

## The Sixth Carbon Budget and Welsh emissions targets – Call for Evidence

### EUA response

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 six organisational divisions - Utility Networks, 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) and the Gas Vehicles Network (GVN).

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### Question and answer form

When responding, please provide answers that are as specific and evidence-based as possible, providing data and references to the extent possible.

***Please limit your answers to 400 words per question and provide supporting evidence (e.g. academic literature, market assessments, policy reports, etc.) along with your responses.***

### B. The path to the 2050 target

**Question 5:** How big a role can consumer, individual or household behaviour play in delivering emissions reductions? How can this be credibly assessed and incentivised?

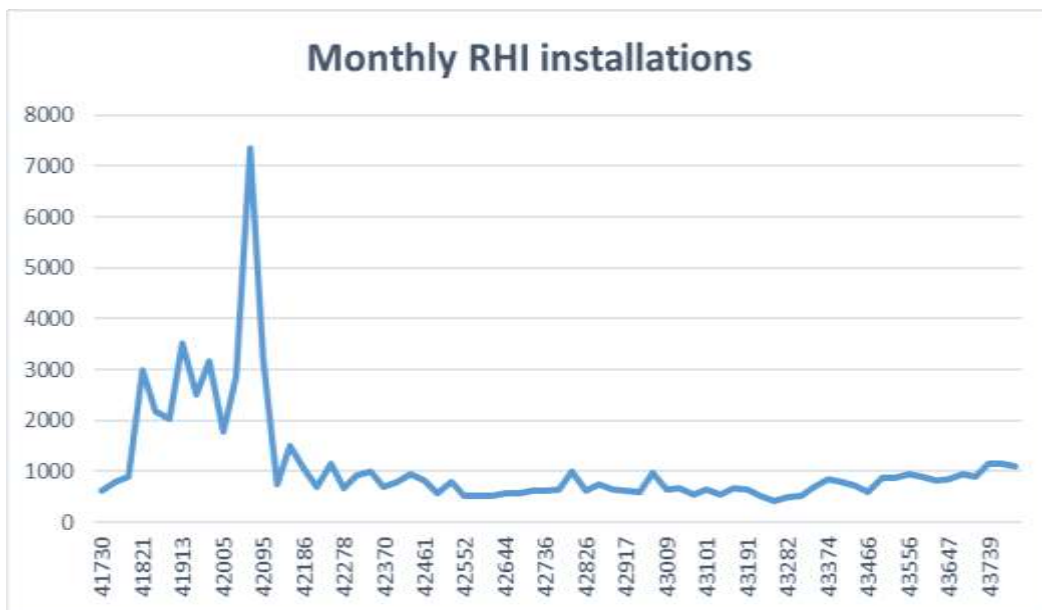
Consumer acceptance of technologies and methods of delivering emissions reduction will be key to the success of efforts to meet the sixth carbon budget. In the domestic sphere, consumers will need to make, or at least accept, changes to the ways in which they use energy and interact with technology.

The extent to which households and landlords are willing and able to improve the energy efficiency of their property and adopt sources of low carbon heating will have a great impact on our ability to meet the 2050 net zero target.

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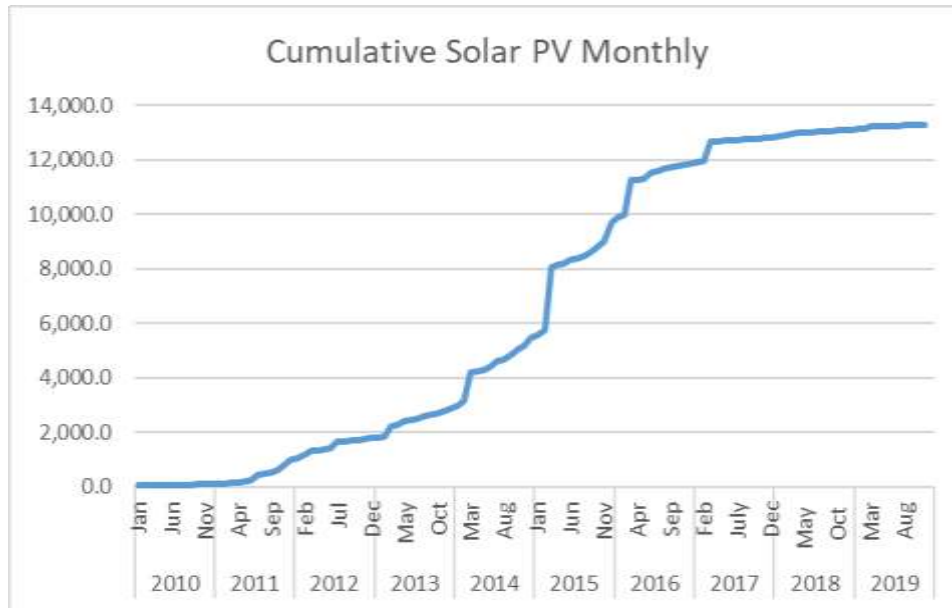
- Much of the progress that needs to happen in this area will need to happen, or be well underway, during the period of the sixth carbon budget; supply chains will need to be developed and technologies accessible and affordable for the majority.
- The form and restrictions of schemes to encourage or incentivise these changes will have a huge impact on their reach and acceptability to consumers.
- Transport will be another key area of change for consumers; the vast majority will either have to adopt an alternatively fuelled vehicle or make greater use of public transport.
- There are ways that the Government can measure the choices being made by consumers, individuals and households and, therefore, how big the role they can play in delivering emissions reductions is.
- The Government already commissions studies such as the English Housing Survey which can assess the use of energy in homes.
- Data on new vehicle sales and registrations can show the penetration of non-petrol and diesel vehicles in the market.

However, we should caution against assuming significant consumer changes. Recent history shows that voluntary or 'nudge' schemes have not provided significant results, (Green Deal, RHI, transition to energy efficient homes). Instead either very generous subsidies (FITs for Solar PV) or simple legislative changes (Condensing Boilers, New Homes standards) have been far more effective.



Despite the RHI subsidies and large initial uptake of the technologies, not much significant movement post 2015, as indicates a largely unsuccessful 'nudge' scheme.

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Very generous subsidy schemes like Solar PV saw significant improvement in volumes, even post 2015. Levels dropped off as the subsidies began to be withdrawn.

For this reason, we believe hydrogen ready appliances<sup>1</sup> should play a significant role in the decarbonisation route map. This will require much less behavioural change than other similar low carbon heat choices and would allow the focus to be on much needed energy efficiency fabric improvements.

**Question 6:** What are the most important uncertainties that policy needs to take into account in thinking about achieving Net Zero? How can government develop a strategy that helps to retain robustness to those uncertainties, for example low-regrets options and approaches that maintain optionality?

The development of new and innovative technologies which could complement or even supersede low carbon options in various sectors could provide a challenge if policy is too narrow; the Government therefore needs to avoid picking winners and instead maintain a more flexible approach which champions consumer choice and preferences.

Within the domestic sphere, an example of this would be incentives or low cost finance for low carbon heating technologies and energy efficiency upgrades which allow consumers, after taking advice from a qualified installer, to make a choice over which options suit their property and energy needs.

The timely development of CCSU is also a key uncertainty. In order to decarbonise it is very likely that this technology will be needed and yet progress in bringing this to market

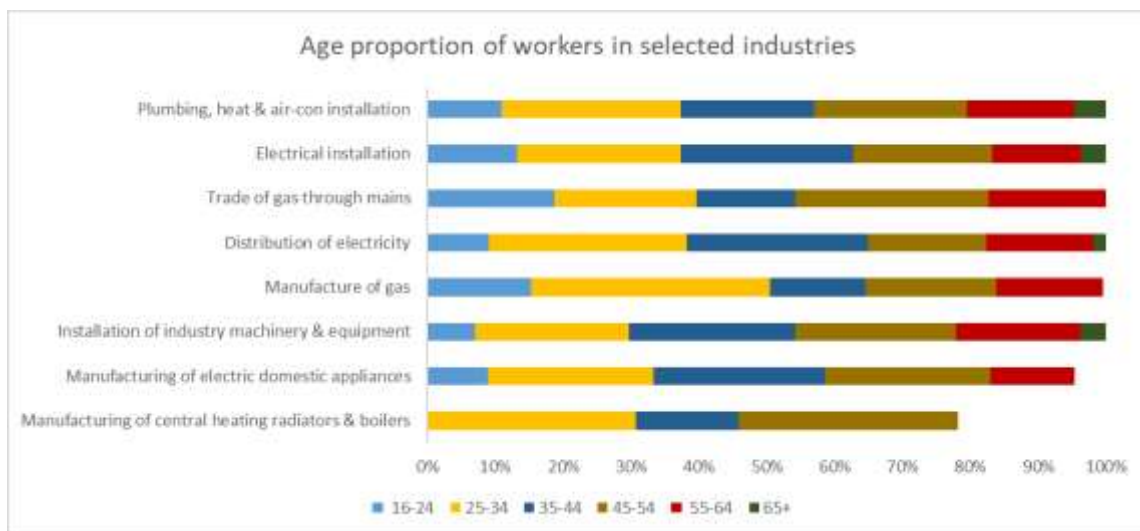
<sup>1</sup> [The Future of Fuel: What the future holds for the UK's mains gas network](#), Worcester Bosch  
[Nigel Evans visits Baxi Heating to see the company's first pure hydrogen boiler](#), Baxi, December 2019  
[Unveiling our industry plan for the world's first zero emissions gas network](#), SGN, November 2019  
[Pathways to Net-Zero: Decarbonising the Gas Networks in Great Britain](#), ENA, October 2019

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appears to have stalled. In order to decarbonise electricity by 2030 and to start to bring forward hydrogen, CCSU will need to be active. Government have to prioritise funding for this technology. It is both a low regret option and one that maintains optionality.

Another key uncertainty is the future of heavy freight vehicles and larger public transit vehicles. There is an assumption that this will either move to battery technology or hydrogen. However, to date there has been little Government support on providing direction to investors and suppliers in this area. A key fuel to progressing to the fully decarbonised HGV transport is biomethane. But most strategies are focussed on domestic vehicles. The industry needs to be recognised in the decarbonisation road map to ensure refuelling stations and infrastructure is built, especially now we have a net zero target.

The final significant uncertainty is skilled workers to deliver the transition to net zero. Most industries in this sector have aging workforces<sup>2</sup>, especially in the heating sector. Some are seeing reducing workforces<sup>3</sup>.



As you can see, a majority of these inter-related industries are highly dependent on workers that are above 44 years of age. For the hydrogen roll out to be accomplished, the aptitude and flexibility of the workforce is important but how much of that is seen in older, more aged workforces? re-train and/or replace? cost? There is already a skill gap and more skilled younger workers are being poached by other sectors. National Grid says that we face a retirement crunch. One fifth of people currently working in the energy sector are set to retire by 2030 as the 'Baby Boomer' generation reaches pensionable age.

New entrants to the market are not training on renewable technologies and awareness is low<sup>4</sup>. A significant overhaul of the way renewable technologies are trained and accredited is needed. It is also far from certain that the workers needed to install energy efficiency measures will be found. The work is likely to be low paid, on short contracts and not appealing. Government will need a strategy on how it will overcome these issues.

<sup>2</sup> [Building the net zero energy workforce](#), National Grid, January 2020

<sup>3</sup> [Employment in UK industry \(% of total employment\)](#), The World Bank, retrieved January 2020

<sup>4</sup> [Renewable energy jobs in UK plunge by a third](#), The Guardian, May 2019

**Question 7:** The fourth and fifth carbon budgets (covering the periods of 2023-27 and 2028-32 respectively) have been set on the basis of the previous long-term target (at least 80% reduction in GHGs by 2050, relative to 1990 levels). Should the CCC revisit the level of these budgets in light of the net-zero target?

Yes, although this may mean a more difficult challenge for us to meet the sixth carbon budget, it will be necessary to avoid a steep reduction being required from 2038. It is also even more likely that we will miss the targets set in the 4th and 5th carbon budgets. This should focus the minds of Government in bringing forward the necessary policies to close the gap. We have to be prepared though for a more negative reaction and the targets being seen as unachievable.

### C. Delivering carbon budgets

**Question 9:** Carbon targets are only credible if they are accompanied by policy action. We set out a range of delivery challenges/priorities for the 2050 net-zero target in our Net Zero advice. What else is important for the period out to 2030/2035?

Addressing the carbon intensity of domestic energy consumption in the large proportion of homes which will be on the gas grid and not built to zero carbon standards will be key.

It is likely that it will be in this decade that the infrastructure changes needed to deliver Net Zero will have to be completed.

The Iron Mains Replacement Scheme is due to be completed by 2032<sup>5</sup>. After this point the gas grid will be compatible for hydrogen to start to be injected. There may be regional opportunities before this date. Therefore, the appliance park needs to see significant change, probably with the use of hydrogen ready boilers and cookers. Policies to support this will need to be enacted and live by this point.

For heavy goods road transport, it will be vital that the fleet is running on biomethane and that during this period we can start the transition to hydrogen refuelling stations. It is critical that the infrastructure to support biomethane HGVs and buses is in place<sup>6</sup>.

Consumers have to be informed by this point. We are very concerned that whilst most people are aware of the broad issues today, very few understand the scale of the change needed and the likely cost<sup>7 8</sup>. To avoid potentially disruptive resistance, we need to ensure that by the 2030 period consumers are aware and willing to make the necessary changes. This will need very careful planning and policy development, with particular care for more vulnerable and fuel poor households.

<sup>5</sup> [Enforcement Policy for the iron mains risk reduction programme 2013-2021](#), Health and Safety Executive

<sup>6</sup> [Make the switch now, tackle air pollution, save lives and the planet](#), Gas Vehicle Network, November 2019

<sup>7</sup> [Green conservatives?: Understanding what conservatives think about the environment](#), Bright Blue, April 2017  
[Polling on public attitudes to climate change \(Raw data\)](#), YouGov, January 2020

<sup>8</sup> [BEIS Public Attitudes Tracker \(wave 29\)](#), Department for Business, Energy and Industrial Strategy, March 2019

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Workers with the appropriate skills will also be need to be available in significant numbers by this period, or the training schemes to deliver the mass change that will have to take place in the early 2040s will need to be developed and live. Timing here may be an issue as people rarely train if a there isn't a job to go to.

**Question 10:** How should the Committee take into account targets/ambitions of UK local areas, cities, etc. in its advice on the sixth carbon budget?

The Committee will need to pay close attention to the direction of travel for some of the more proactive local authorities and/or combined authorities who are taking their own action on decarbonisation that suits their area e.g. Leeds with hydrogen. The critical issue will be how this is brought together in a wider national programme.

There has been a lot of emphasis put on regional development work in recent times, all of which helps in bringing forward initiatives. However, there has to be a national programme behind this to ensure they are all compatible and do not shut off other more beneficial pathways.

There is a concern from manufacturers and suppliers that an overly regional approach will increase prices and prevent certain innovations coming to market. In order to be cost effective many technologies will need some form of mass take up, especially for decarbonising heat. Product costs and product availability will be hampered with an overly regional approach.

Some regions may be much more proactive than others, we suspect there will be a stark city/rural divide and therefore the CCC should take an active role in advising which areas need more support to bring them up to the national average.

**Question 11:** Can impacts on competitiveness, the fiscal balance, fuel poverty and security of supply be managed regardless of the level of a budget, depending on how policy is designed and funded? What are the critical elements of policy design (including funding and delivery) which can help to manage these impacts?

Our recent history seems to indicate that this is not the case. The underfunded RHI and ECO schemes have led to far fewer measures installed in homes that was planned for. The Green Deal was a poorly designed and funded scheme which also failed to overcome these problems.

One of the first problems is often having a clear target. What does government want to achieve? For ECO this started as a way to increase funding for installing insulation and energy saving technology without the government having to directly fund it. Initially the budgets were high and so were the number of installations, but as this led to an increase in energy bills political pressure was brought to reduce the impact, the obvious effect was to reduce the measures installed<sup>9</sup>. The RHI couldn't decide if it was a scheme to trial low

<sup>9</sup> <https://www.nao.org.uk/wp-content/uploads/2016/04/Green-Deal-and-Energy-Company-Obligation.pdf>

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carbon technology, or an incentive scheme. The concern over not benefitting one technology over another or to not have runaway costs led to an overly conservative scheme that has failed to achieve.

Unfortunately, policy is complex to deliver. EUA would advocate that policy should be trialled in the 2020's by running small schemes to test policy. For example, testing what effect reducing stamp duty for energy efficient homes. If we take that learning and then use it to develop policy we may be able to better manage budget, consumers and competition.

There will also naturally be a difficult compromise between state control and competition. One point that will need to be avoided is policy capture by one or two large companies akin to what has happened with local authority procurement contracts and companies like Capita.

**Question 12:** How can a just transition to Net Zero be delivered that fairly shares the costs and benefits between different income groups, industries and parts of the UK, and protects vulnerable workers and consumers?

This is probably the most complex part of the transition. It is almost certain that there will be an increase in costs for all groups. We believe however that this is why any future decarbonisation plan has to not assess what the overall cost is going to be a single number but assess it on a more granular level.

For example, the CCC should assess how much the options will cost householders upfront, what are the immediate costs for new technologies, home improvements and energy. We have learnt with the RHI that consumers are mostly concerned with how much it will cost them upfront rather than long term savings, or spreading the cost out over a longer timescale<sup>10</sup>. If we are going to ask households for more than £10,000 for a new heat pump compared to the counterfactual of £2,500 for an existing gas boiler, then there will have to be mechanisms in place to mitigate that cost. Alternatively, other options such as hydrogen ready boilers may be more appropriate.

Initial reports<sup>11</sup> from industry are that hydrogen ready boilers could be manufactured and sold at around £200 over the counterfactual (£800 on average for an existing new boiler, so around £1000 for a hydrogen ready boiler). These can be installed by the existing workforce without additional training. This means that all boilers in the UK could be replaced with a hydrogen ready one in around 15 years, based on current annual sales of around 1.7 million. The upgrade required to make them 100% hydrogen compatible will take around an hour and cost an additional £100, approximately. The hy4heat project is currently exploring this in more detail, but it does offer a less costly and fairer way to decarbonise heating for those on the gas grid.

There will still be around 20% of homes where this is not compatible and so the safeguards will have to be on offering grants to those in fuel poverty and using low cost loans to help

<sup>10</sup> <https://www.eua.org.uk/uploads/5728A3487ECAD.pdf>

<sup>11</sup> <https://www.thetimes.co.uk/article/hydrogen-boilers-may-be-only-choice-for-homes-by-2025-2rw5t3tpt>

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the abler to pay sectors. The CCC should explore how bio fuels such as bio lpg and bio oil can also help the off grid sector as these in many cases would not require additional upfront costs.

## E. Sector-specific questions

**Question 21 (Surface transport):** In our Net Zero advice, the CCC identified three potential options to switch to zero emission HGVs – hydrogen, electrification with very fast chargers and electrification with overhead wires on motorways. What evidence and steps would be required to enable an operator to switch their fleets to one of these options? How could this transition be facilitated?

The only realistic and affordable option to switch to zero emission HGVs is to encourage the existing diesel fleet adopt gas vehicles. Today that would be using biomethane as a growing number of hauliers and companies are doing. These trucks and refuelling stations can then be converted to hydrogen. This will be far easier and simpler than trying to convert the fleet later in the 2030s. To facilitate the transition these steps will be vital.

- The maintenance of the Fuel Duty differential for the long term will ensure that CNG and LNG solutions continue to provide operators with significant cost savings over diesel.
- HGV fleets are typically renewed every six to ten years. Businesses will need to be encouraged to switch to cleaner alternative to diesel before the 2040 ban on new petrol and diesel sales. We believe taxation signals which create disincentives companies from continuing to purchase new diesel vehicles combined with penalties for driving such vehicles into urban areas, would provide the industry with clear signals.
- A network of refuelling station infrastructure is needed to support widespread adoption of gas powered vehicles. Currently gas refuelling infrastructure has been expanded with little or no subsidy from the Government. Whilst the expansion of this infrastructure continues at pace, without further signals from Government this may not be sufficient to keep up with future demand. Gas infrastructure put in place today can be repurposed for hydrogen in the future as we move to a zero carbon economy.
- The anticipated closure of the Renewable Heat Incentive (RHI) poses a considerable threat to the biomethane sector. Incentives for the generation of 'green gas' are extremely beneficial to the carbon reduction potential of the heat, power and transport sectors and uncertainty regarding the post-2021 regime is stifling business investment in potential clean sources of fuels. The Renewable Transport Fuel Obligation should remain an alternative subsidy regime for biomethane producers, however, we feel that a floor price is needed for Renewable Transport Fuel Certificates (RTFCs). The rates paid for biomethane used in transport are variable whereas those for heat under the RHI are at a fixed rate. If RTFCs are to substitute the RHI beyond 2021, then investors will require some level of certainty over the price they will be paid.



**Question 26 (Buildings):** For the majority of the housing stock in the CCC's Net Zero Further Ambition scenario, 2050 is assumed to be a realistic timeframe for full roll-out of energy efficiency and low-carbon heating.

- a) What evidence can you point to about the potential for decarbonising heat in buildings more quickly?
- b) What evidence do you have about the role behaviour change could play in driving forward more extensive decarbonisation of the building stock more quickly? What are the costs/levels of abatement that might be associated with a behaviour-led transition?

- a)** Based on current installation rates it would not be possible to decarbonise heating before 2050 without drastic Government intervention.

Currently gas boiler sales are running at 1.7million a year<sup>12</sup>. If these were all converted to Hydrogen ready boilers, then it would be feasible to replace the existing gas boiler stock in around 15 years. However best case scenario this could start in 2025. This would the boiler stock could be ready in 2040. But at this point hydrogen would have to be injected into the grid and it would be realistic to assume that the conversion process would take around 10 years to complete so taking us to 2050.

Heat pump sales are only at around 25,000<sup>13</sup> per year currently so there would have to be regulation to improve their uptake, even if new homes were mandated by 2025 to have heat pumps.

Heat networks will have limited impact due to geographical and building type constraints.

Therefore, we do not believe there is a credible roadmap to decarbonise heating significantly before 2050.

The concerning factor is that decision will need to made this decade if we are to achieve even a 2050 date. We are reassured that BEIS are undertaking trials for hydrogen and heat pumps, the completion date for these is 2022/2023. Lessons from these trials will have to be implemented quickly if we are to ensure we meet our carbon targets.

- b)** We do not believe consumer behaviour can be relied on to decarbonise the building stock more quickly. There may be some savings from smarter control systems and time of use tariffs, though these may be limited due to increase in demand overall.

It took close to 30 years to roll out central heating into most homes in the UK. There are still over 6 million non-condensing boilers in UK homes 15 years after legislation to mandate only condensing boilers<sup>14</sup>.

The high upfront costs and hassle factors will always be a major constraint on the amount of activity that will be possible through behaviour change. One other important factor is lack of space in UK homes. Since 2005 the number of hot water storage cylinders installed in UK homes has halved<sup>15</sup>. This space has been taken by new

<sup>12</sup> <https://www.installeronline.co.uk/2019-record-year-gas-boiler-sales/>

<sup>13</sup> BSRIA data

<sup>14</sup> <https://www.gov.uk/government/statistics/english-housing-survey-2018-to-2019-headline-report>

<sup>15</sup> Hot Water Association Statistics

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bathrooms or built in storage space. Most new homes have no space for storage. A large number of lofts are not accessible and a significant number of cavities are hard to treat. The cost savings to consumers are also minimal.

CCC could recommend policy trials for initiatives to overcome so of those barriers, but it is unlikely to lead to a significant increase in decarbonisation that could lead to early achievement of net zero.

**Question 27 (Buildings):** Do we currently have the right skills in place to enable widespread retrofit and build of low-carbon buildings? If not, where are skills lacking and what are the gaps in the current training framework? To what extent are existing skill sets readily transferable to low-carbon skills requirements?

We currently don't have the skills for decarbonising heat. However, we do have the mechanism. Currently there are approximately 130,000 registered gas engineers. All registered engineers have to pass an exam and retrain every 5 years under the ACS programme. This is administered by EU Skills. We would advocate that this mechanism should be used to retain these engineers to be able to install low carbon heating appliances. It is a legally mandated route that is relatively low cost and would dovetail into an existing work stream without the upheaval and complexities of a new accreditation and training system. We are in discussions with the HSE and BEIS on how this could happen practically.

Manufacturers also train around 30,000 engineers a year through their training centres. This was the route for upskilling engineers for the condensing boiler roll out. This route could be utilised for more product specific training. Manufacturers would be happy to talk about how a structured training scheme could be organised.

**Question 28 (Buildings):** How can local/regional and national decision making be coordinated effectively to achieve the best outcomes for the UK as a whole? Can you point to any case studies which illustrate successful local or regional governance models for decision making in heat decarbonisation?

We don't have specific evidence on this area. However, it should be noted that manufacturers and suppliers will need a national market in order to achieve economies of scale for products. Regionality can disrupt that and make it harder to bring products to market that are affordable. It also complicate supply chains with uncertainty over delivery and availability. There are further concerns over training and skills development outside of a wider national framework.

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However, we do recognise that regional planning and local coordination can help in some circumstances, whilst cautioning that not all local councils and community groups are equal and there will need to be national oversight to ensure best practice.

**Question 31 (Hydrogen):** The Committee has recommended the Government support the delivery of at least one large-scale low-carbon hydrogen production facility in the 2020s. Beyond this initial facility, what mechanisms can be used to efficiently incentivise the production and use of low-carbon hydrogen? What are the most likely early applications for hydrogen?

The HyDeploy project is currently looking at the safety case for injecting up to 20% of hydrogen into the existing grid. All gas boilers are safety tested with up to 20% blended so it should be technically possible. This could be the best early use in the 2020s for heat and buildings. More information can be found

For transport, hydrogen cars are likely to be available in the mid-2020s<sup>16</sup>. However, this will be constrained by refuelling facilities. This is similar to the issue in decarbonising gas HGVs, the technology is available but without some upfront support or long term certainty mechanism it can be difficult to build the infrastructure, especially as there will not be demand until after the infrastructure is in place.

Issues around providing investors with some degree of ongoing certainty has derailed decarbonisation projects in the last 2 decades with a number of innovations failing to come to market, like micro CHP, principally because of a very uncertain investment environment. Government can help in these situations by declaring support or confidence in a market vector. However, this has to be underpinned by long term commitments. Too often Governments change policy direction or cut funding. There will need to be mechanisms that provide a level of guarantee for investors in these circumstances.

**Question 37 (Infrastructure):** What will be the key factors that will determine whether decarbonisation of heat in a particular area will require investment in the electricity distribution network, the gas distribution network or a heat network?

We believe that overall decarbonisation decisions should be made nationally; it would be too complicated to assume certain areas will have a different decision tree. For example, all pipes should be made suitable for hydrogen and all areas capable for electric cars. Heat networks are different but should probably be calculated on a project basis.

It is worth noting that the gas networks are already preparing the whole network for decarbonisation by undertaking the Iron Mains Replacement scheme, due for completion in 2032.

<sup>16</sup> <https://www.iea.org/reports/the-future-of-hydrogen>

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There could be certain geographic benefits, such as proximity to a hydrogen or biomethane production facility that could lead to a more regional strategy. However as stated in other questions, hydrogen and decarbonised heat appliances will need a national market in order to bring about cost reductions, adequate skills provision and innovation. Limiting certain regions to specific technologies is likely to be counterproductive and more expensive in the long term. We also have a well-developed and interconnected national grid for gas and electricity. This has enabled us to produce renewable electricity in the North Sea for use across the UK, regionalisation could create far more fragmentation and create resilience concerns, especially in rural areas with less diverse energy production facilities.