Briefing 21-21 **April 2021**

APSE Briefing: The Sixth Carbon Budget – Building's report

To: All Chief Executives, Main Contacts and APSE Contacts in England,
For Information: Scotland, Wales and Northern Ireland

Key Points

On 9 December the UK Climate Change Committee released its Sixth Carbon Budget report which included a number of subset reports and recommendations.

The report is based on analysis, consultation and consideration by the CCC and its staff. APSE Briefing 20-96 The Sixth Carbon Budget and Local Authority Recommendations published in December 2020 provides an overview of the report. This briefing provides more in-depth information and analysis of the section of the report relating to buildings.

1. Background.

The Climate Change Committee (CCC) is an independent, statutory body established under the Climate Change Act 2008. The purpose of the Committee is to advise the UK and devolved governments on emissions targets and to report to Parliament on progress made in reducing greenhouse gas emissions and preparing for, and adapting to, the impacts of climate change.

On 9 December the UK Climate Change Committee released its Sixth Carbon Budget report which included a number of subset reports and recommendations.

The report is based on analysis, consultation and consideration by the CCC and its staff. APSE Briefing 20-96 The Sixth Carbon Budget and Local Authority Recommendations published in December 2020 provided an overview of the report.

This briefing provides a more in-depth analysis of the scenarios outlined in the report on the issues of carbon reduction in buildings. A copy of the full report including details of the assumptions that the scenarios are based upon can be accessed via the following link:-

Sector Summary: Buildings

2. Current and historical emissions in buildings.

The first section of the report sets out the current and historical position regarding emissions in buildings and advises that direct greenhouse gas emissions from buildings were 87 MtCO2e in 2019, around 17% of the UK total. Including indirect emissions, buildings account for 23% of the UK total and can be split into three categories: -

- **Direct building CO_2 emissions**. These were 85 $MtCO_2$ in 2019, split between homes (77%), commercial buildings (14%) and public buildings (9%). Direct emissions in buildings result primarily from the use of fossil fuels for heating. Around 74% of the UK's heating and hot water demand in buildings is met by natural gas, and 10% by petroleum, with smaller amounts of other fuels such as coal and biomass.

- **Indirect building emissions**. Buildings are responsible for 59% of UK electricity consumption, equivalent to a further 31 $MtCO_2e$ of indirect emissions. Most electricity use (counted as indirect emissions) stems from appliances and lighting in homes, and cooling, catering and ICT equipment in non-residential buildings.

- **Non-CO2**. Around 1.4 $MtCO_2e$ of methane and 0.8 MtCO2e of nitrous oxide emissions were associated with buildings in 2019. The use of nitrous oxide as an anaesthetic account for just under 0.6 MtCO2e of these emissions. Other non-CO2 emissions are produced by fuel combustion processes.

Trends and drivers

The CCC highlight that direct emissions from buildings fell by 19% from 1990 to 2015. However, the emissions have remained at a similar level since then. Falls in emissions largely reflect energy efficiency improvements in buildings. Demand for gas and electricity has fallen by 16% and 14% respectively since 2005.

Indirect emissions from buildings have been falling at an average rate of 10% per year since 2009, due to both reductions in demand and the decarbonisation of electricity generation.

3. Options for reducing emissions

The CCC state that in the buildings sector, there are opportunities for emission reductions in four main areas: behaviour change, increasing the energy efficiency of the building stock, improving the energy efficiency of lighting and electrical appliances, and switching away from fossil-fuel based heat. In general, switching to efficient electric systems now delivers the largest readily available savings. These savings will grow steadily as the power sector continues to rapidly decarbonise.

Behaviour change – Residential Buildings
It is concluded that there is a range of steps that can be taken to reduce and manage energy use in homes, saving on both emissions and bills. The following range of measures are examined across the scenarios outlined in the report: -

- Turning off lights
- Pre-heating
- Smarter heating management and use
- Low-flow showerheads
- Hot water temperature
- Water softening
- Heat as a service

Behaviour Change - Public and commercial buildings
The report draws on evidence from the Building Energy Efficiency Survey (BEES) for both behaviour change and energy efficiency potential for non-residential buildings and these two categories of measures have not explicitly been separated in the analysis.

Efficiency – Residential buildings
The scenarios examine the role that a wide range of energy efficiency measures can play in reducing energy use in homes, both new build and existing homes. It is suggested that measures to address thermal efficiency, overheating, indoor air quality and moisture must be considered together when retrofitting or building new homes. The report, therefore also examines illustrative cost ranges for shading and ventilation measures in addition to these scenarios.

The energy efficiency assumptions have been updated in four key areas, relative to the CCC's previous work on the following; technical potential, range of measures, costs, and savings. The updated assumptions around costs and savings draw on a comprehensive assessment of the latest available evidence, undertaken by University College London.

It is stated that while the assumptions draw on the best available evidence, there remains some uncertainty over the costs and savings associated with the measures and it is stated that it is important that energy efficiency must be viewed in the context of the substantial wider benefits which can be delivered.

Efficiency - Public and commercial buildings
The evidence for energy efficiency potential in public and commercial buildings has been drawn from BEES and includes measures such as improved fabric efficiency, upgrades to lighting and cooling equipment, controls and metering.

Low carbon heat – residential buildings
The analysis for the CCC's 2018 report 'Hydrogen in a low-carbon economy' found that there was a range of pathways for heat decarbonisation, based on low-carbon hydrogen and / or electrification which have similar costs. On this basis this report sets out a range of pathways modelled for decarbonising heat, with the key objective of balancing the emissions trajectory. The range of models is aimed at allowing a flexible approach but also drives sufficient progress in the next decade.

The Committee's assessment of the economy-wide best use of biomass indicates that use in buildings should be minimised as far as possible. Therefore, some of the scenarios exclude a role for biofuels. Others include a limited role, restricted to use in hybrid configurations alongside heat pumps in the hardest-to-heat off-gas homes, such that biofuels provide a back-up role in meeting peak demands on the coldest winter days.

Low carbon heat - public and commercial buildings
The Sixth Carbon Budget scenarios explore a range of decarbonisation routes for public and commercial buildings, with a varying balance between electrification and hydrogen. The CCC advises that they see low-carbon district heat networks as providing a significant share of public and commercial heat demand and serving as key anchor loads for networks. It is reported that this is equivalent to around 22% by 2035 and 42% by 2050 in the majority of our scenarios. The analysis of district heating is based on a refresh of evidence commissioned for the Fifth Carbon Budget analysis. The 'Widespread Innovation' scenario explores lower district heat deployment, with a higher share of building-level technologies.

4. Approach to analysis for the Sixth Carbon Budget advice

This section of the report provides an outline of the Committee's approach to analysis. The report uses scenarios that explore a range of different futures, including ones with higher levels of innovation and behaviour change. The underlying aim of the scenarios is to develop approaches that minimise costs and disruption for households and businesses, and working with technology lifetimes to minimise

scrappage. In determining the pathways, the Committee has also tested a range of regulatory policy levers in addition to new business models.

It is advised that the starting point for determining the pathways was current Government policy. In addition, consideration has also been given to the impact of a range of extra policy levers, including the phase-out dates for fossil fuel boilers.

The model developed has been used to calculate end states for 2050 across scenarios, comprising of behavioural measures, energy efficiency measures and a low-carbon heating system for every home in the UK. The end states in the scenarios are informed by a number of considerations which include: -

- Cost-effectiveness
- Wider benefits
- Consumer preferences

The Committee has separately modelled the decarbonisation of gas cooking appliances (2.1% of residential direct emissions), and household and garden machinery (0.6% of residential direct emissions). It is assumed that gas cooking appliances will be replaced with electric appliances in most scenarios and that the phase-out of petrol and diesel household and garden machinery (such as lawnmowers, garden tractors, and hedge trimmers) will be aligned with the phase out of petrol vehicles in the transport sector (i.e., all new sales are zero-carbon from 2032 at the latest in a Balanced Pathway).

Public and commercial buildings

The non-residential buildings analysis was approached by reducing baseline emissions in the following sequence: subtracting energy savings from behavioural measures and energy efficiency, allocating a share of remaining heat demand to district heating, then analysing fuel-switching and improved system efficiency for remaining building-level heat, catering and other fossil fuel demands.

Deriving the paths for the devolved administrations across the UK

The devolved administrations have implemented their own targets for net zero, for example the Scottish Governments targets are as follows:

- Net zero by 2045
- Greenhouse gas emission to be cut by 75% on 1990 levels by 2030
- Reduce carbon by 56% by 2020, 75% by 2030, 90% by 2040 on 1990 levels
- 50% of homes and non-domestic properties to low carbon by 2030
- New build zero emissions heat standards will be implemented by 2024
- A review of energy efficiency standards for social housing will be implemented by 2023

To support these targets the Scottish Government have pledged £95m to decarbonise public sector estate.

The report takes into consideration the different pathways for the devolved administrations and these have been derived from a combination of approaches based on key metrics, and some more detailed workings for existing homes. However, the scenarios do not differentiate between the different regulatory levers which it is important to consider.

Approach to uncertainty
It is acknowledged in the report that there are key sources of uncertainty that are tested through the Buildings scenarios and these uncertainties have been identified as follows: -

- Energy costs
- Behaviour change
- Energy efficiency
- Heat mixes
- Heating technology costs, lifetimes and sizing
- Heat technology efficiency
- Pace of action

In addition, the Committee state that they have not explicitly modelled the impacts of COVID-19 on-demand and note that the longevity of any impacts remains highly uncertain. Any long-term shift to home working would lead to a shift in emissions from non-residential to residential buildings, particularly during the heating season. This could imply an increase in emissions in aggregate due to the loss in efficiency of having people working in a greater number of spaces that all need heating during working hours.

Residential buildings
The report advises that it has been possible to test the range of uncertainties through the scenarios, with sensitivities undertaken alongside. However, the analysis is limited by the number of scenarios that have been developed, and by the availability of evidence to inform assumptions. In particular, updated evidence or analysis in the following areas could be expected to impact aspects of the results: -

- Projections of fuel use and new homes
- Solid wall insulation
- Heat pump efficiency
- Hybrid heat pumps
- The performance gaps

It is also noted that changes in the UK's climate will impact the energy demand of buildings between now and 2050. The scenarios for homes have been designed to reflect a number of expected dynamics resulting from the changing climate.

Public and commercial buildings
The report states that there are a number of further uncertainties and limitations associated with the non-residential analysis that could have an impact on results:

- Energy efficiency cost
- Heat and hot water
- Heat technology mixes
- Heat technology costs
- Baseline projections
- N2O emissions from anaesthetics

It is stated that the scenarios and analytical approach have been deliberately designed to explore and test the implications of uncertainties, allowing for the Committee to develop a balanced assessment of achievable carbon savings which might be met in a range of ways. The Committee believes that while uncertainties will inevitably remain, the analysis undertaken provides a solid basis on which to proceed.

5. Emissions pathways for the buildings sector

Chapter two of the report focuses on the emissions pathways for the building sector and it is commented that across all buildings, around 34% of abatement to 2030 will come from energy efficiency measures, with a growing share of abatement from low-carbon heating, which dominates the picture from 2028 onwards. Buildings shift on to low carbon heat networks, high efficiency and flexible electrification, along with some hydrogen near industrial clusters from 2030.

It is stated that given boiler lifetimes of around 15 years, the CCC has looked at phasing out the installation of fossil fuel boilers, in advance of 2035 and therefore they have adopted a central date of 2033 for gas boilers across buildings, with public buildings moving faster.

The other key dates set out in the report are based on the need to build critical supply chains and skills and preparing the building stock for the transition to low-carbon heating, with most of the energy efficiency programme completed by the time fossil fuel boiler installations are phased out from 2033.

Energy efficiency in the Balanced Net Zero Pathway
The report advises that the household energy efficiency programme in the Balanced Net Zero Pathway corresponds to a similar level of ambition as the Government's EPC C targets. In total, 15 million households will receive one of the main insulation measures (loft / wall / floor) and a further 8 million will benefit from draught-proofing. Most homes with hot water tanks will benefit from hot water tank insulation and with all fuel poor homes receiving a high-efficiency upgrade.

Energy efficiency and behavioural measures in the Balanced Pathway deliver a 12% reduction in heat demand to 2050 (compared to a 22% reduction in the Committee's Tailwinds scenario).

It is commented that there remains uncertainty over the balance of costs and benefits for wall insulation in solid walled homes in particular, as well as levels of public support. Therefore, it is advised that further research is required to inform deployment. To the extent there is any under-delivery of solid wall insulation relative to the scenarios, the abatement would need to be delivered in other ways e.g. through increased uptake or performance of other energy efficiency measures, or through a faster rate of heat pump deployment.

The timetable associated with the Committee's Balanced Net Zero Pathway allows for rapid scale-up of supply chains for critical insulation measures which are outlined as follows: -

- Total loft insulations will rise rapidly from just 27,000 lofts insulated in the past year to back to over 700,000 installations per year by 2025. This compares to 1.6 million which were insulated in 2012 under the supplier obligations.
- The rate of cavity wall insulation will rise from 41,000 cavities to over 200,000 a year by 2025.
- Solid wall insulation measures will also increase to just over 250,000 a year by 2025 from just 11,000 in the past year.

The non-residential building scenarios include a 27% reduction in energy consumption compared with the CCC's 2018 baseline. In the Balanced Pathway, commercial energy efficiency is fully deployed by 2030 in line with the Clean Growth Strategy target and public sector measures are fully deployed by 2032 to contribute to the Government's emission reduction target.

Low-carbon heating in the Balanced Net Zero Pathway
The Balanced Net Zero Pathway implies that by 2030, low-carbon heat installations in homes could represent up to around 80% of sales. Of these low-carbon heat

installations, 75% are assumed to be heat pumps (including hydrogen hybrids), 19% are assumed to be low carbon heat networks, and 5% are other flexible electric heating with space heat storage or solar thermal.

The report also states that by 2030, 37% of public and commercial heat demand will be met by low-carbon sources. Of this low-carbon heat demand, 65% is met by heat pumps, 32% district heating and 3% biomass. By 2050 all heat demand will be met by low-carbon sources of which 52% is heat pumps, 42% is district heat, 5% is hydrogen boilers and around 1% is new direct electric heating.

6. Alternative routes to delivering abatement in the mid-2030s

This section of the report provides an overview of how abatement can be delivered using alternative scenarios. It is advised that the alternatives achieve close to zero emissions by 2050. The Tailwinds and Widespread Engagement pathways are faster than the Balanced Pathway, reducing close to zero by 2044. By 2035, the pathways achieve reductions of 45% - 65%, relative to current emissions.

The Committee explores different contexts by varying the key timings, costs, performance assumptions and by exploring the impact of innovation such as new business models. The alternative scenarios are summarised as follows: -

- **Widespread Engagement**. Households and businesses are prepared to undertake renovations at scale through the 2020s, with high levels of preheating and other behaviour change in homes.

- **Innovation.** Power sector innovation drives down electricity costs. Households adopt smart, flexible electric heating including hybrid heat pumps, as well as high-temperature heat pumps. New business models such heat-as-a-service and new financial models for deep retrofits become common, delivering-high performance solutions. High levels of cost reduction through learning, and increases in performance over time.

- **Headwinds.** People change behaviour and new technologies develop, but there are no widespread behavioural shifts or innovations that significantly reduce the cost of green technologies ahead of current projections. Alongside strong electrification, there is widespread use of hydrogen, led by the conversion of industrial clusters.

- **Tailwinds**. Households and businesses support early regulatory approaches, and minimise their use of energy through behaviour change and the highest

uptake of energy efficiency measures. At the same time, innovation drives down costs (with 40% reductions in heat pump costs to 2050) and drives up performance.

It is also stated that the availability of hydrogen in the Headwinds scenario is increased at an ambitious rate in the 2030s, implying that some possible hydrogen-dominated pathways could lead to lower emissions in the budget period. However, as a result, this scenario has considerably higher overall hydrogen demand, creating a substantially bigger challenge to source sufficient volumes of low-carbon hydrogen. In turn, this is likely to lead to more use of fossil gas reforming with carbon capture and storage (CCS), increasing residual emissions from hydrogen production and increasing reliance on CCS and fossil gas imports.

While higher buildings demands could be conceived of, these have not been included in the scenarios due to supply challenges and residual emissions.

The report provides a summary of the key differences in the building sector scenarios for Balanced Net Zero Pathway, Widespread engagement, Widespread Innovation, Headwinds and tailwinds: -

Behaviour change and demand reduction

- **Balanced Net Zero Pathway** - Moderate levels of behaviour change (homes). 25% of eligible households preheat, 3% reduction in space heat demand from smarter heating management and use, low-flow showerheads.
- **Widespread engagement** - High levels of behaviour change (homes). 50% of eligible households preheat, 6% reduction in space heat demand, 50°C hot water temperature with daily legionella cycle, low flow showerheads.
- **Widespread innovation** - High levels of behaviour change (homes). 50% of eligible households preheat, 6% reduction in space heat demand, heat-as-a-service delivering higher performance, low flow showerheads
- **Headwinds** - Moderate levels of behaviour change (homes) 25% of eligible households preheat, 3% reduction in space heat demand, low flow showerheads
- **Tailwinds** - High levels of behaviour change (homes) 50% of eligible households preheat, 6% reduction in space heat demand, heat-as-a-service delivering higher performance, low flow showerheads

Efficiency

- **Balanced Net Zero Pathway -** Moderate energy efficiency uptake in homes. Loft and wall insulation for all fuel poor. Fast commercial uptake; Moderate-paced public uptake.

- **Widespread engagement -** Moderate-high energy efficiency uptake in homes. Loft and wall insulation for all fuel poor. Fast uptake of energy efficiency in other building
- **Widespread innovation -** Lower energy efficiency uptake in homes. Loft and wall insulation for all fuel poor. Innovation drives down energy efficiency costs and delivers high-performing deep retrofits. Moderate-paced uptake in other buildings.
- **Headwinds -** Lower energy efficiency uptake in homes. Loft and wall insulation for all fuel poor. Slow commercial uptake; moderate-paced public uptake.
- **Tailwinds -** High energy efficiency uptake in homes (full economic potential). Loft and wall insulation for all fuel poor. Fast uptake of energy efficiency in other buildings

Low-carbon fuels/ technology

- **Balanced Net Zero Pathway -** Hybrid hydrogen scenario in homes, with 11% of homes using hydrogen for heat. Limited use of biofuels in homes. Heat networks fully electrified. Non-residential buildings heat and catering demands mainly electrified with some hydrogen**.**
- **Widespread engagement -** Fully electrified scenario (including heat networks). No biofuels in homes.
- **Widespread innovation -** Hybrid hydrogen scenario in homes, with 10% of homes using hydrogen for heat. Widespread uptake of high-temperature heat pumps and flexible technology. No biofuels in homes. Heat networks fully electrified. Lower levels of low carbon heat networks in non-residential buildings. Non-residential buildings heat and catering demands mainly electrified with some hydrogen. Higher efficiency of heat pumps and greater reduction in cost over time.
- **Headwinds -** Widespread network conversion to hydrogen, with 71% of homes using hydrogen for heat. A smaller role for heat pumps across all buildings; 13 million in homes. In homes, hydrogen boilers in north and heat pump-hydrogen hybrids in south. Limited use of biofuels. Heat networks supplied by hydrogen and large-scale heat pumps. Catering and cooking demand predominantly met with hydrogen.
- **Tailwinds -** Buildings fully electrified, except for areas around industrial clusters which use H2 boilers. 11% of homes using hydrogen for heat. No biofuels in homes. Higher efficiency of heat pumps and greater reduction in cost over time

This section of the report concludes with an outline of the critical dates and scenario metrics for the Balanced Net Zero Pathway.

7. Impacts of the scenarios: costs, benefits and co-impacts on society

This section of the report focuses and the cost, benefits and co-impacts of the scenarios. In the 2019 Net Zero report, it was identified that buildings were one of the costliest challenges across the economy, with in-year costs in 2050 of around £15 billion per year and uncertainty around the total costs throughout the period to 2050. These costs have been updated in the Sixth Carbon Budget pathways with an estimate provided for the full costs.

It is reported that the Balanced Pathway requires investment across all buildings (residential and non-residential) at an average rate of around £12 billion per year to 2050, offset by reductions in operating costs of £5 billion per year and a summary of cost is provided as follows:

- Total investment costs are £360 billion to 2050, of which around £250 billion is for the programme of upgrading homes and £110 billion in public and commercial buildings.
- Total investment in the programme of efficiency in existing homes in this scenario is around £45 billion to 2035 with a total spend of £55 billion by 2050. This compares to BEIS's published estimate of £35-65 billion to achieve the EPC C standard.
- Total investment costs are less than £10,000 per household on average in our Balanced Pathway. 63% of homes need spend no more than £1000 on retrofitting energy efficiency measures.
- The deployment of all energy efficiency potential in public and commercial buildings entails £2 billion per year of commercial investment to 2030 and £0.5 billion per year of public sector investment to 2032. Annual operating cost savings of around £1.5 billion and £0.5 billion result for commercial and public buildings respectively.
- Including low-carbon heat increases this to £2.8 billion per year investment in commercial buildings and £0.9 billion in public buildings through the 2030s and 2040s. This is associated with total operating cost savings of £3 billion per year across public and commercial buildings.

It is also commented that energy efficiency is projected to deliver ongoing operating cost savings, resulting in lower overall bills for households in all scenarios apart from Headwinds. Behaviour change in the Balanced Pathway is estimated to contribute around £0.4 billion of savings per year by 2050.

The Committee also set out the benefits of the Balanced Pathway and state that it represents a major investment programme, which if managed well could have a

strong economic benefit, acting as a stimulus and create skilled employment throughout the UK, and form part of the 'green recovery.'

In addition, upgrading the building stock will deliver a significant set of wider benefits in terms of improved comfort and health, particularly for the fuel poor and retrofitting buildings to meet the challenges of climate change has also got the potential to play role in the regeneration of the area.

8. Policy recommendations for the buildings sector

Chapter three of the report sets out the Committee's recommendations for the buildings sector and builds on the recommendations put forward in the CCC's 2020 Progress Report to Parliament.

The policy recommendations for the buildings sector are summarised as follows: -

- **Heat and buildings strategy** - Produce a robust and ambitious heat strategy that sets the direction for the next decade, with clear signals on the phase-out of fossil heating and funding commitments. This must include a clear set of standards; plans to rebalance policy costs while making low carbon more financially attractive; plans to introduce green building passports, and a role for area-based energy plans.
- **Standards for existing buildings** - Bring forward the date to reach EPC C in social homes to 2028, in line with the Private Rented Sector (PRS) proposals, and finalise the delivery mechanism. Implement PRS proposals for homes and non-residential buildings in line with new proposals and implement improvements to the EPC framework, including ensuring they drive the energy efficiency measures needed. Develop options to cover the regulatory policy gap for owner-occupied homes, looking at trigger points at point of sale and through mortgages. Publish proposals for standards to phase out liquid and solid fossil fuels by 2028, and in-use standards in commercial buildings.
- **Newbuild standards** - Implement a strong set of standards – with robust enforcement – that ensure buildings are designed for a changing climate and deliver high levels of energy efficiency, alongside low carbon heat. Publish a robust definition of the Future Homes Standard and legislate in advance of 2023.
- **Green recovery and supply chain development** - Provide a stable long-term policy framework to support sustained growth at sufficient scale (i.e., 600,000 heat pumps per year in existing homes by 2028). Ensure continuing support for non-residential heat pump installations beyond 2022, including

low-carbon heat sources for district heating schemes. Create a level-playing field for hybrid heat pumps by continuing to support new business models off the gas grid both financially and by ensuring hybrid heat pumps are an integral part of PAS2035 retrofit coordinator advice.

- **Hydrogen development** - BEIS and Ofgem should undertake a programme of research to identify priority candidate areas for hydrogen, along with areas that are unlikely to be suitable, to inform the development and network investments. Undertake one or more hydrogen trials at a representative scale in the early 2020s (e.g., 300-3000 homes), to inform decisions on low-carbon zoning from 2025. All new boilers to be hydrogen-ready by 2025 at the latest. Continue further pilots in the late 2020s, to inform large-scale take-up.

It is acknowledged that buildings are a particularly challenging sector to decarbonise due to the following issues: -

- Slow progress being made to date.
- The implementation of key measures remains at very low levels.
- Levels of public engagement are low.
- The cost of gas heating is low.
- UK housing stock is both diverse and relatively inefficient, which means that a range of approaches is necessary.

However, it is stated that an understanding of public support has now been developed, along with a growing consensus on the way forward. In particular, the UK Climate Assembly has shed new light on public support for different heating solutions and priorities for the transition, which could assist in shaping Government's strategic approach on the following:

- On low-carbon heating, the Assembly Members backed the use of hydrogen, heat pumps and heat networks, stressing that local areas should be able to choose the options best suited to their needs.
- On home retrofits, the Assembly emphasised the need to minimise disruption in the home, put in place support around costs and offer flexibility and choice to householders.

It is commented that the BEIS and MHCLG are currently developing a Heat and Buildings Strategy for imminent publication, following on from the 2018 evidence assessment. The Committee has worked up a set of policy recommendations based on the evidence of what works, insights from their pathways work and significant stakeholder input. The following sections of the report look at the current policy commitments and the key changes required.

9. Current Government policy commitments

This aspect of the report provides an overview of the plans that the UK Government has developed to improve the energy efficiency of all buildings over the next 10-15 years, and the plans in place to phase-out the installation of new high-carbon fossil fuels in the 2020s which includes the following: -

- **Home efficiency**. In the 2017 Clean Growth Strategy, the Government committed to getting all fuel poor and rented homes to EPC C by 2030, and other owner-occupied homes by 2035. In September 2020 it published proposals to bring forward the date for private-rented homes to 2028.
- **Rented commercial and public buildings**. Existing regulations require all privately-rented properties in England and Wales to be at least EPC E by April 2023. In October 2019 the Government published proposals for all non-residential private-rented buildings in England and Wales to meet EPC B by April 2030 where cost-effective, based on meeting a seven-year payback test. BEIS estimate 64% of the stock will meet the EPC B target, 20% to fail but meet EPC C cost-effectively and 17% to be unable to meet EPC C cost effectively.
- **New buildings**. Under the proposed Future Homes Standard, no new buildings will be built with fossil fuel heating. UK Government is looking to introduce this in advance of 2025 in England and Wales, with the Scottish Government aiming for the same outcome from 2024.
- **Commercial efficiency**. In the Clean Growth Strategy, the Government set a goal to enable businesses and industry to improve energy efficiency by at least 20% by 2030.
- **Public buildings**. Government is aiming to reduce public sector emissions by 50% by 2032 against 2017 levels.
- **High-carbon fossil fuel phase-out**. The commitment here is to phase out the installation of new coal and petroleum appliances in the 2020s, on which a consultation is due shortly. This covers 11% of the current energy consumption for heating and hot water.

The Committee also outlines the financial support and regulatory policy support that are currently in place which includes: -

- £9.2 billion of funding targeting public sector buildings, social homes and the fuel poor, in addition to at least £4 billion committed under the ECO programme.
- An additional £2.0 billion of funding for homes has recently been that has been announced through the Green Homes Grant.
- The UK Government's 2020 Ten Point Plan.

- The Scottish Government's more ambitious programme that proposes point-of-sale standards which is supported by £1.6 billion of funding.
- Smaller amounts of funding are available in Wales and Northern Ireland.

The CCC report that it has identified the main regulatory policy gaps are related to the efficiency standards for 15.5 million owner-occupiers (of which over 65% are below EPC C), owner-occupied commercial buildings and plans for phasing out natural gas heating.

The next section of the report sets out what more the Committee believes is required to address the regulatory policy gap as part of a broader policy package that creates employment and delivers a broad set of wider benefits in terms of comfort, health and ongoing energy bills savings.

10. Key changes needed

The CCC has developed a policy package in consultation with stakeholders which draws on the Sixth Carbon Budget Pathway analysis. The package has four core components that are summarised below, the evidence that the Committee provides to support these four components can be viewed in the full report.

A clear direction

- Clear trajectory of standards towards fossil fuel phase-out
- Clear signals in the future of the gas grid – a critical role for electrification, with hydrogen providing flexibility and as a regional solution.

Making low carbon financially attractive

- Shift relative prices in favour of electricity over gas, value flexible electric loads
- Further financial incentives
- Unlock green finance at scale

Enabling measure

- Quality household information with real-world performance measurement
- Stronger compliance and enforcement
- Skills and retraining packages

Getting on with it

- Strong early action in new builds, off-grid, social rented sector
- Area-based planning and green building passports across housing stock
- Energy planning informing RIIO investment cycles

APSE Comment

There is a critical role for local authorities in facilitating change at a local level. Local authorities are well versed in managing efficiently and effectively large-scale projects. With many councils returning housing stock for example to direct management models, opportunities are presented for large scale retrofit programmes, on a size that will allow for rapid interventions linked to new green energy, construction jobs and skills development.

Research conducted by APSE and the TCPA - At a crossroads: Building foundations for healthy communities, provides an overview of the challenges presented by the current planning regime which still permits the development of new homes, and buildings, reliant upon fossil fuels for heating. In this publication, which is free to download for APSE members, it highlights ways in which local authorities can better address the need for effective planning measures to ensure all new developments support reducing carbon in buildings.

APSE has also called for a greater role by local councils in major retrofit programmes, urging governments across the UK to draw upon local expertise, around the stock conditions and property types, to gain the most advantageous outcomes from retrofit schemes.

APSE Energy is designed to bring councils together to share information, ideas, resources, best practice, and to support local energy projects. Working together enables them to exchange knowledge on finance, law, and procurement. It also helps them to gain greater marketplace leverage.

Our bespoke Local Authority Energy Collaboration is a partnership developed by member authorities that maximises the opportunities local authorities are currently offered by bringing councils together on a national scale to work on the green energy agenda

In addition, APSE's housing, construction and building maintenance advisory group provides a forum for local authorities to share knowledge and best practice in both new build and retrofitting social housing and public buildings.

The APSE Climate Change and Renewables Network is a free to access network for APSE member councils and you can sign up to the network using this link.