Essex Climate Action Commission: Built Environment

Technical Annex

Essex County Council

Contents

Foreword

The Built Environment is concerned with both addressing the needs of the future and what is yet to be built, as well as addressing the needs and changes within the existing places within Essex. This Climate Commission workstream looked at how we make new places, how we create communities that are healthy places to live sustainably, with quality architecture and public realm, efficient use of energy and water, and reduce our dependence on car travel. New development is guided by the planning system which is undergoing radical change in the way Local Plans are prepared and decisions are made on development proposals and land uses. All these decisions have a massive impact on the environment and on carbon emissions. What is as important as the design of new homes and buildings, is how the energy and water resources are managed, operated, and maintained within homes; we need people to want to live in such places valuing and appreciating the importance of their decision making and choosing a low carbon lifestyle.

The town planning system is the most important lever local authorities have in being able to create the right sustainable future and help us plan the world we need.

Equally, the Built Environment work also considered the existing needs and requirements of the places which make up Essex. We recognise there is a significant impact on the environment from poorly insulated or maintained buildings where there is a need to introduce ‘retrofit’ measures to reduce emissions and to address major issues which impact people, their health and the climate. Hence a significant focus of this retrofit work has been to identify problems such as poorly insulated homes and offices, homes that are at risk of flooding etc. Where buildings are owned by the public sector such as schools or the NHS it is easier to make changes, subject to budget availability. Where places are owned and run privately there is a huge need to act if we are to meet the carbon targets set by Government and those set by the Essex Climate Change Commission.

Graham Thomas

Head of Planning and Sustainable Development

Essex County Council

Built Environment – SIG lead

Executive Summary

The Built Environment Special Interest Group (SIG) first met in the Summer 2020 to discuss the issues facing the built environment regarding its contribution to climate change and how the carbon and greenhouse gas impact of new and existing, buildings, public realm and infrastructure can be reduced sufficiently to meet the challenging goals set by the Climate Change Commission and more recently by the UK Government. The six Commissioners who have advised and guided the work of this group steered us to approach the topic in three ways:

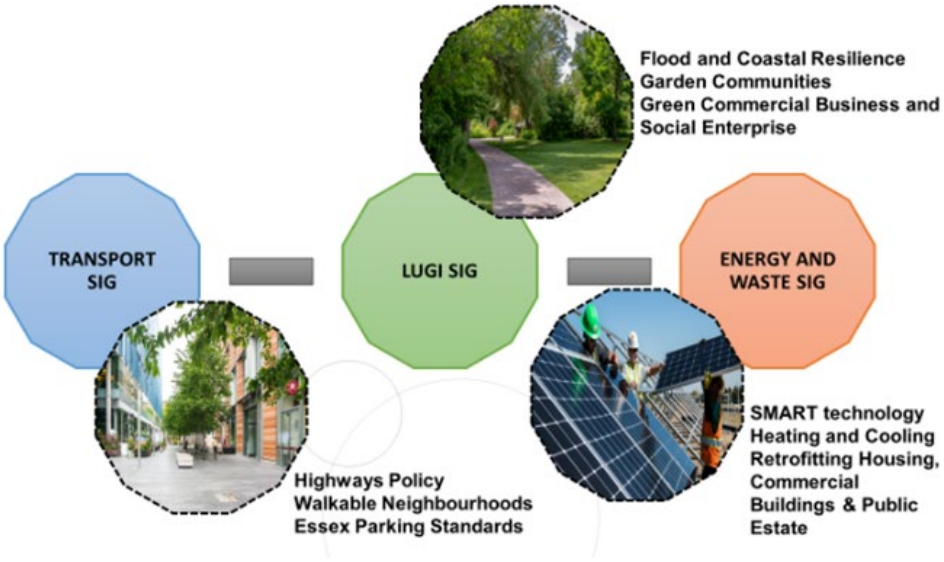
1. The new build environment, primarily influenced by the planning system and embracing travel, accessibility, and healthy places to live.

2. A retrofit programme of existing buildings, places, heritage areas as well as environmental protection measures through, for example, flood resilience.

3. Working with the communities and the political process to influence behaviour, energy and water usage, attitudes, funding, and strategy.

At the same time, we recognised the overlap with the other thematic areas and the need for collaboration on interventions and communication with the wider public.

Figure 1: Collaboration and Links between the Built Environment SIG and other SIGs



Source: Essex Climate Action Commission

There are eight core targets for the Built Environment Group which address the absolute need for the highest of standards in the design, construction and operation of new buildings for all uses and their environments, together with a massive investment in existing buildings, especially housing, to reduce carbon emissions and to achieve energy efficiency.

Figure 2: New Build. Headline Aspirational Targets from Commissioners

N1. All new schools commissioned to be Carbon Zero by 2022	N2. All New Homes consented to be Carbon Zero by 2025	N3. All New Commercial Buildings consented to be Carbon Zero by 2025	N4. All New Schools Commissioned to be Carbon Positive by 2030	N5. All new homes and non-domestics buildings consented to be Carbon Positive by 2040

Figure 3: Retrofit. Headline Aspirational Targets from Commissioners

R1. Coastal flood resilience schemes in critical areas to be implemented by 2023.	R2. 50% of Essex schools to be retrofitted to net zero standards by 2025. 100% by 2030.	R3. All Anchor Institutions and ECC estate assets to be retrofitted to net zero carbon standards by 2030.	R4. One Third of commercial buildings to be retrofitted as far as possible with renewable energy sytsems by 2030.	R5. Two thirds all dwellings to be retrofitted as far as possible to net zero carbon standards by 2030.	R6. Existing residential buildings: carbon emissions reduction of 50% by 2030. Carbon Zero by 2040.

This Technical Appendix outlines the evidence that led to these targets and the proposals the group is developing to address the issues raised and to achieve the scale of reduction in carbon emissions to which ECAC has pledged.

1. Background to Essex and the Challenge of Climate Change

1.1 The Essex Climate Action Commission

The UK is bound by several national and international statutory requirements and policies relating to climate change including the Climate Change Act 2008 (Climate Change Act 2008 (legislation.gov.uk) which required the UK to reduce its greenhouse gas emissions by at least 80% compared with 1990 levels by 2050. In recognition of recommendations by the Climate Change Committee (Climate Change Committee (theccc.org.uk)), Parliament declared a 'Climate Emergency' in May 2019 and called on the Government to set a more demanding target (Environment and Climate Change - Wednesday 1 May 2019 - Hansard - UK Parliament). In June 2019, the Act was amended and committed the UK to achieving net zero carbon emissions by 2050 (UK becomes first major economy to pass net zero emissions law. GOV.UK (www.gov.uk). More recently, and ahead of COP 26 (HOME - UN Climate Change Conference (COP26) at the SEC. Glasgow 2021 (ukcop26.org)) in Glasgow this year, the Government has pledged to achieve a reduction of 78% carbon emissions by 2030 (UK enshrines new target in law to slash emissions by 78% by 2035. GOV.UK (www.gov.uk).

Given this national and legal context, the Essex Climate Action Commission (Essex Climate Action Commission) was set up to identify ways of mitigating climate change, improve air quality, reduce waste, and enhance green infrastructure and biodiversity across the County. The Commission also looks to identify how Essex can attract investment in natural capital and low carbon growth.

The Commission set up a series of Special Interest Groups (SIG) covering:

- Transport
- Built Environment
- Energy
- Waste
- Land Use & Green Infrastructure (LUGI)
- Community Engagement

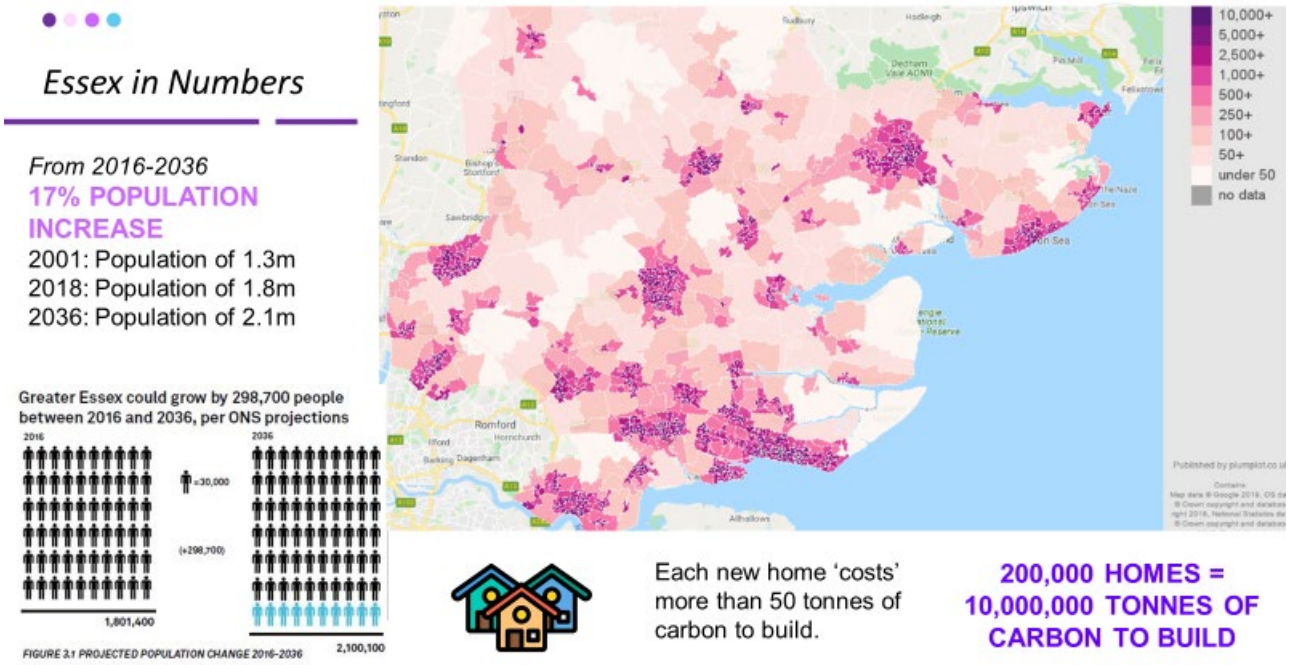
Each SIG has been tasked with exploring ways of how climate change can be mitigated and meet legally binding net zero emissions targets.

In their latest report the national Committee on Climate Change stated that the Built Environment contributed a significant 18% of emissions in the UK in 2019 (Net Zero. The UK's contribution to stopping global warming.pdf (theccc.org.uk). It is clear that

the Built Environment sector must embrace more innovative 'green', net-zero technologies to help mitigate and adapt to climate change.

In England, there are around 24.5m dwellings with over 660,000 of these found in Essex (Live tables on dwelling stock (including vacants). GOV.UK (www.gov.uk)). The Government's target of building 300,000 homes per year (Building the homes the country needs.pdf (publishing.service.gov.uk)), means at least 8,355 homes a year are required in Essex (based on the Government's Standard Assessment Method). Furthermore, there are nearly 2 million non-domestic properties in the UK with just under 50,000 in Essex (MHCLG, 2020). Each one of these properties and associated public realm will need to reduce emissions to a net zero before 2050. Beyond this, the Greater Essex Growth and Infrastructure Framework forecasts a population increase of 17% across Essex between 2016-2036 (GIF). With many of the county's districts declaring climate emergencies and focusing on these issues, the huge scale of the changes required in the Built Environment is evident. Crucially, the built environment has local political backing. Working through the planning system is one of the principal mechanisms to meet Climate Change targets. The graphic below summarises the growth pattern in the county.

Figure 4: Essex Population Density Map and Population Predictions



Sources: ONS (2019), Greater Essex Growth and Infrastructure Framework (2017), Plumpot.co.uk (2020), Periodic Carbon Budgets for 2018

The map (Figure 4) shows the density distribution of residents in Essex and areas where population is likely to increase. There is also illustrative graphics showing the numbers of people in Essex over periods of time. In 2018, the population of Essex was 1.8m and by 2036 it is projected to increase to 2.1m. According to ONS, Greater Essex could grow by 298,700 people, or 17%, by 2036. The project growth could have significant impact on climate considering that each new home 'costs' more than 50 tonnes of carbon to build; 200,000 homes will need about 10,000,000 tonnes of carbon to build.

The Planning System is the strongest statutory lever for change in the built environment and policy and development management planners are rightly viewed primarily as Place-Makers and creators of healthy communities. Some of the key challenges faced in relation to climate change are:

- Current building methods are very carbon intensive. Each new home 'costs' more than 50 tonnes of carbon to build (Citu: What is the carbon footprint of a house? - Citu). Steel is the worst culprit with bricks and concrete major contributors.
- A national building programme of 300,000 homes a year using traditional methods would have a footprint of 15m tonnes of CO2 (Inside Housing. Comment: If the housing sector does not act on climate change we will be complicit).
- In 2018, only 1% of new homes met the top EPC A standard (Energy efficiency of housing in England and Wales: Office for National Statistics (ons.gov.uk)).

How can we meet the legally binding target of net zero emissions as well as providing multiple other benefits such as better air quality, more attractive public realm and green infrastructure and increased biodiversity? Our approach has been to look to ways: at: New Build and at the Retrofit challenge.

1.2 The Built Environment SIG: Objectives

1.2.1. Facing the scale of the challenge of growth across the county.

Figure 5: The Challenge of the Built Environment Growth and Retrofit in Essex

180,000 new homes planned. With 660,000 existing homes
40 to 50 new schools planned. With 550 existing schools.

Source: Greater Essex Growth and Infrastructure Framework (2017)

Our challenges include:

- Scale of retrofit
- Perceived cost versus benefit of low carbon technology
- Availability of low carbon technologies produced locally
- Defining carbon net zero for new build
- Specifying and enforcing sustainability standards above building regulations
- Developers' perceptions of market acceptability of low carbon domestic utilities
- Inadequate knowledge and skills within planning and building control departments
- Public attitudes to running costs, convenience, trust in newer forms of energy
- Planning for the Future White paper (Planning for the future. GOV.UK (www.gov.uk)) and NPPF (National Planning Policy Framework. GOV.UK (www.gov.uk)) requirements

- Healthy Homes Bill (Campaign: The Healthy Homes Act | Town and Country Planning Association (tcpa.org.uk)) and TCPA garden community principles (Garden City Principles | Town and Country Planning Association (tcpa.org.uk))
- Developers' assessment of viability: build costs, time, profit margin, enforceability
- Member support and understanding of net zero
- Central Government commitment to green recovery, flexibilities, and grants, loans or fiscal support.

1.2.2 Objectives

The Commissioners have led the Built Environment SIG in the following objectives:

1. To act as the liaison point with the Essex Climate Action Commission and the ECC administration on all matters related to the Built Environment

2. To steer, coordinate and review the work of the subgroups, in relation to determining what measures are needed to improve the quality and sustainability of new development planned, help coordinate ECC estate requirements, and come forward with practical retrofit measures to improve the resilience and carbon reduction of the existing Built Environment in Essex.

3. To explore best practice for the integration of carbon reduction approaches in new settlements and strategic urban extensions. This involves researching local plans across the country such as the London Plan (The London Plan. London City Hall), relevant reports and evidence, and quality schemes to build a library of good practice.

4. To establish partnerships with key stakeholders including the NHS, Government departments and agencies, relevant sector organisations such as the Building Research Establishment (BRE) (BRE Group. Building a better world together), district and borough councils, utility companies as appropriate to provide a platform for knowledge transfer and dissemination on climate and sustainability matters.

5. To liaise with the Essex Planning Officers Association (EPOA) and Planning Portfolio Holders, to identify key District officers to facilitate working groups. This and the Essex Developers' Forum are key areas of influence.

6. To utilise the planning system to maximum effect by embedding climate action measures in local planning policy, in the determination and negotiation of planning applications. This will include the reuse of existing buildings to improve their carbon efficiency. Planners are well placed to undertake the task and the early stage at which several of the local plans across Essex have reached is useful, along with proposals for new settlements and garden communities as illustrated in the for Beaulieu Garden Village Master Plan in Chelmsford below.

Figure 6: Beaulieu Garden Village, Chelmsford. Concept Masterplan

Source: http://www.am-plan.com/wp-content/uploads/2020/03/Chelmsford-Garden-Village.pdf

Figure 7: Focus of the Built Environment SIG

Source: Essex Climate Action Commission

The focus of the Built Environment SIG

- Creating healthy communities (New Build)
- New build energy efficient housing (New Build)
- Schools retrofitting programme and net zero energy new build (Retrofit)
- How to retrofit existing stock; residential and commercial and historic building carbon offsetting (Retrofit)
- Flood mitigation (Retrofit)
- Retrofit of public and County assets and anchor buildings (Retrofit)
- Green employment opportunities and skills, new jobs, training, environmental procurement (New Build)
- Demonstrator zero net carbon projects (New Build)

2. New Build

A critical element of ECAC's approach is how new development can incorporate measures to meet net zero targets since without this immediate action and impact on decision making now it will impossible to meet the 2050 challenge for all building.

Figure 8: The Avenue, Saffron Walden

Source: Essex Design Guide

2.1 Planning and New Build

Given that over 180,000 new dwellings in Essex are proposed over the next 15 years (GIF.pdf (digitaloceanspaces.com)), it is clear that climate change mitigation and adaptation must be at the forefront of development proposals to ensure that new development does not contribute to climate change.

In the creation of new communities, green spaces, public realm and buildings, the Planning System is one of the most effective and guiding legislative instruments to help enforce local and national policy. This can include policy relating to climate change. This highlights the importance of the ECAC recommendations that support the planning system as a key lever to deliver the changes required.

It is central that the Commission works with National and Local Government partners to ensure that climate change mitigation and adaptation is actively debated and at the forefront of discussions in relation to New Build development. One area that requires close collaboration is national planning and building legislation and ensuring that Essex Local Planning Authorities have the ability to embed stringent climate change policy such as net zero emission targets within Local Plans. Such relevant national planning and building legislation includes the National Planning Policy Framework (National Planning Policy Framework. GOV.UK (www.gov.uk)), The Future Home Standard (The Future Homes Standard: changes to Part L and Part F of the Building Regulations for new dwellings. GOV.UK (www.gov.uk)) and any climate change policy as included in the Planning Bill (Planning Bill (parliament.uk)) which is due to go before Parliament in the Autumn of 2021. It is also critical that climate change related design guidance is developed, and technical support and training is provided to help guide Built Environment officers. This will help officers make informed decisions on new development proposals in relation to climate change mitigation and resilience targets and ensure the overall aspirations of the Commission are met.

Figure 9: Berryfields, Tiptree

Source: Essex Design Guide

2.2 Economic Growth and Skills

As we transition to a net zero economy, we know that the demand for both new green technologies, and the right skills and so called green job are already needed and in demand and the pace for this will quicken in the next few years. This will drive growth in jobs in Essex. These jobs will require a diverse range of skills and expertise in order to support the production and deployment of clean technologies. Although we anticipate that the majority of jobs in new build, retrofit and ECC assets will be in construction, maintenance, design and planning, and engineering, there will also be jobs in financial, IT and legal sectors supporting this low carbon activity. The Commission should have a clear understanding of the existing skills and training landscape, as well as a strategic role in influencing how Essex partners deploy their resources to support the local green economy. This includes existing European funding, its successor UK Shared Prosperity Fund, and other national initiatives and programmes, as well as private investment and S106 funding.

It is also crucial that the Commission works with ECC, and partners, to identify how to maximise the creation of new jobs, retrain the existing workforce and develop a pipeline of local skills pertaining to the green economy. Working through ECC and partners, the Commission can be a key place shaper, and may choose to bring together a wide range of economic development stakeholders, including district councils, industry, SEB, SELEP and education institutions including our schools. This will ensure that Essex takes an integrated and forward looking approach to skills and training within the low carbon sector.

A growing and changing green economy will require new entrants, new and enhanced training to meet the industry standards, as well as existing workforce continuously upskilling to maintain relevancy and quality. A multi-skilled workforce is more efficient, more productive, and much quicker to adapt to a changing world.

2.3 Schools

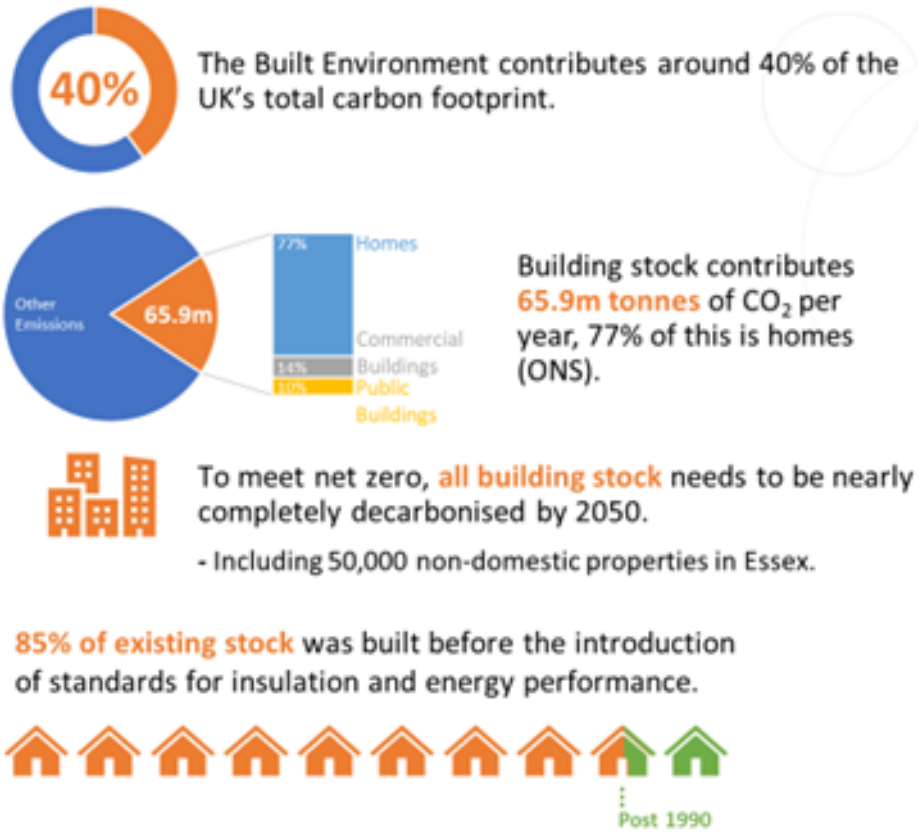
Essex continues to deliver one of the largest school building programmes in the country, investing in high quality school buildings to ensure children have a great learning environment. ECC has had early success in delivering high quality low carbon buildings with A+ Energy Performance Certificate (EPC) ratings. We have a pipeline of further schemes to test net zero designs in more situations, including upcoming new primary schools, so that we can move as quickly as possible to identify the best value net zero solutions to adopt as standard for our new school buildings. We are pushing

Government to allow us to spend our maintenance budgets on not just replacement equipment but equipment that has an improved performance and efficiency from a carbon perspective. This will complement our work monitoring energy usage in buildings, increasingly using Smart technology and in apparel working with parents and school children on the importance of this.

3. Retrofit

The focus on retrofitting including the ECC public estate faces these challenges:

Figure 10: The Built Environment Challenge. Key Statistics



Source: Creating the Carbon Decarbonisation Plan (2020)

- The Built environment contributes around 40% of the UK's total carbon footprint (Climate change. UKGBC. UK Green Building Council).
- Building stock contributes 65.9m tonnes of CO2 per year which is c.18% of total UK emissions (Inside Housing. Comment: If the housing sector does not act on climate change we will be complicit).
- Of this, homes comprise 77%; commercial buildings 14%; and public buildings 10% (Energy efficiency: building towards net zero. Business, Energy and Industrial Strategy Committee. House of Commons (parliament.uk))
- To meet net zero, all building stock needs to be nearly completely decarbonised by 2050.
- Only around 15% of the existing stock was built after 1990, therefore the majority of homes (85%) were built before the introduction of standards for insulation and energy performance (UK housing Fit for the future. CCC 2019.pdf (theccc.org.uk)).

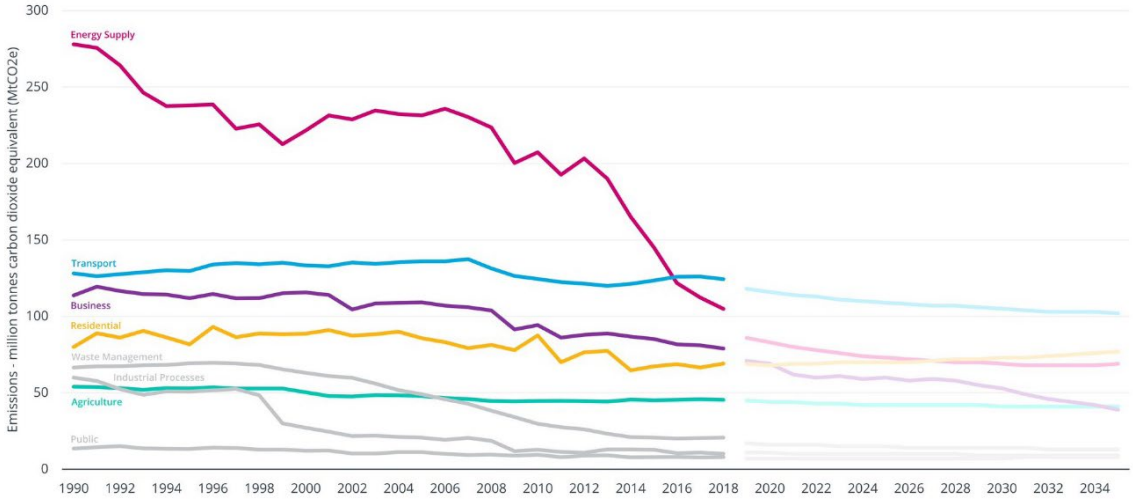
- The 29 million existing homes across the UK must be made low carbon, low energy and resilient to a changing climate. This is a UK infrastructure priority and should be supported as such by HM Treasury.

Widespread deployment of energy efficiency measures across the UK's building stock will be a key plank of *any* credible and cost-effective strategy to meeting net zero. This follows repeated warnings from the CCC that energy efficiency needs addressing immediately if the UK is to meet its 4th and 5th carbon budgets. In spite of these warnings the UK's building stock remains one of the most energy inefficient in Europe.

3.1 Housing and Commercial Buildings

The UK Committee on Climate Change has stated that the Government's legally binding climate change targets will not be met without the near-complete elimination of greenhouse gas emissions from the country's buildings. Elsewhere, Government commissioned evidence suggests that the UK's housing stock accounts for 14% of total emissions (UK homes unfit for the challenges of climate change, CCC says. Climate Change Committee (theccc.org.uk)). Both these facts make it clear that the ongoing impact of Essex's housing stock on climate change needs to be addressed through the Essex Climate Change Commission and ECC's response.

Figure 11: UK Greenhouse Gas Emissions by Sector: 1990 to 2018 (actual), 2019 to 2035 (projected)



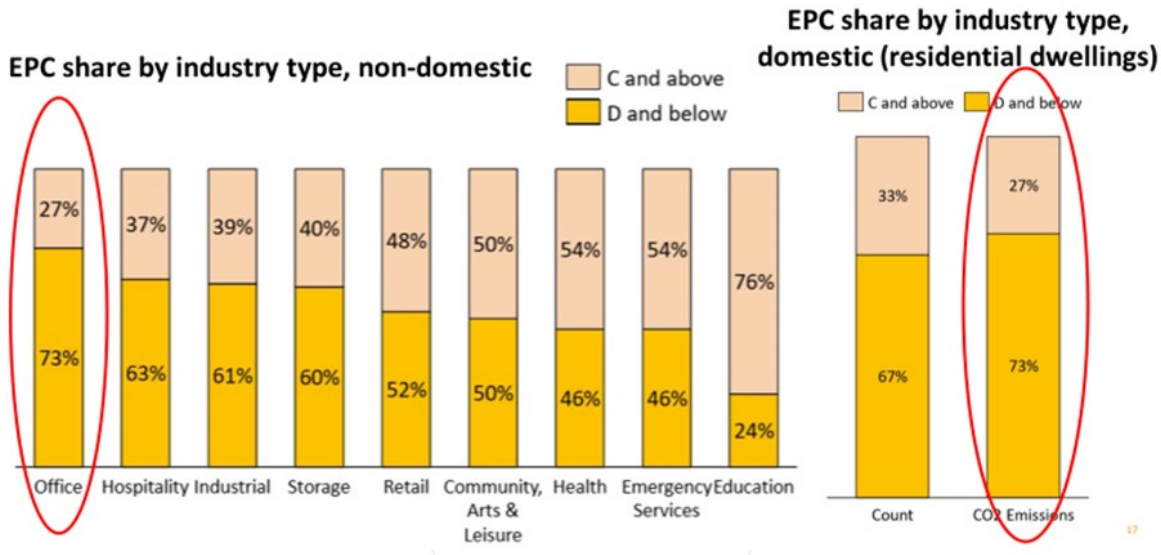
Source: Department for Business Energy and Industrial Strategy, Final UK greenhouse gas emissions national statistics, 1990-2018; and Updated energy and emissions projections 2018 (Reference scenario).

The UK residential sector (yellow line) is forecast to be a continuing contributor to greenhouse gas emissions.

According to the UK Committee on Climate Change, recent efforts to adapt the UK's existing housing stock to the impacts of the changing climate (higher average temperatures, flooding, and water scarcity) are lagging far behind what is needed to ensure safety and comfort, even as climate change risks grow over time. Nationally, around 4.5 million homes overheat, even in cool summers; 1.8 million people live in areas at significant risk of flooding; and average UK water consumption is higher than in many other European countries (UK homes unfit for the challenges of climate change, CCC says. Climate Change Committee (theccc.org.uk)). The Committee has stated that cost-effective measures to adapt the UK housing stock are not being rolled out at anywhere near the required level to have a meaningful impact on climate change mitigation.

The national Committee has highlighted that the technology and knowledge to create high quality, low carbon and resilient homes already exists, but the current system of planning and building regulations are failing to drive either the scale or the pace of change needed to address the challenge. For example, in their recent report UK Housing: Fit for the future? (UK housing: Fit for the future? Climate Change Committee (theccc.org.uk)) it states that home insulation installations have stalled; key policies, like the 'zero carbon homes' scheme have been abandoned and policies to encourage property-level flood protection, water efficiency devices and window shading are weak or non-existent; furthermore UK building standards are inadequate, overly complex and not enforced; and local authorities, faced with insufficient resources, are largely failing to address the need for low emission, climate change resilient homes.

Figure 12: Energy Performance Certificate (EPC) Rating by Building Types in Essex



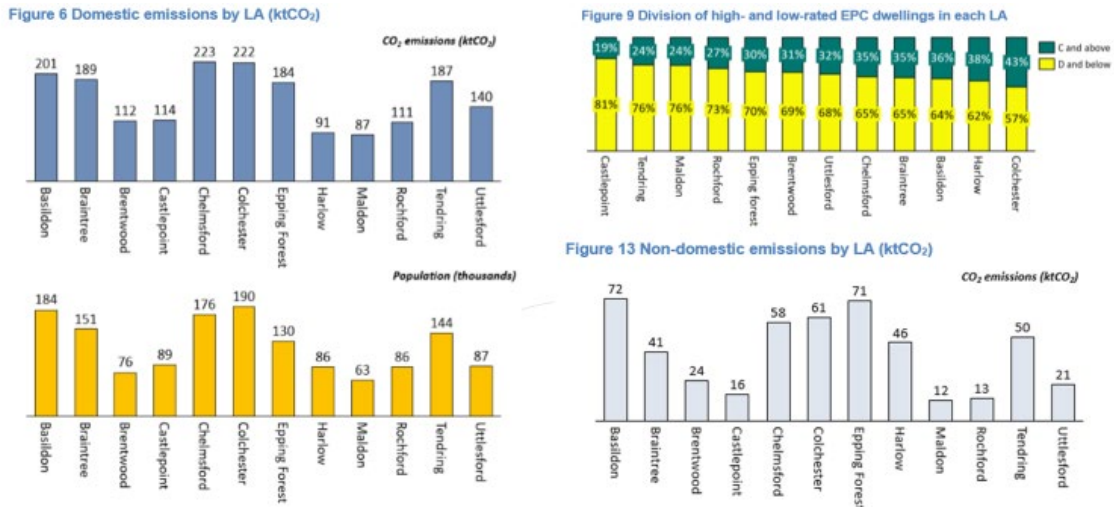
Source: Element Energy (2020)

Across Essex there is a poor record of insulation for all building types, with less than a fifth of most non-residential buildings having energy performance ratings of C and above. Notably, the best performing non-residential buildings re in the community, health, and schools' sectors. Proposals to address retrofit in schools are a key plank of our approach in Essex with a number of initiatives underway to meet the ambition to secure net zero carbon emissions in all schools by 2030.

There is also disparity across the county regarding emissions. As the graphs indicate, this reflects not only the higher emissions expected from districts with larger, more urban settlements and more employment uses but also poorer quality homes in areas towards the south and east coast where despite Essex's prosperity some of the most deprived areas in the South East of the country are located.

Housing within these areas tends to be of a worse quality than average leading to poor energy efficiency performance and consequent higher heating and lighting costs for the occupants. Whereas households with higher incomes are able to make adaptions to their homes to make them more cost efficient over the longer term, poorer households are liable to falling into a trap of struggling to pay for home improvements, causing larger energy bills and fuel poverty. Existing evidence suggests a strong correlation between areas of high relative deprivation and low EPC. Targeting poorer households which do not have the necessary means to make home improvements will be a priority for future policy initiatives and an essential element of addressing the target to reduce emissions from Essex's existing housing stock.

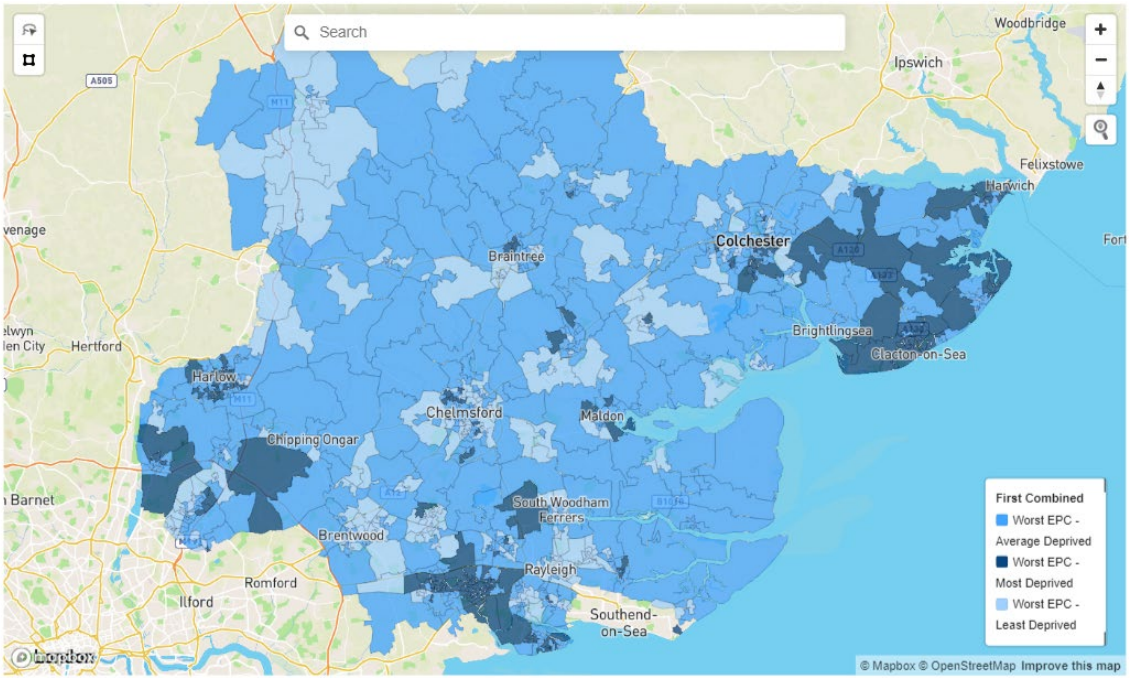
Figure 13: Emissions by Local Authority



Source: Element Energy

Figure 13 shows the domestic and non-domestic CO_2 emissions by Local Authority (LA) area. This is compared with the population within each Local Authority, and the insulation quality of homes in these areas.

Figure 14: Worst Energy Performance Certificate Ratings correlated with Level of Deprivation



Source: ECC and Census, 2020.

3.2 Energy Efficiency, Anchor Buildings and Public Estate.

ECC has a large and diverse estate portfolio totalling some £1.7bn in value which is utilised to support the delivery of services throughout Essex (Property Disposal Process (essex.gov.uk)). The broad range of building types, ages and services that utilise them, makes it difficult to apply a carbon zero strategy in a uniform way. Instead, the opportunities must be identified through careful assessment of individual cases. The critical piece of work is ensuring that the estate is fully understood and immediately following this, ensuring that buildings are operating as efficiently as possible *ahead* of any energy efficiency projects being delivered. Only at this stage can the true value of any further enhancements be understood and evaluated. Funding is a critical factor and as such, on an estate wide basis, ECC must achieve best value regarding carbon impact per pound spent. The opportunities must therefore be assessed and ranked with the greatest potential outcomes taking top priority and being delivered in a comprehensive programme.

3.3 Flood Resilience

In December 2015, parts of the UK were devastated by record-breaking levels of rainfall as a result of Storm Desmond (Flood risk and the UK. Energy & Climate Intelligence Unit (eciu.net)). More recently, Britain experienced the wettest February on record in 2020 due to the succession of Storm's Dennis, Ciara and George, which left thousands of homes flooded and many more without power. Since 1998, the UK has seen six of the ten wettest years on record (Record breaking rainfall. Met Office). Despite this, plans and actions to address increasing risk are lacking. Climate change is set to make severe weather events more likely and to raise sea levels.

High level modelling suggests approximately 23,000 residential and non-residential properties in Essex are located in areas at risk of flooding in a 1 in 100 scenario. Whilst high level modelling has been undertaken, more detailed assessments are needed to further outline the flood risk extents for both residential and non-residential properties. These detailed assessments would need to include the current and future impacts of climate change on flood risk to fully understand what impact climate change will have on flooding across Essex.

Flooding is a key issue that feeds across many of the Special Interest Groups (SIGs) most notably the Land Use & Green Infrastructure SIG where managing flooding and the increased risk of flooding from climate change in rural and urban settings will be a key objective. It is equally important to consider flood risk as part of the built environment to ensure existing properties are protected from the impact of climate change on the risk of flooding. Ensuring that, for example, correct planning policy is included within Local Plans to help mitigate flood risk through measures such as Sustainable Drainage Systems (SuDS) and steer development away from areas at risk at flooding will be a clear driver in helping to manage flood risk in the built environment. It is also important that the Commission works with all flood risk partners to highlight the importance of including flood risk management and resilience schemes when calculating developer contributions from a new development. This will help to ensure that the potential increased risk of flooding in the built environment is managed and places become more climate resilient.

Figure 15: Building Controls Industry Association (BCIA).
Award winning scheme at Kingsmoor, Harlow

Source: Essex County Council

Glossary

Anchor Institutions: Large non-profit organisations of the public sector, such as local authorities, NHS, police and fire services, schools, and universities, who are dedicated to the wellbeing of the communities they serve and therefore they are unlikely to relocate.

Built Environment: All forms of human made environment from housing, industrial and commercial property, to hospitals and schools, streets, sidewalks, and even open spaces.

Carbon neutral: A state by which the amount of greenhouse gas emissions released into the atmosphere as a result of an activity, is balanced by an equivalent amount being taken away via "offsetting" (see Carbon Offsetting), or removing from the atmosphere, an equivalent amount of carbon. Carbon neutrality is not associated with a commitment to *reduce* overall greenhouse gas emissions.

Carbon Offsetting: Environmental practices and activities implemented to reduce emissions of carbon dioxide in order to compensate for unavoidable emissions made elsewhere, e.g. the creation of new woodlands and the restoration of peatlands, providing habitats for wildlife, and green spaces for the public. Offsets are measured in tonnes of carbon dioxide equivalent.

Carbon Positive: A carbon positive project, e.g. a building, goes beyond achieving net zero carbon emissions. It makes use of low carbon materials and produces an energy surplus under operation which sends back to the grid. This creates an environmental benefit by removing additional carbon dioxide from the atmosphere.

Carbon Zero: The state where no carbon emissions are being produced from a particular human activity.

Circular Economy: An economic model whereby waste is eliminated, and closed loop systems are created to ensure the continual and effective use of existing resources for as long as possible (see also **Closed Loop System**).

Clean Energy: Energy produced from renewable, zero emission sources that do not pollute the atmosphere, and through means that do not damage the environment or deplete resources irreparably. Clean energy is also energy which is saved through energy efficiency measures.

Climate Change: A change in the state of the climate that can be identified (e.g. by using statistical tests) by changes in the mean and/or the variability of its properties, and that persists for an extended period (typically decades or longer).

Climate Change Adaptation: Adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects. Adaptation moderates harm or exploits beneficial opportunities, and can be distinguished to anticipatory, autonomous, and planned adaptation.

Climate Change Mitigation: Actions taken to avoid and reduce emissions of greenhouse gases into the atmosphere with an aim to reduce impacts to the point where they have no adverse effects.

Climate Emergency: The term refers to the severe adverse effects of climate change as a result of human activity, posing a threat to the biosphere and humanity. In this situation, urgent action is required to reduce or halt climate change and avoid potentially irreversible environmental damage.

Coastal Flooding: A situation when dry and low-lying coastal land is submerged by seawater as a result of waves, tides, storm surge, or heavy rainfall from coastal storms.

Decarbonisation: The process of removing carbon from a product or to reduce the amount of gaseous carbon compounds released in or as a result of a process

Demonstrator Project: A project used to promote innovations and showcase best practice. A demonstrator project can help develop an evidence base to test and support improvements in different sectors.

Energy Performance Certificate (EPC) : A rating that measures the energy efficiency of buildings.

Fossil Fuels: Fuels such as coal, petroleum, and natural gas, which contain carbon and release energy in combustion. Fossil fuels were formed as a result of natural processes (such as anaerobic decomposition) acting on the remains of buried organic matter of ancient plants and animals, which began in the Archean Eon (4.0 billion to 2.5 billion years ago). Fossil fuels also include oil shales, bitumen, tar sands, and heavy oils.

Fuel Poverty: Fuel poverty in England is measured using the Low-Income Low Energy Efficiency (LILEE) indicator. Under the LILEE indicator, a household is considered to be fuel poor if they are living in a property with a fuel poverty energy efficiency rating of band D or below, and when they spend the required amount to heat their home, they are left with a residual income below the official poverty line.

Garden Community: The concept originated from the Garden City movement of urban planning in the 19th and early 20th century and referred to well planned, sustainable towns. According to the Town and County Planning Association (TCPA), a garden town or city is a “holistically planned new settlement which enhances the natural environment, tackles climate change and provides high quality housing locally and accessible jobs in beautiful, healthy and sociable communities”. Garden Towns or Communities should be based on the TCPA Garden City Principles which are a collection of key elements which help to deliver high-quality places.

Green Construction (or Green Building: The term refers to both a structure and the application of principles in its design, construction and operation that aim to reduce or eliminate negative and create positive impacts for the climate and the environment, promote resource efficiency throughout a building's life-cycle, and improve quality of life.

Green Economy: A model of economy where the reduction of the environmental impact of business enterprises results in economic advantages for the companies themselves.

Green Procurement: The process whereby organizations meet their needs of supplies and services, utilities and works not only on a value-for-money basis, but also with a commitment to use less harmful or environmentally friendly products and practices.

Land Use: The function of land and what it is used for. Land use varies from area to area. In rural areas (countryside) land use can include forestry and farming. In urban areas (towns and cities) land use could be housing or industry

Lobbying: A form of advocacy whereby individuals or organisations seek to influence the decisions made by the government.

Low Carbon Growth: A growth model where economic development is based on low carbon power sources and reduction of greenhouse gas emissions.

Net zero carbon: The state where there is a balance between the amount of greenhouse gases released into the atmosphere by a human activity, and the amount which is removed. A commitment to net zero carbon is associated with a commitment to reduce greenhouse gas emissions in order to achieve this balance. It can be defined with respect to three components as set out by the UK Green Building Council:

Net zero carbon (in construction): Defined as: “When the amount of carbon emissions associated with a building’s product and construction stages up to practical completion is zero or negative , through the use of offsets or the net export of on site renewable energy.” A whole life carbon assessment should be undertaken to determine the building’s carbon impact, in line with the RICS Professional Statement ‘Whole life carbon assessment for the built environment’.

Net zero carbon: operational energy: Is defined as: “When the amount of carbon emissions associated with the building’s operational energy on an annual basis is zero or negative. A net zero carbon building is highly energy efficient and powered from on site and/or off site renewable energy sources, with any remaining carbon balance offset.” The energy used in the operation of existing buildings represents the most significant carbon impact from the built environment contributing 30% of the UK’s total emissions in 2017.It covers energy used for heating and cooling, cooking, lighting and plug loads, but excludes commercial process loads and transport (electric vehicle charging).

Net zero carbon (whole life): Defined as: “When the amount of carbon emissions associated with a building’s embodied and operational impacts over the life of the building, including its disposal, are zero or negative.” In order to achieve a net zero carbon economy, the UK must account for and offset all carbon impacts from the built environment. This will require moving towards a net zero whole life carbon approach for all buildings which will need to be developed in detail over the next five years.”

Renewable Energy: Energy collected from renewable sources which are infinite and constantly replenished, e.g. solar energy and wind energy.

Retrofitting: The addition of new components, technology, or features to a product or a system, in order to reduce carbon emissions and increase its efficiency.

Sustainability: A characteristic or state whereby the needs of the present and local population can be met without compromising the ability of future generations or populations in other locations to meet their needs.

Sustainable Building Materials: Materials that do not deplete non-renewable natural resources, have no adverse impact on the environment when used for construction, and do not pose specific risk to people's safety.

Sustainable Drainage Systems: Systems used to manage surface water that take account of water quantity (flooding), water quality (pollution) biodiversity (wildlife and plants) and amenity.

Walkable Neighbourhoods: A neighbourhood where motor vehicle traffic has been replaced with more active and sustainable ways of transportation, such as walking and cycling.

References

1. Climate Change Act 2008 (legislation.gov.uk)
2. Climate Change Committee (theccc.org.uk)
3. Environment and Climate Change. Wednesday 1 May 2019. Hansard. UK Parliament

   UK becomes first major economy to pass net zero emissions law. GOV.UK (www.gov.uk)
4. HOME - UN Climate Change Conference (COP26) at the SEC. Glasgow 2021 (ukcop26.org)
5. UK enshrines new target in law to slash emissions by 78% by 2035. GOV.UK (www.gov.uk)
6. Essex Climate Action Commission. Essex County Council
7. Net Zero. The UK's contribution to stopping global warming.pdf (theccc.org.uk)
8. Live tables on dwelling stock (including vacants). GOV.UK (www.gov.uk)
9. Building the homes the country needs.pdf (publishing.service.gov.uk)
10. MHCLG, 2020
11. GIF.pdf (google.com)
12. Citu. What is the carbon footprint of a house? Citu
13. Inside Housing. Comment: If the housing sector does not act on climate change we will be complicit.
14. Energy efficiency of housing in England and Wales. Office for National Statistics (ons.gov.uk)
15. Planning for the future. GOV.UK (www.gov.uk)

    National Planning Policy Framework. GOV.UK (www.gov.uk)

16. Campaign: The Healthy Homes Act. Town and Country Planning Association (tcpa.org.uk)

17. Garden City Principles. Town and Country Planning Association (tcpa.org.uk)

18. The London Plan. London City Hall

19. BRE Group. Building a better world together

20. GIF.pdf (digitaloceanspaces.com)

21. National Planning Policy Framework. GOV.UK (www.gov.uk)

22. The Future Homes Standard: changes to Part L and Part F of the Building Regulations for new dwellings. GOV.UK (www.gov.uk)

23. Planning Bill (parliament.uk)

24. Climate change. UKGBC. UK Green Building Council

25. Inside Housing. Comment: If the housing sector does not act on climate change we will be complicit.

26. Energy efficiency: building towards net zero. Business, Energy and Industrial Strategy Committee. House of Commons (parliament.uk)

27. UK housing: Fit for the future? CCC 2019.pdf (theccc.org.uk)

28. UK homes unfit for the challenges of climate change, CCC says - Climate Change Committee (theccc.org.uk)

29. UK homes unfit for the challenges of climate change, CCC says - Climate Change Committee (theccc.org.uk)

30. UK housing: Fit for the future? Climate Change Committee (theccc.org.uk)

31. Property Disposal Process (essex.gov.uk)

32. Flood risk and the UK. Energy & Climate Intelligence Unit (eciu.net)

33. Record breaking rainfall. Met Office

This information is issued by:

Essex Climate Action Commission

Contact us:

Email: Climate.Commission@essex.gov.uk

Twitter: @EssexisGreen
Facebook: www.facebook.com/greenessex
www.facebook/essexclimateaction
Instagram: www.instagram.com/essexisgreen

The information contained in this document can be translated, and/or made available in alternative formats, on request.

July 2021