Committee on Climate Change

Independent advice to government on building a low-carbon economy and preparing for climate change

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

Background to the UK's sixth carbon budget

The UK Government and Parliament have adopted the Committee on Climate Change's (CCC) recommendation to target net-zero emissions of greenhouse gases (GHGs) in the UK by 2050 (i.e. at least a 100% reduction in emissions from 1990).

The Climate Change Act (2008, 'the Act') requires the Committee to provide advice to the Government about the appropriate level for each carbon budget (sequential five-year caps on GHGs) on the path to the long-term target. To date, in line with advice from the Committee, five carbon budgets have been legislated covering the period out to 2032.

The Committee must provide advice on the level of the sixth carbon budget (covering the period from 2033-37) before the end of 2020. The Committee intends to publish its advice early, in September 2020. This advice will set the path to net-zero GHG emissions for the UK, as the first time a carbon budget is set in law following that commitment.

Both the 2050 target and the carbon budgets guide the setting of policies to cut emissions across the economy (for example, as set out most recently in the 2017 Clean Growth Strategy).

The Act also specifies other factors the Committee must consider in our advice on carbon budgets – the advice should be based on the path to the UK's long-term target objective, consistent with international commitments and take into account considerations such as social circumstances (including fuel poverty), competitiveness, energy security and the Government's fiscal position.

The CCC will advise based on these considerations and a thorough assessment of the relevant evidence. This Call for Evidence will contribute to that advice.

Background to the Welsh third carbon budget and interim targets

Under the Environment (Wales) Act 2016, there is a duty on Welsh Ministers to set a maximum total amount for net Welsh greenhouse gas emissions (Welsh carbon budgets). The first budgetary period is 2016-20, and the remaining budgetary periods are each succeeding period of five years, ending with 2046-50.

The Committee is due to provide advice to the Welsh Government on the level of the third Welsh carbon budget (covering 2026-30) in 2020, and to provide updated advice on the levels of the second carbon budget (2021-25) and the interim targets for 2030 and 2040. Section D of this Call for Evidence (covering questions on Scotland, Wales and Northern Ireland) includes a set of questions to inform the Committee's advice to the Welsh Government.

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.

A. Climate science and international circumstances

Question 1: The climate science considered in the CCC's 2019 Net Zero report, based on the IPCC Special Report on Global Warming of 1.5°C, will form the basis of this advice. What additional evidence on climate science, aside from the most recent IPCC Special Reports on Land and the Oceans and Cryosphere, should the CCC consider in setting the level of the sixth carbon budget?

ANSWER:

Question 2: How relevant are estimates of the remaining global cumulative CO_2 budgets (consistent with the Paris Agreement long-term temperature goal) for constraining UK cumulative emissions on the pathway to reaching net-zero GHGs by 2050?

ANSWER: They are a relevant benchmark, yet their impact in constraining UK cumulative emissions may remain a political consideration in the first instance.

Question 3: How should emerging updated international commitments to reduce emissions by 2030 impact on the level of the sixth carbon budget for the UK? Are there other actions the UK should be taking alongside setting the sixth carbon budget, and taking the actions necessary to meet it, to support the global effort to implement the Paris Agreement?

ANSWER: Given the Net Zero commitment further international commitment appear to only leave room for either Net Positive commitments, or more urgent deployment commitments – both could offer potential opportunity for the UK to act, as an exemplar nation, as a first mover in technologies. Many communities of the UK now have political leaders who have signed up to more urgent net zero ambitions and/or climate emergency motions which suggests greater power and additional levers in the hands of local and combined authorities would add to the urgency of the UK response, while bringing further players into action – this could be particularly relevant to the retrofitting of the existing housing stock and the deployment of higher standard of build for new homes (avoiding further future retrofit, reducing general domestic energy demand, reducing the need for unnecessary energy infrastructure (which can be carbon intense in construction).

Question 4: What is the international signalling value of a revised and strengthened UK NDC (for the period around 2030) as part of a package of action which includes setting the level of the sixth carbon budget?

ANSWER: This may depend on how the UK is viewed as post Brexit trade relationships become clearer towards the end of 2020. What could be of wider value, and less dependent on these unknown outcomes, would be for the devolved equivalents of NDCs – what would be the impact of a Welsh Declared Contribution, or a London, Manchester or Liverpool – linked to combined authority and city deal powers these could reinforce the additional capability, local action and community buy in that these parties can bring

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?

ANSWER: They can through consumer power and expectations, yet they are often dependent upon the system within which they are a party so should not be expected to be the sole source of action or pressure for change; so a meaningful yet shared role. At the highest level there are two types of decisions that could be interrogated to assess their role – 'entry' decisions, and operational decisions. The former would include whether to buy an ULEV or not, whether to retrofit your home with demand reducing and energy capturing technology (various elements making up an Active Building dependent on the nature of the home), whether to buy a home with greater attention to energy bills and EPC ratings; operational decisions are repeated, yet changeable decisions, e.g. food purchasing, mode of transport for long and short journeys, energy supplier and tariff – many of these can and are be monitored, some may require greater analysis of whole life carbon impacts to make a judgement on their value as behaviours to incentives (or to disincentivise their opposite)

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?

ANSWER: The most fundamental uncertainty is that we don't collectively know how well we could respond if we took climate emergency seriously – and we risk only finding that out when it is all too late; glorious failure akin to the polar explorers Scott and Franklin is profoundly undesirable! By contrast Amundsen and Rea took a much more open mind to their polar task.

Much of what is written and established in [policy regarding climate action is the wrong way round, e.g. we need to reduce this or stop that, when it should be much more about who wouldn't want to live in a cosy home that is low cost to run and wouldn't be out of place on Grand Designs; who wouldn't want to drive a car that doesn't pollute their neighbourhood.

Government should adopt a strategy that delivers the new age of post carbon living, and aim to get the UK there first; while change has its impacts and we should be actively mindful of achieving a just transition, there should be few regrets if we can help show the world how humanity can live and thrive post fossil fuels…..

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?

ANSWER: Yes, and also show how more urgent action sooner helps deliver – one interesting observation from a recent Ofgem event, referencing their struggle to balance the needs of current and future consumers and noting they have often prioritised the former – with a UK death rate of under 1% p.a. ~70% of the population alive today will be alive and dealing with climate impacts in 2050.

Question 8: What evidence do you have of the co-benefits of acting on climate change compatible with achieving Net Zero by 2050? What do these co-benefits mean for which emissions abatement should be prioritised and why?

ANSWER: There is a considerable and growing literature on the co-benefits of clean air/reduced air pollution, and while this is often initiated by concerned over emissions from vehicle exhausts there is a recognition of the air quality impacts of fossil fuel gas central heating boiler exhaust. Any move to non-fossil fuel heating will contribute to cleaner air.

See also the work of the C40 [https://www.c40.org/benefits], which highlights, with case studies the benefits of clean air, and walking & cycling.

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?

ANSWER: Greater urgency from all sectors and communities (not least to avoid freeloading on those who are taking action).

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?

ANSWER: Noting Qu.4 above, a key issue may be how to avoid freeloading by the less engaged so could the Committee quantify and illustrate the commitments made, and not made, across the 150 or so upper tier and combined authorities of the UK? (At the highest level of net zero or similar ambitions).

That would show the range, and potentially highlight where early adopters need support and what might be needed to bring up the laggards. The Committee could reinforce its understanding of which emissions are best attended to by locally led or nationally led interventions, and any consequential implications for local government; for example the current consultation on Part L of building regulations and the Future Home Standard include measures to prevent varied/higher standard from local authorities – given local authorities have led, through interventions such as 'The Merton Rule', their ability to trigger innovation through variety should be valued not constrained.

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?

ANSWER: N/A

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?

ANSWER: A whole piece of work in itself – the Committee should work with the Citizens Assembly and others to explore a) what ''just' means, and b) how that plays out over the short and medium terms. Nb 70% of the UK population alive today will be alive in 2050.

D. Scotland, Wales and Northern Ireland

Question 13: What specific circumstances need to be considered when recommending an emissions pathway or emissions reduction targets for Scotland, Wales and/or Northern Ireland, and how could these be reflected in our advice on the UK-wide sixth carbon budget?

ANSWER: The Committee will be aware of the devolutionary settlement for Wales and how that affects the ability of the Welsh Government and other Welsh institutions to impact on emissions, e.g. the non-devolved decision to only electrify the South Wales mainline railway to Cardiff rather than all the way to Swansea.

That said Wales does have devolved powers that can affect the trajectory of Welsh emissions, some of which is considered here - Re-energising Wales: A Framework for Action:
Next steps for Regulatory and Policy Powers over Energy in Wales - https://www.iwa.wales/wp-content/uploads/2018/04/IWA_WP5_FrameworkforAction_v6-3.pdf

That highlighted, among other things, that Wales has considerable powers in the built environment domain, powers that could be deployed more robustly and with greater urgency – an approach that could also support the development and growth of capacity and competence in a variety of Welsh businesses in this sector.

As you have already noted in your first Carbon Budget advise to the Welsh Government there are point sources of emissions that can make formulating policy more nuanced in Wales, having to take into account a particular entity rather than a sector – the more to Net Zero may help in that it forces all sources of emissions to be examined, and reduced the scope for trading off one sector against another – all will have to massively reduce their emissions.

ABC will have further evidence to follow from our Scottish and NI work later in the year.

Question 14: The Environment (Wales) Act 2016 includes a requirement that its targets and carbon budgets are set with regard to:

- The most recent report under section 8 on the State of Natural Resources in relation to Wales;
- The most recent Future Trends report under section 11 of the Well-Being of Future Generations (Wales) Act 2015;
- The most recent report (if any) under section 23 of that Act (Future Generations report).

a) What evidence should the Committee draw on in assessing impacts on sustainable management of natural resources, as assessed in the state of natural resources report?

b) What evidence do you have of the impact of acting on climate change on well-being? What are the opportunities to improve people's well-being, or potential risks, associated with activities to reduce emissions in Wales?

c) What evidence regarding future trends as identified and analysed in the future trends report should the Committee draw on in assessing the impacts of the targets?

d) Question 12 asks how a just transition to Net Zero can be achieved across the UK. Do you have any evidence on how delivery mechanisms to help meet the UK and Welsh targets may affect workers and consumers in Wales, and how to ensure the costs and benefits of this transition are fairly distributed?

ANSWER: On d) living in an Active Building has the potential to significantly reduce the cost of living, and the transition to Net Zero, for the occupants:

- It can directly reduce energy consumption, and hence energy bills, through lower demand (high fabric efficiency), scope for energy capture and storage giving reduced net demand for electricity (not least at otherwise peak times) and no requirement for gas connection;
- Suitably deployed Active Buildings can be thought of as part of a micro or local grid and in doing so could reduce costs associated with additional or reinforced electricity grid infrastructure (they also do away with the need for a gas network connection) – offering a further cost saving to energy consumers;
- Active Buildings are also designed to support the roll out of EVs, integrating them into the electricity system of the building, allowing for the use of the vehicle battery in wider energy management, as well as potentially providing renewable electricity to 'fuel' the vehicle, often at a price that is a third of more cheaper than the cost of liquid fossil fuel

Depending on siting and orientation Active Building may be more expensive to build, that though is cost potentially borne by the developer; with developer 'margins' effectively guaranteed at the present time a just and fair solution should require greater investment /a lower guaranteed profit margin, on their side in building buildings that are lower cost to run, while wholly fuelled by renewable energy.

Question 15: Do you have any further evidence on the appropriate level of Wales' third carbon budget (2026-30) and interim targets for 2030 and 2040, on the path to a reduction of at least 95% by 2050?

ANSWER: None to add

Question 16: Do you have any evidence on the appropriate level of Scotland's interim emissions reduction targets in 2030 and 2040?

ANSWER: None to add.

Question 17: In what particular respects do devolved and UK decision making need to be coordinated? How can devolved and UK decision making be coordinated effectively to achieve the best outcomes for the UK as a whole?

ANSWER: We are aware of the work of the Institute for Welsh Affairs (IWA) and UK100, the local authority network committed to 100% clean energy, to coordinate the engagement of the English Mayors and the Scottish and Welsh First Ministers so as to ensure the forthcoming RIIO-2 settlement for electricity distribution is fit for the achievement of their respective decarbonisation ambitions – that would require an open engagement with Ofgem and a robust understanding that while they oversee a UK regulated system it cannot continue to be place agnostic.

In parallel the work of National Grid FES team should build on the widespread investment being made in energy planning at local and regional level across the UK – these plans will both support local ambition to meet Net Zero and help develop a deeper understanding of the gaps in delivery that may remain for UK policy attention.

E. Sector-specific questions

Question 18 (Surface transport): As laid out in Chapter 5 of the Net Zero Technical Report (see page 149), the CCC's Further Ambition scenario for transport assumed 10% of car miles could be shifted to walking, cycling and public transport by 2050 (corresponding to over 30% of trips in total):

a) What percentage of trips nationwide could be avoided (e.g. through car sharing, working from home etc.) or shifted to walking, cycling (including e-bikes) and public transport by 2030/35 and by 2050? What proportion of total UK car mileage does this correspond to?

b) What policies, measures or investment could incentivise this transition?

ANSWER: For b) measures to support Active Buildings that integrate public service ULEVs would help incentivise this transition, providing new, clean and green bus and related vehicle alternatives to private fossil fuelled cars.

Question 19 (Surface transport): What could the potential impact of autonomous vehicles be on transport demand?

ANSWER: No additional evidence at this stage.

Question 20 (Surface transport): The CCC recommended in our Net Zero advice that the phase out of conventional car sales should occur by 2035 at the latest. What are the barriers to phasing out sales of conventional vehicles by 2030? How could these be addressed? Are the supply chains well placed to scale up? What might be the adverse consequences of a phase-out of conventional vehicles by 2030 and how could these be mitigated?

ANSWER: The deployment of Active Buildings can support the roll out of ICE alternatives – the work of the Active Building Centre includes the integration of EVs and related technologies within the energy scope of a building which has implications for the roll out of charging points, vehicle and building battery/storage technologies, the role of building standards in supporting EV roll out.

DfT/HMT should have assessment of the car scrappage schemes that have been deployed since the 2008 Low Carbon Industrial Strategy that would inform the mitigation measures that are required or best deployed.

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?

ANSWER: Nothing to add at this stage.

Question 22 (Industry): What policy mechanisms should be implemented to support decarbonisation of the sectors below? Please provide evidence to support this over alternative mechanisms.

a) Manufacturing sectors at risk of carbon leakage
b) Manufacturing sectors not at risk of carbon leakage
c) Fossil fuel production sectors
d) Off-road mobile machinery

ANSWER: Not a specific area of our expertise.

Question 23 (Industry): What would you highlight as international examples of good policy/practice on decarbonisation of manufacturing and fossil fuel supply emissions? Is there evidence to suggest that these policies or practices created economic opportunities (e.g. increased market shares, job creation) for the manufacturing and fossil fuel supply sectors?

ANSWER: Worth speaking to the Cambridge University Institute of Manufacturing, Professor Steve Evans (https://www.ifm.eng.cam.ac.uk/people/se321/).

Question 24 (Industry): How can the UK achieve a just transition in the fossil fuel supply sectors?

ANSWER: Challenging – the sector has massively contributed to unjust impacts, not least climate change impacts; how should this be accommodated while ensuring skills and competencies that are useful post fossil fuels are not lost.

Question 25 (Industry): In our Net Zero advice, the CCC identified a range of resource efficiency measures that can reduce emissions (see Chapter 4 of the Net Zero Technical Report, page 115), but found little evidence relating to the costs/savings of these measures. What evidence is there on the costs/savings of these and other resource efficiency measures (ideally on a £/tCO2e basis)?

ANSWER: On Construction both the Construction Innovation Hub (CIH) and the Active Building Centre (ABC) are engaged in research regarding productivity in the building sector, for example through the deployment of modular and off site construction techniques – more evidence will be forthcoming during 2020; the CIH can be found here - https://constructioninnovationhub.org.uk

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?

ANSWER: ABC's programme of work includes a consideration of technologies that should be deployed to provide decarbonised heat; many elements of their more immediate impact relate to the impending revisions to Part L of building regulations and how that steps up to a robust, non-gas, Future Homes Standard. We would be happy to discuss our emerging findings, both for new build, our initial focus, and for retrofit (subject to further work during 2020).

Further evidence can be found in the following links, which cover the form, function and potential of Active Buildings in different settings:

- The Active Classroom Case Study
- The Active Office Case Study
- The Active Industrial Building Case Study
- A distributed energy future for the UK

We have a distinct work package looking at social, health and well-being benefits of Active Buildings that could inform (b) in due course.

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?

No additional evidence at this stage

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?

ANSWER: Case study examples would include the work of Stoke-on-Trent City Council as part of the LGA/Nesta Creative Councils programme [https://www.nesta.org.uk/project/creative-councils/] which subsequently led to a successful 'city' deal for Stoke & Staffs County that includes the creation of a new heating system, with some novel heat solutions (please drop Hywel@activebuildingcentre.com, previously an advisor to that programme of work, a line for further detail

We are aware of further work on governance is being conducted by UK100 and also the Energy System Catapult. One important benefit of local and sub-national decision making is that there will be a greater variety of approaches, a greater degree of local integration and place based advantage being take, which would not otherwise appear in a solely UK wide view of opportunities.

Question 29 (Power): Think of a possible future power system without Government backed Contracts-for-Difference. What business models and/or policy instruments could be used to continue to decarbonise UK power emissions to close to zero by 2050, whilst minimising costs?

ANSWER: While this question is primarily a mass power system further analysis is required to assess the net impact of demand reduction, building and local energy provision. We already know that buildings can be built that do meet the 2030 Construction Sector target of a 50% reduction in (all) energy demand.

Active Buildings that we are aware of can readily provide the electricity required to power their associated EVs suggesting that a significant roll out of EV and solar PV enabled Active Buildings could ensure little or no increase in net electricity demand as we transition from ICEs to EVs, in turn affecting the future demand profile for power generation; as well as reducing costs to consumers of power they need to buy and infrastructure their bill payments help fund.

We are aware of at least one DNO that is looking at Domestic Flexibility as an approach to managing grid constraints/introducing aggregated demand side response; based on collections of Active Buildings, or an Active neighbourhood/local grid this could be another approach that is a bottom up contribution to power decarbonisation.

Question 30 (Power): In Chapter 2 of the Net Zero Technical Report we presented an illustrative power scenario for 2050 (see pages 40-41 in particular):

a) Which low-carbon technologies could play a greater/lesser role in the 2050 generation mix? What about in a generation mix in 2030/35?

b) Power from weather-dependent renewables is highly variable on both daily and seasonal scales. Modelling by Imperial College which informed the illustrative 2050 scenario suggested an important role for interconnection, battery storage and flexible demand in a future low-carbon power system:

   i. What other technologies could play a role here?

   ii. What evidence do you have for how much demand side flexibility might be realised?

ANSWER: Further to answer 29 we expect Active Buildings to play a considerable role in reducing net demand, supporting de-peaking and in time providing as route to inter-seasonal storage at the user level, as they provide an alternative route to generation and energy capture, specific controls and storage applications to meet users/consumers specific needs, while also reducing their costs AND bringing into play they capabilities and investment of the build and construction sectors (elements of which the CCC have rightly castigated in the past)

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?

ANSWER: We are aware of proposals in the work of the IWA RE-energising Wales programme to support the South Wales hydrogen cluster – for example to only offer planning permission to future CCGT stations in Wales on the basis that they be hydrogen fuel turbines, helping create a demand pull for hydrogen production in South Wales.

Question 32 (Aviation and Shipping): In September 2019 the Committee published advice to Government on international aviation and shipping and Net Zero. The Committee recognises that the primary policy approach for reducing emissions in these sectors should be set at the international level (e.g. through the International Civil Aviation Organisation and International Maritime Organisation). However, there is still a role for supplementary domestic policies to complement the international approach, provided these do not lead to concerns about competitiveness or carbon leakage. What are the domestic measures the UK could take to reduce aviation and shipping emissions over the period to 2030/35 and longer-term to 2050, which would not create significant competitiveness or carbon leakage risks? How much could these reduce emissions?

ANSWER: N/A

Question 33 (Agriculture and Land use): In Chapter 7 of the Net Zero Technical Report we presented our Further Ambition scenario for agriculture and land use (see page 199). The scenario requires measures to release land currently used for food production for other uses, whilst maintaining current per-capita food production. This is achieved through:

- A 20% reduction in consumption of red meat and dairy
- A 20% reduction in food waste by 2025
- Moving 10% of horticulture indoors
- An increase in agriculture productivity:
  - Crop yields rising from the current average of 8 tonnes/hectare for wheat (and equivalent rates for other crops) to 10 tonnes/hectare
  - Livestock stocking density increasing from just over 1 livestock unit (LU)/hectare to 1.5 LU/hectare

Can this increase in productivity be delivered in a sustainable manner?

Do you agree that these are the right measures and with the broad level of ambition indicated? Are there additional measures you would suggest?

ANSWER: N/A

Question 34 (Agriculture and Land use): Land spared through the measures set out in question 33 is used in our Further Ambition scenario for: afforestation (30,000 hectares/year), bioenergy crops (23,000 hectares/year), agro-forestry and hedgerows (~10% of agricultural land) and peatland restoration (50% of upland peat, 25% lowland peat). We also assume the take-up of low-carbon farming practices for soils and livestock. Do you agree that these are the key measures and with the broad level of ambition of each? Are there additional measures you would suggest?

ANSWER: N/A

Question 35 (Greenhouse gas removals): What relevant evidence exists regarding constraints on the rate at which the deployment of engineered GHG removals in the UK (such as bioenergy with carbon capture and storage or direct air capture) could scale-up by 2035?

ANSWER: N/A

Question 36 (Greenhouse gas removals): Is there evidence regarding near-term expected learning curves for the cost of engineered GHG removal through technologies such as bioenergy with carbon capture and storage or direct air capture of CO_2?

ANSWER: N/A

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?

ANSWER: The widespread deployment, or not, of Active Buildings !

And in the future an integrated regulatory framework for buildings and energy (electricity) distribution.

Question 38 (Infrastructure): What scale of carbon capture and storage development is needed and what does that mean for development of CO_2 transport and storage infrastructure over the period to 2030?

ANSWER: N/A