decisions require it. However, this strategy has to recommend policies that are 'no regret' policies in the short term and that do not close off energy vectors at this early stage. The government is notoriously bad at picking winners as the recent DECC history shows. So the new strategy and policy needs to be technology neutral and concentrate of cost effectiveness and overall mass effectiveness.

How could a whole systems approach across the power, heat and transport sectors be utilised to ensure the 2020 targets are met?

A whole systems approach utilising smart technologies, demand-side management, and innovative heat technologies is an intuitively appealing solution, but it cannot be delivered by 2020.

We currently still have around 48 million smart meters to install. Despite the best efforts of the RHI, it is estimated that 99 out of every 100 heating appliances sold in the UK is a gas boiler. Similarly, just 1% of the 2.6 million new cars registered in the UK in 2015 were eligible for the Plug-In Car Grant. .

Given these infrastructure challenges, it is simply not feasible to use a whole systems approach to meet our 2020 targets.

We believe that DECC should be exploring what systems could be deployed to meet our 2050 carbon targets. For example looking at how waste management can help low carbon heat deployment and low carbon road haulage. Smart meters and heating controls could reduce overall heat demand and provide the information for grid balancing.

However, we should not expect a whole systems approach to be easy to implement and should not be considered a 'silver bullet'.

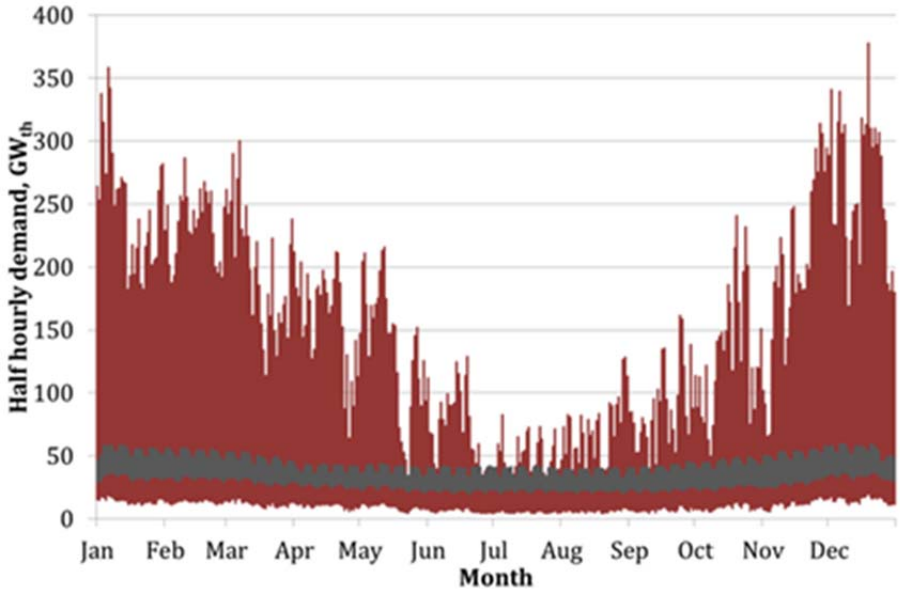
There are very few actual examples of whole system approaches being deployed. The technological developments required are extremely complex and the government has a poor track record of trying to manage large inter-related IT projects.

If the market is able to develop whole systems approaches then this should be encouraged. But these should be allowed to develop naturally in order to maximise benefit and reduce cost. DECC and government's role should be to facilitate this and not to dictate it.

But we must reiterate our caution that relying on a whole systems approach could place too much expectation on currently untested technology and theory.

To what extent is electrification of heat and transport a viable approach up to 2020 and beyond?

Put simply it is not. This graph below explains the reason very simply:



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

Gas and petroleum currently account for 75% of final energy consumption in the UK (DECC – ECUK, Chart 4) - 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 (not yet invented) electricity storage or increased generational capacity that would be unused for much of the year.

So, EUA does not believe that wholesale electrification of heat is a viable approach to meeting our 2020 or beyond targets.

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. Heat pumps need a low-temperature system to operate efficiently. This often means the homeowner will need new pipework and radiators. On top of that, increased electrical demand would require further expenditure on grid reinforcement and new power plant.

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.

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.

Electrification could have a role for new build properties. A new build home has the ability to include electric heat pumps at a low cost and to ensure the thermal properties of the building are suitable. Unfortunately, the watering down of the Zero Carbon Homes requirements for new homes has reduced the best driver for this. Reinstating it would go a long way to ensuring new homes are future proofed at a low cost. This is further compounded by the fact that house building has not increased at a rate to justify its removal.

However, the electrification of new build is a long term project and would have no impact on the 2020 targets. Also, 80% of our housing stock will still be with us in 2050. That is why tackling existing build is so important. As stated before in this document, decarbonising gas is the simplest and effective way of doing this.

One further point is that until electricity is much less carbon intensive the electrification of heat is going to have a negligible impact on carbon emissions. Grid electricity currently produces 2.7 times more carbon dioxide equivalent per unit of energy than natural gas. Given the high efficiency of modern gas boilers, a heat pump would need to be around 250% efficient just to attain carbon parity. While this is theoretically possible, the real world

evidence suggests that a high proportion of “renewable” heating systems are actually less green than the fossil fuel alternative. Many of the future energy scenarios in the public domain are predicated on the assumption that grid electricity will be significantly decarbonised in the near future. One of the key ways of achieving this was the widespread introduction of Carbon Capture and Storage (CCS). With the government cutting funding for CCS, it is unclear how grid electricity will be cost effectively and reliably decarbonised.

This illustrates the banality of the renewables target. Reducing carbon emissions is vital. However, the mechanism for achieving this is irrelevant, provided it is sustainable and has few negative side effects. The increased use of biomass for electricity and heat generation arguably do not meet these criteria. To put it plainly, a singular focus on a short term goal could actually increase carbon emissions and prove detrimental to the UK’s ability to meet its more meaningful longer term targets.

What are the challenges (regulatory, technological, behavioural, and others) to decarbonising heat and transport over the longer-term and how might these be overcome?

Decarbonising heat is an extremely complex issue. Existing policies have tended to focus on the replacement of ~27 million heating appliances across the UK.

Mass replacement of products across the country is not simple and increasingly difficult. The slow deployment of smart meters and the Kafkaesque complexity of the regulations needed to support it are a testament to this. With only 2 million smart meters installed, we will need to install an average of 30,000 smart meters each day to meet our 2020 deadline.

This is why EUA are urging DECC to resist dictating change on a micro level and instead let the market implement change.

The RIIO programme has enabled innovation funding to come forward to allow the gas distribution networks to look at innovative ways to decarbonise their gas and to make deployment and repair of gas mains less expensive and complicated. RIIO does not dictate how this should be done, which is precisely why it has been such a success.

If the Gas Distribution Networks decarbonise their gas, then carbon emissions from homes will be slashed without householders having to change their behaviour. The current trend for recommending replacing millions of appliances with more expensive alternatives will be seen as outdated.

Our proposed solution addresses many of the behavioural problems with decarbonising heat. We know from discussion with gas engineers, manufacturers and evidence from schemes like the RHI, that the majority of consumers are not interested in replacing their appliances. Despite the regulations changing in 2005 to require all new boilers to be condensing, 9 million homes still have a non-condensing boiler, despite the compelling bill savings that could result from changing.

The RHI has resulted in the installation of just 20,000 new 'renewable' appliances in nearly two years. This is in spite of the significant financial incentives for those who install them. At a time of near-zero interest rates, it speaks volumes that a scheme offering a target rate of return of 7.5% has received such sparse interest. The evidence suggests that those who have installed renewable appliances are financially secure and live in large properties, where the economic case for joining the scheme is most compelling. This feature of the scheme is well documented in the RHI's supporting information. However, having noticed this, DECC's proposals to incentivise renewable heating in less affluent households, unfortunately, don't have the substance to make them realistic solutions.

Wales and West Utilities carried out a project in Bridgend to look at how they could decarbonise properties in the town. They found that the majority of households didn't have sufficient savings to ever be able to afford a heat pump or biomass boiler. They also found that heat networks were prohibitively expensive. The people of Bridgend were also not willing to change from their existing appliances. This backs up other studies that show that people like their gas boilers and are reluctant to change.

Some organisations and think tanks would advocate forcing people to change, either by affecting house sales or by penalising people. EUA does not see how this is fair or politically viable.

Once again, this points to decarbonising gas as the simplest and easiest solution.

There are some planning issues that would have to be addressed in order to roll out green gas. For Bio-SNG, waste would need to be sent to plant to be transformed to gas. At the moment, councils are tendering out for waste incinerators. Councils would need to be asked to build Bio-SNG plant instead. The payback for councils is just as favourable and would solve long-term waste storage issues. However, this change would need to be assisted to ensure new waste incinerators are not built in the coming years as they have 25-year life spans.

The gas Wobbe index would also need to be addressed. Currently, the Wobbe index, the regulation that controls the makeup of gas used in the UK, is tightly controlled. A project in Oban by Scottish Gas has demonstrated that widening the Wobbe index would not affect gas appliances. However, this would need to be agreed by DECC.

These issues are small compared to the regulatory, cost and behavioural issues that would need to be overcome if we were to move to an all-electric heating system.

As we have said throughout this document the only sensible, cost effective and deliverable solution to decarbonising heat is by 'greening' our gas. It can be done, it can be delivered effectively and it is already being done on a small scale across the country. We urge the Energy and Climate Change Committee to recommend a move away from the arbitrary and ineffective renewables targets for 2020 and instead look at how we decarbonise the UK for 2050. Green Gas remains the best solution for this.

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

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