Essex Climate Action Commission
Powering positive change

Net Zero: Making Essex Carbon Neutral

Essex Climate Action Commission

Essex County Council

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Leader of Essex County Council

I'd like to begin by offering this Council's sincerest thanks to the Commission's Independent Chair Lord Randall, his Co-Chairs Prajwal and Daniel and all of the expert Commissioners. For me, their work is an international exemplar, the gold standard for how local government can tackle climate change and we owe each of them a great debt of thanks for their hard work and their expertise in producing what is an excellent and stretching report.

I do not think I need to tread old ground here, we have explored at length just how important it is to take immediate meaningful action to tackle climate change. As the new Leader of Essex County Council, I have set out my vision for Renewal, Equality and Ambition across Essex, the central pillar of which is climate action. It must be at the heart of everything we do. I am grateful to have a Commission that is independent of the Council and that can tell us how to do exactly that.

As a demonstration of how seriously this council is taking climate change, I have moved responsibility for Climate Action into the Leader portfolio and allocated Cllr Peter Schwier the newly created role of Climate Csar. His sole role is to ensure that sustainability is at the heart of everything we do and to hold us to account for delivering the recommendations pertaining to us.

The actions recommended in this report are not just the responsibility of Essex County Council and we will have failed if we are ploughing a lone furrow. This takes the collective might of everyone in Essex and beyond: our district, borough, city, town and parish councils; our public and private sector partners; our residents and of course national government. This report is for all of us. We will of course share our plan for how we as a council will implement the recommendations made in this report soon, but we must also help ensure that everyone takes this responsibility as seriously as we do.

Cllr Kevin Bentley
Leader of Essex County Council

Foreword

Lord Randall

I am really delighted to be able to present a clear and ambitious plan for Essex which aims to tackle the climate and biodiversity challenge head on. We have been able to set out a vision for a future for Essex which has not shied away from the scale of the challenge or the difficult choices and changes we all need to make, but is also alive with the vision and hope for a better future for all of us. I am personally committed to, and passionate about the need to preserve our precious natural world.

We have recognised through this work that the natural world is our best ally in reversing climate change – it is key to absorbing and storing carbon. We also face ever increasing risks from our already changing weather systems – more flooding, over-heating, soil degradation, subsidence and water shortage. Here too, making space for green infrastructure and nurturing our natural world is the best and most effective way to manage and reduce these impacts which will continue to affect all of us.

This plan brings together the work of the Commission across the past year, which we have undertaken, like so many others, online. This was certainly not how I envisaged the Commission working when I was first asked to chair it in 2020! However as we have struggled together through the pandemic, this is just one example of how quickly we can all move to change and adapt to manage challenges. Whilst this year has been extraordinary, it has also highlighted our capacity for working together and we will need that even more now as we re-build. In the year that the UK is host to COP 26 – the next round of international negotiations to shape climate action around the world – we are reminded we all have a role to play and a contribution to make. We have been able to showcase here some of the excellent work already going on in Essex and it is so inspiring to see pledges from across the county to do more. We have a fantastic opportunity to build on these commitments and open up a cleaner, greener future in Essex for us and our children.

Lord Randall
Chair of Essex Climate Action Commission

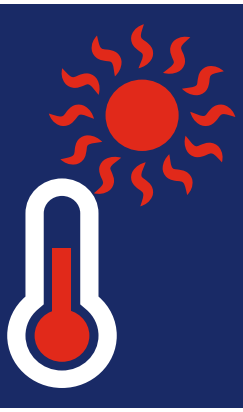
Opening statement

1 The Challenge

In 2018, the Intergovernmental Panel on Climate Change (IPCC)[1] set out the impact of global temperature rise of 1.5°C from pre-industrial levels.

The report warns of increasingly extreme weather events with rising sea levels and melting glaciers; wildlife becoming threatened and at risk of extinction and our own health deteriorating; food becoming scarce and clean water running dry; tensions rising between people and increasing migration and environmental refugees as people flee inhospitable parts of the Earth.

How did we get here? In the 11,000 years before the Industrial Revolution, the average temperature across the world was stable at around 14°C. The Industrial Revolution began in the mid-1800s when humans started to burn fossil fuels such as coal and oil. Burning fossil fuels produces energy, but also releases greenhouse gases such as carbon dioxide and methane into the air. Over time, large quantities of these gases have built up in the atmosphere. Once in the atmosphere, greenhouse gases form a 'blanket' around the planet. This blanket traps the heat from the sun and the earth heats up. This causes global temperatures to rise, resulting in long-term changes to the climate[2].



Human activities have caused approximately a 1°C rise above pre-industrial levels already. If we do not change course, global warming is likely to reach a 1.5°C rise between 2030 and 2052[3]. The UK Met Office states that if we continue to burn fossil fuels and cut down forests at the same rate as we currently do, the planet could warm by more than 4°C by 2100. This warming could fundamentally change life on earth, with potentially drastic consequences[4].

1 www.ipcc.ch/sr15/chapter/spm

2 www.metoffice.gov.uk/weather/climate-change/what-is-climate-change

3 www.ipcc.ch/sr15/chapter/spm

4 www.metoffice.gov.uk/weather/climate-change/what-is-climate-change

1 The Challenge

The 2015 Paris Agreement – an international treaty signed by 194 countries – commits the world to act to hold global temperature rises to below 1.5°C. However, Patricia Espinosa, Head of the United Nations Framework Convention on Climate Change has noted that governments are nowhere close to the level of ambition needed to limit climate change to 1.5°C and meet the goals of the Paris Agreement.

This next decade is critical. The World Economic Forum sets out that climate change is not incremental. The ways the earth stores and releases carbon could change suddenly in response to the gradual global warming that is underway[5]. Think of it as a game of Jenga and the planet's climate system as the tower. For generations, we have been slowly removing blocks. But at some point, we will remove a pivotal block, such as the collapse of one of the major global ocean circulation systems, for example the Atlantic Meridional Overturning Circulation (AMOC), that will cause all or part of the global climate system to fall into a planetary emergency. Recent research suggests the AMOC has already weakened by around 15 per cent since the middle of the 20th century[6]. If this continues, it could have a major impact on the climate of the northern hemisphere, but particularly Europe. It may even lead to the cessation of arable farming[7] in the UK, for instance.

These global changes can sound far away but in fact in Essex, we are already experiencing some of the impacts. The Met Office's State of the UK Climate report for 2018 shows the ten hottest years in the UK since 1884 have all happened in the last 17 years and note that we can expect warmer, wetter winters, hotter drier summers and more frequent and intense weather extremes. This has real impact on us. The number of homes at risk of flooding in Essex could double by 2050. We already experience water shortages in the summer, and this is expected to worsen. It will negatively affect our health and wellbeing. Our homes, jobs, businesses, and agricultural land could all be at risk. The green spaces and wildlife, which were so important to us during the COVID-19 pandemic, are also threatened.

5 www.weforum.org/agenda/2021/01/climate-change-sudden-cataclysmic-need-act-fast

6 Atlantic 'conveyor belt' has slowed by 15% since mid-20th century | Carbon Brief

7 Shifts in national land use and food production in Great Britain after a climate tipping point (exeter.ac.uk)

The number of homes at risk of flooding in Essex could double by 2050.

1 The Challenge

The UK is at the forefront of responding to the climate crisis. We have signed the Paris Agreement and are the first country to enshrine in law a commitment to reducing greenhouse gas emissions to net zero by 2050. This year, the Government has committed in law to reduce our greenhouse gas emissions, 78 per cent, by 2035 from a 1990 baseline. The UK Climate Change Committee Chair Lord Deben has said this target emphasises the importance of the 2020s as a decade of delivery on our climate ambitions, and urgent action is needed now to make this a reality[8].

“What happens next is up to us all.”
David Attenborough (from Climate Change – the Facts, BBC)

Here in Essex we need to play our part. The good news is we are already doing a lot of good work – we have the UK’s first electric vehicle charging forecourt in Braintree, we are building exemplar schools and a greener Essex with local authorities collectively planting 107,593 trees last year – but we need to plant more and plant faster.

If we are to succeed in our goal of Essex becoming a net zero county by 2050, the bulk of the work needs to be done in the next decade. In this report, the Essex Climate Action Commission (ECAC) makes recommendations that we believe are both necessary for Essex to be net zero by 2050 as well as achievable. Many of them are for measures to be taken, or be well underway, by 2030.

If our recommendations are implemented, we strongly believe that not only can we successfully tackle the climate crisis, but Essex will have an improved natural environment for people to enjoy and a vibrant economy for the benefit of local jobs and livelihoods. By transforming Essex into a net zero county, it can become a sustainable, thriving place to live, work and play.

[8] www.gov.uk/government/news/uk-enshrines-new-target-in-law-to-slash-emissions-by-78-by-2035

By transforming Essex into a net zero county, it can become a sustainable, thriving place to live, work and play

2 The Commission

The Essex Climate Action Commission (ECAC) is an independent, voluntary, and cross-party body, bringing together groups from the public and private sector, as well as individuals from organisations, to promote and guide climate action in the county. As a Commission, our purpose is to provide expert advice and up-to-date recommendations to move Essex to net zero by 2050.

When we were established as a group, we agreed that recommendations should include actions for adapting to an already changing climate. We need to ensure Essex is resilient to climate change impacts such as the extreme weather and flooding we are now experiencing.

Our recommendations also consider the roles of multiple partners across Essex, all of whom will have responsibilities and contributions to make in moving Essex to a net zero county.

We know the next decade is critical and we have set targets for action with this in mind. Essex needs to have halved its greenhouse gas emissions in the next 10 years.

About our Commissioners

We have over 30 commissioners and they are are drawn from a wide cross-section of society.

Our two co-chairs come from the Young Essex Assembly and represent the views of the young people of Essex. We have elected officials, drawn from all political parties, representing the residents of Essex.

A full list of Commissioners can be found on page 106 .

What we do

We have been meeting virtually as the ECAC regularly throughout 2020/21 to present, debate, and agree the recommendations that we are presenting to Essex County Council in this Report.

The UK Committee on Climate Change supported the Commission in considering current and future potential impacts of climate change in Essex. The recommendations for adaptation and resilience measures have been integrated and are fully reflected in the Commission's work which has been structured around six core themes:

Land Use and Green Infrastructure | **Energy** | **The Built Environment** | **Transport** | **Waste** | **Community Engagement**

2 The Commission

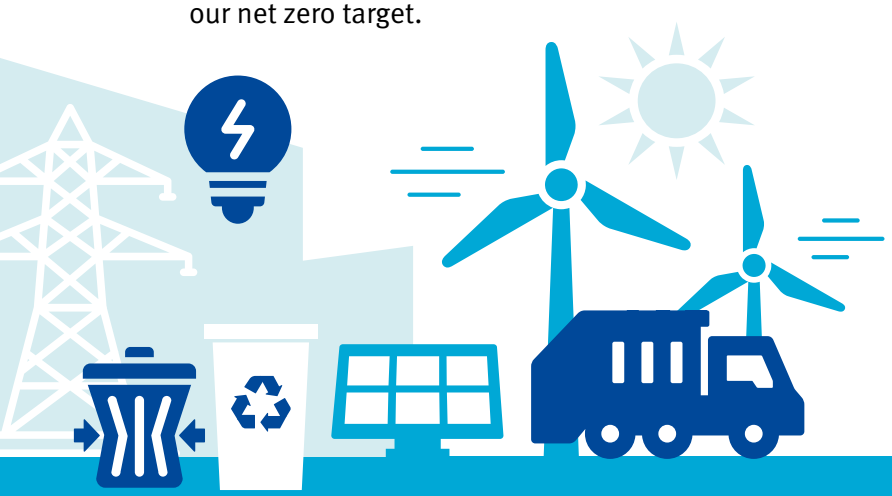
Commissioners formed different working groups, each joining a group (or groups) that fits their interests and areas of expertise. With support from Essex County Council and other local authority officers, each working group has worked hard to develop evidence-based recommendations that will be set out in the following chapters.

The Commission has set out recommendations for Essex County Council on tackling the climate crisis across the six core themes with a trajectory of targets and milestones that need to be met for Essex to become a net zero county by 2050.

The next 10 years will see a lot of change. What will Essex look like for me in 2031?

By 2031 we will be well on the way to becoming a net zero county. If we grasp the challenge now, all the 2031 targets in this report (Essex Climate Action Commission's 2021 report) will have been met, and Essex will be on track to achieve net zero by, or before, 2050. We are building a world where:

- Everyone can enjoy our green spaces. We all value and get the best out of our incredible landscape and our public spaces.
- We buy local and support our local businesses.
- We avoid waste and recycle, reuse, repair and refurbish as much as we can. Our universities, colleges, and schools inspire and equip future generations with the skills we need to tackle the climate crisis.
- Essex is a key centre of innovation in the UK where green economy is booming. Skilled workers want to come and live here, and green industries want to invest here. Our existing businesses are transforming into low carbon, and environmentally responsible organisations. We operate a Circular Economy where we no longer throw anything away but instead our industries are set up to re-use our materials carefully.
- Our local businesses and organisations, and all the people who live, work, and play in Essex – understand the climate challenge. We are all doing the right thing and helping to move us towards our net zero target.



We avoid waste and recycle, reuse, repair and refurbish as much as we can.

2 The Commission

- We have built clean solar and wind farms, and we can have a share in these - helping to fund them and seeing the benefits in our own communities. Our public services – the local councils, NHS, police, and fire services – have improved their buildings so they are net zero. They are leading by example, making sure they source properly sustainable goods and services locally and supporting projects that carry us closer to net zero.
- We don't need to travel so much because lots of us are working from home. When we do need to go somewhere, it is safer and easier for us to walk and cycle or get on public transport. Where we need to use a car, it's electric, and we can charge our electric vehicle (EV) easily.
- Nature is recovering. We have planted new forests and created new saltmarshes to absorb carbon and protect us against flooding and overheating. We have doubled the amount of natural green space and half of all Essex farmland is being managed according to sustainable principles. We have a new network connecting our green spaces together so that our wildlife can have more space to live. We all can enjoy more wildlife across the county.
- When we build new homes, they include green space for the people and the local wildlife, and these homes can cope with wetter winters and hotter summers – they don't flood or overheat. We know that when we move into one of these new homes, we will be able to walk or cycle to the things we need locally like shops, doctors, schools, and parks.
- We are much less likely to see our homes and roads flooded because we have invested in flood prevention – using planting and green spaces to soak up water quickly and store it effectively. We have put plants throughout our towns and villages, and on our buildings, to stop overheating and flooding. Our farmland includes stable hedgerows, trees, and wild areas – all of this means our land can store water – stopping flooding and reducing drought.
- We are a leading green tourist destination – visitors come for our great landscapes, stunning coast, fantastic green spaces, and iconic wildlife including beavers which we have re-introduced.

Half of all Essex farmland is being managed according to sustainable principles.

Essex Climate Action Commission's key steps to reaching net zero by 2050

2021
EV strategy; E-Scooter Pilots running;
Ten Liveable Neighbourhoods
Community owned renewables
Essex Design Guide; Green construction training
Smart meters in schools
All new builds to have solar panels

2022
New schools commissioned net zero
25 school streets
10 local delivery hubs
5 E-cargo bike schemes
Energy sector innovation hub

2023
Essex Housing Demonstrator net zero development
Developers to fund flood risk management via CIL
Coastal flood resilience scheme in critical areas completed

2024
Network community reuse and repair hubs

2025
All New buildings net zero and support circular economy recycling
50% Essex schools retrofitted to net zero
All residents & businesses to have kerbside recycling
All biodegradable waste to beneficial use

2030
25% all roofs have solar panels
1.43GW solar energy
Bioenergy in difficult rural homes
Hydrogen store for renewable energy
20 Liveable Neighbourhoods
3 new park and choose sites

2030
25% land natural green infrastructure (urban and rural)
50% farmland uses sustainable land stewardship
30% Essex in a Climate Focus Area
Per capita waste reduced by 10%
70% recycling rate
Zero waste to landfill

2030
All public sector estates in Essex Net Zero
100% fuel poor homes retrofitted & supplied with renewables
2/3 Essex houses retrofitted
1/3 commercial buildings retrofitted
100% schools retrofitted
All new buildings carbon positive

2035
All waste heat reused
All gas fired power repurposed to bioenergy
Network of community energy neighbourhoods in every district

2040
All housing retrofitted
Zero GHG emissions from housing
Essex renewables meets all county needs
30% all land natural green infrastructure
75% farm land adopts sustainable land practises

2050
All roofs have solar panels
75% all developments have integrated natural water management
100% farm land uses sustainable land practises

Land Use and Green Infrastructure

Where are we now?

We have a nature crisis as well as a climate crisis. Over the last century, huge areas of meadows, hedgerows, fresh and saltwater marshes, orchards, and woodland, together with the wildlife they contained, have disappeared in Essex, primarily due to intensification of agriculture and growth of our towns and villages. We have one of the lowest areas of land given over to trees in the UK and many local species are threatened with extinction.

In making its recommendations, the Commission deliberately targeted land use measures that address both the nature and climate crises.

More than 60 per cent of Essex is farmland, and agriculture currently generates approximately 10 per cent of UK greenhouse gas (GHG) emissions[9]. Food production is of course essential to our survival, but agriculture needs to change to more sustainable farming practices if we are also to reach net zero and achieve nature recovery.

Another key land use change is to double the amount of natural green infrastructure in Essex. This applies in our towns and villages, as well as in rural areas. It will mean more land can absorb and store carbon, help restore nature and biodiversity, alleviate flooding and drought, and improve both soil and air quality. Every piece of land in our county has a role to play.

Enhanced natural green infrastructure has other benefits as well, such as physical and mental wellbeing for Essex residents, as has been demonstrated by the COVID-19 pandemic. Yet only 29 per cent of our population is within a five-minute walk of a publicly accessible green space. There is a lot of work still to do to achieve the change we need.

The **Essex Green Infrastructure Strategy**, published in 2020, was awarded a Building with Nature Accreditation of Excellent, one of only eight local authorities to gain this authentication[10].

9 www.gov.uk/government/statistics/final-uk-greenhouse-gas-emissions-national-statistics-1990-to-2019

10 www.buildingwithnature.org.uk/newsblog1/2021/3/30/essex-county-council-lead-the-way-in-developing-an-exemplar-green-infrastructure-strategy

Why is this important?

Sustainable land stewardship

Agricultural production can either deplete or increase carbon stocks. Sustainable land stewardship can a) absorb carbon by increasing organic matter in plants, roots, and soils; and b) lower carbon use through less artificial inputs.

These techniques will also have benefits for biodiversity and water quality. Incentivising them will be built into the new Environmental Land Management Scheme, and the Commission's recommendations centre around helping increase scheme uptake.

It will not be possible to transform the whole of Essex farmland through sustainable land stewardship practices immediately, but we must make substantial progress in the next decade to meet the 2050 net zero target. The Commission is therefore recommending a target of 50 per cent of Essex farmland adopting sustainable land stewardship practices by 2030, 75 per cent by 2040, and 100 per cent by 2050.

The **RSPB's Wallasea Island Wild Coast Project**, based just north of Southend, is helping to tackle several climate-change impacts, including creating conditions for colonising species, replacing habitat lost to rising sea levels and reducing flood risk to local communities.

Natural Green Infrastructure

Natural Green Infrastructure (natural and semi-natural habitat) currently covers about 14 per cent of Essex. The Commission is recommending that this be increased to 25 per cent by 2030 and 30 per cent by 2040. This will be a major undertaking, but the Commission believes it is essential to achieve net zero from land use in Essex and will have enormous other benefits – for biodiversity, flood and drought control, soil health, air quality, reduced urban heat island effect, human health and wellbeing.

Increasing Natural Green Infrastructure will help carbon absorption, locking more carbon into nature. It will create more space for nature. Biodiversity is fundamental for the effective functioning of natural ecosystems, and healthy natural ecosystems provide humanity with essential benefits and services to thrive. It will also increase resilience and help nature survive the impact of climate change that is already happening.

The **Essex Forest Initiative** has exceeded its first-year target of planting 25,000 trees, by digging in 38,615 trees this year. This was done with the help of local farmers, charities, district, borough, and city councils[11].

[11] www.essex.gov.uk/the-essex-forest-initiative

Why is this important?

To flourish, nature needs space and connectivity. Both the United Nations and the UK Government have pledged to protect at least 30 per cent of land and sea by 2030. Connectivity is also crucial, so our natural green infrastructure is not in isolated islands. We should adopt the UK Government's commitment to a Nature Recovery Network and use natural river corridors, other green linear features and planned new green infrastructure to create effective interlinked nature corridors across Essex.

Local nature recovery networks in every part of the County will be hugely important; they can be in urban as well as rural areas, and we hope every town, village and parish can develop their own Natural Green Infrastructure enhancement plan.

Chelmsford, Colchester, Harlow and Uttlesford Councils

The four Councils are joining forces to plant more trees across Essex, with Colchester aiming for 200,000 trees by 2024 and Chelmsford 150,000 by 2030.

Natural Flood Management

Over the next 30 years, the risks from flooding are projected to double across Essex. The Commission is recommending that 75 per cent of schemes to increase flood resilience pursue nature-based solutions.

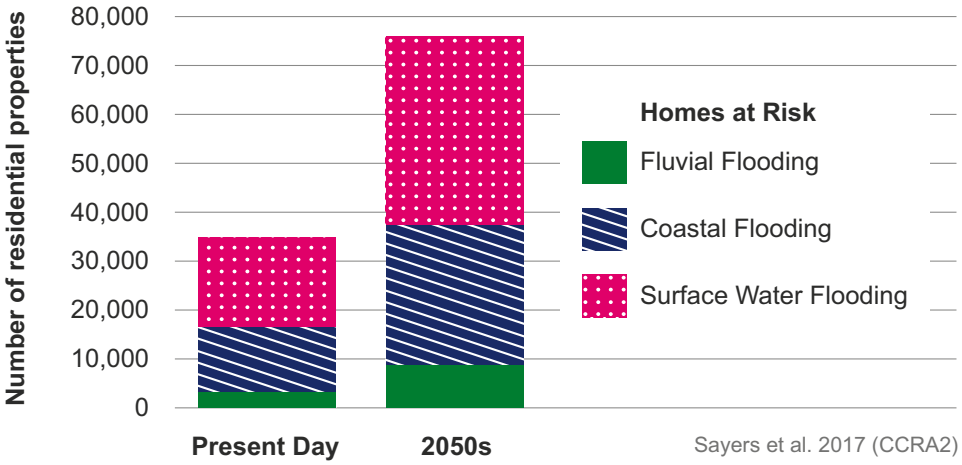


Figure 1. Residential properties at significant flood risk in Essex, Norfolk and Suffolk, Sayers et al 2017 (CCRA2)

Nature-based flood solutions accumulate carbon and enhance biodiversity as well as reduce flood risk. They create large areas of Natural Green Infrastructure, improve wetland habitat, and act as a sponge, allowing water to percolate more slowly into groundwater and rivers, improving both water conservation and water quality.

Why is this important?

Essex has a long, low coastline that is particularly vulnerable to rising sea levels and increasing risk of coastal flooding. Many areas of coastline have already experienced significant loss. It is therefore a recommendation that new policies and action plans on coastal flooding and shoreline erosion risk management are developed. This will include specific long-term, evidence-based, quantified outcomes with the agreement of affected communities and stakeholders that will be sustainable in economic, social and environmental terms. Through these interventions, we can increase resilience to sea level rise, absorb more carbon and enhance biodiversity through natural flood management such as restoration and creation of saltmarshes, mudflats, and washlands.

Urban Green Infrastructure

The Commission is recommending that its targets for increasing Natural Green Infrastructure be applied to urban as well as rural areas. Increasing urban green infrastructure through measures such as tree planting, sustainable urban drainage systems (SuDS) and green buildings will help absorb carbon and lower the “heat island effect” in built up areas. It will also reduce air pollution, address urban flooding, improve water quality and reserves, and improve the mental and physical health and wellbeing of residents.

Chelmsford City Council

Chelmsford plans to establish a new ‘green wedge’ through the Chelmer River Valley and will be creating new natural open spaces and country parks in North East Chelmsford and Sandon.

50 per cent of farmland in Essex will adopt sustainable land stewardship practices by 2030.

Our recommendations

The recommendations for Land Use & Green Infrastructure are:

30 per cent of all land in Essex will enhance biodiversity and the natural environment by creating natural green infrastructure. We expect these figures to be 25 per cent by 2030 and 30 per cent by 2040.

50 per cent of farmland in Essex will adopt sustainable land stewardship practices by 2030; 75 per cent by 2040 and 100 per cent by 2050.

To increase urban greening – 30 per cent greening of our towns, villages, and new developments by 2040: increased greenspace creation, naturalising existing green space, greening the public realm, and developing SuDS. Every citizen of Essex can contribute by making space for nature, either in their own gardens or buildings, or through communal areas where they live.

For the 75,000 properties in Essex still at risk of flooding, we will develop schemes to increase their flood resilience by 2050 and aim for three-quarters of the schemes developed to include integrated water management and natural flood management techniques.

Develop and agree new policy on coastal flooding and erosion risk management that specifies long-term, evidence-based, quantified outcomes that have the buy-in of the affected communities and stakeholders.

Coastal flood resilience schemes in critical areas to be implemented by 2023.

Ensure that adaptation (and mitigation) are integrated into the Environmental Land Management system.

Develop a Funding and Partnership Development Programme.

Our recommendations

The Commission's recommendations cannot be delivered by any single agency or body. It will require a massive effort across society, both financial investment and partnership building, to encourage everyone to play a role. The Commission is recommending a funding and partnership development which can act as a catalyst, using local funds as seed capital to attract other funders and can empower others to invest in land use change, flood risk management and resilience schemes.

RSPB's Horsey Island Recharge Project is looking to increase the resilience of the most important Little Tern colony in Essex to climate change and predicted rises in the sea level. This will be done by recharging an existing beach with sand and gravels from Harwich Haven Authority Capital Dredge.

Energy

Where are we now?

Energy provides heat and electricity for our homes and places of work, and powers our transport but a long-standing reliance on fossil fuels (e.g. coal, gas and oil) has resulted in energy generation being responsible for 21 per cent of the UK's greenhouse gas emissions, which is a huge contributor to the climate crisis[12].

Good progress has been made in recent years to decarbonise – that is reduce the greenhouse gas emissions from the UK's electricity supply by phasing out the remaining coal-fired power stations and growing the offshore wind industry. However, we are still heavily reliant on gas being burned in gas power stations to generate electricity.

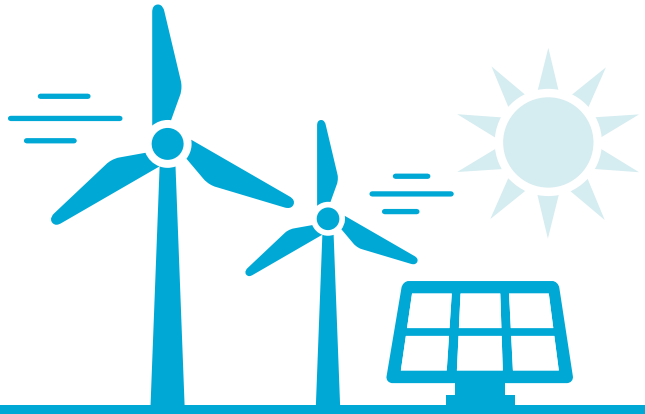
As we decarbonise, we will need to improve the energy efficiency of our homes and other buildings. We will need a substantial increase in renewable energy generation capacity, to provide power and heat to homes, places of work and for electric vehicles. As energy produced from renewable sources is often variable and it is inefficient to transmit energy over long distances, we will need to be able to generate and store more energy locally.

What we need to do now is reduce our greenhouse gas emissions from energy to net zero as quickly as possible. This can be achieved by decreasing energy consumption through improving energy efficiency of our buildings, changing our behaviour and alongside embracing cleaner, renewable energy technology.

Mid and South Essex NHS Foundation Trust

The Broomfield Hospital site in Chelmsford uses state-of-the-art heat pumps which saves 60–70 per cent on current carbon usage and will provide a return on investment in less than five years. During periods of high carbon usage, the hospital has a system that works from storage batteries, running the heat pumps at more cost-effective times, while providing cooling for a data hub, as well as supplying domestic hot water to a ward block.

12 assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/957687/2019_Final_emissions_statistics_one_page_summary.pdf



We should embrace large-scale renewable energy installations, such as solar and wind farms.

Why is this important?

We want our residents and businesses to be supplied by 100 per cent renewable energy and we want to see Essex produce enough renewable energy within the county to meet its own needs by 2040. Solar generation photovoltaics (Solar PV) will be important because it is more affordable and can be installed more quickly compared to other technologies and also because it performs well – Essex is one of the sunniest counties in the UK with an average of 1,598 hours of sunshine per year compared to the national average of 1,373[13]. We should have solar panels fitted by default on new builds, on a quarter of our existing buildings by 2030 and every available roof by 2050.

Danbury Park Community School in Chelmsford has gone solar. In October half term 2020, solar panels were fitted which will save 15 tonnes of carbon in the first year and 375 tonnes over the panels' lifetime. At the same time, the school embarked on a sustainability journey with the pupils researching all aspects of sustainability in class, including how to recycle plastic and participating in Sustrans Big Pedal Week. The pupils explored simple ways to reduce the school's carbon output and save the school money in energy costs. (See full case study on page 78) Essex Outdoors, Danbury was also fitted with solar panels at the same time as part of the Council's commitment to acting on climate change. Most recently, in June 2021, St John's C of E Primary School also in Danbury was fitted with solar panels as part of the same project.

We should embrace large-scale renewable energy installations, such as solar and wind farms. We can do this without giving up too much agricultural land and in a way that benefits the local community and supports developments that offer community ownership, and improvements to biodiversity.

We should make Essex a centre for renewable energy innovation, working with universities and businesses to explore and develop opportunities for renewables, energy storage and other new technologies such as small scale nuclear. A Local Government Association study[14] into local green jobs estimated that Essex would need over 15,000 new jobs in the local carbon and renewable energy economy sectors by 2030 and over 27,000 by 2050. We should support hydrogen storage facilities by 2030 to help capture excess renewable energy, from solar and wind, when it cannot be used immediately. Solar and wind energy is dependent on availability, i.e. when it is a sunny day or when there is sufficient wind blowing. Furthermore, supply and demand dictates that often the most productive time for renewable energy generation is when demand is its least. Therefore, to utilise this excess renewable energy it can be used to produce hydrogen via a number of processes, for example electrolysis, which can then be stored for later use in fuel cells or to supplement heating via the gas network.

13 www.metoffice.gov.uk/research/climate/maps-and-data/uk-climate-averages/u10q3cdwd

14 lginform.local.gov.uk/reports/view/lga-research/estimated-total-number-of-direct-jobs-in-low-carbon-and-renewable-energy-sector?mod-area=E09000006&mod-group=AllBoroughInRegion_London&mod-type=namedComparisonGroup

Why is this important?

Willmott Dixon Construction

The company is aiming to be net zero in all their operations, including new builds, by 2030 without carbon offsetting.

We want to see much more local involvement, where residents play their part in this by generating more of their own energy, either as individuals or through community energy schemes and co-operative purchasing clubs. We will build a network of community energy neighbourhoods by 2035 where residents generate, store, share and use far more of their energy locally, helping to bring down bills and tackle issues like fuel poverty and keep more of the value of the energy they produce in their local community.

Figure 2. Graphic taken from Energy Systems Catapult

https://es.catapult.org.uk/reports/local-area-energy-planning/

South East Local Enterprise Partnership (SELEP)

The partnership will be supporting innovation in green energy and technologies, including through the Freeports. It will support the development of renewable energy infrastructure and low carbon technologies and behaviours and work with partners to ensure new developments protect and enhance our natural resources to deliver social and environmental benefit.

Our recommendations

The energy recommendations focus on ways to invest in renewable energy, switch to a greener electricity supply and create community energy neighborhoods. We are calling for:

Essex to be made a centre of innovation for emerging renewable technologies (e.g. small scale nuclear and manufacturing of renewables products such as solar tiles).

A network of community energy neighbourhoods to be built across every district in Essex, to generate, store, share and use energy locally by 2035.

Essex to produce enough renewable energy within the county to meet its own needs by 2040.

All large-scale renewable developments to have an element of community ownership from 2021.

1.43 GW of large-scale solar panels to be built on available land without compromising current agricultural land by 2030.

Solar panels to be installed on every available roof on domestic, industrial and commercial buildings by 2050, with a target of 25 per cent by 2030.

All new build houses, industrial and commercial units to have solar panels fitted immediately.

One-third of commercial buildings to be retrofitted as far as possible with renewable systems by 2030.

Retrofit across the whole housing stock by 2040, introduce an incentive to accelerate the shift to low carbon heating solutions.

Our recommendations

Bioenergy to be used for all rural homes that are hard to decarbonise through electrification by 2030.

100 per cent of fuel-poor households to be retrofitted and supplied with affordable renewable energy by 2030.

All gas-fired power in Essex to be repurposed to bioenergy by 2035.

All waste heat from industrial and commercial use to be captured and reused (where local demands exists) by 2035.

Create hydrogen storage facilities to store excess renewable energy (off-shore wind and solar) by 2030.

Facilities to be created to produce green hydrogen to fuel heavy goods vehicles by 2040.

The EV charging network to be rapidly expanded beyond the UK national average, focusing particularly on rural locations.

University of Essex

Plans are in place to install additional solar PV roof-mounted panels at nine locations on the University's Colchester campus. This has the potential to generate circa 720,000 kWh of own electricity, saving approximately 276 tonnes of greenhouse gases per year.

Built Environment

Where are we now?

In 2019[15], 17 per cent of greenhouse gases were created in the UK by buildings including homes, industrial and commercial property, hospitals, and schools[16]. In 2020-21, buildings in Essex are predicted to emit just under 3MtCO_2[17]. It was predicted that the building stock across Essex will emit 3 million tonnes of carbon dioxide during 2020/21 with 60% (1.862mt) emitted from dwellings and around 15% (0.486mt) from each non-domestic and industrial buildings. The greenhouse gases emitted from buildings are mainly the result of burning fossil fuels – gas and oil – for heating. Our buildings are a significant contributor to the climate crisis.

Within Essex, we have over 600,000[18] existing homes, 85 per cent of which were built before the introduction of standards for energy and insulation performance. Energy Performance Certificates (EPC)[19] give a rating to properties showing how energy efficient they are. Many of our residential properties, around 67 per cent, have a poor Energy Performance Certificate (EPC) rating of D or below, meaning most residents are paying more for their heating than is necessary and creating more greenhouse gas emissions. The Government set standards for privately rented homes. Since April 2020 landlords can no longer rent properties below EPC E, and there is a national target of EPC band C for all private rented homes by 2030[20]. The Government has also set out that as many existing homes as possible should hit EPC C by 2035[21].

15 www.gov.uk/government/statistics/final-uk-greenhouse-gas-emissions-national-statistics-1990-to-2019

16 www.theccc.org.uk/wp-content/uploads/2020/12/Sector-summary-Buildings.pdf

17 www.bre.co.uk/filelibrary/Briefing%20papers/92993_BRE_Poor-Housing_in_-Europe.pdf

18 Essex Built Environment study – Element Energy

19 www.gov.uk/buy-sell-your-home/energy-performance-certificates

20 www.gov.uk/guidance/domestic-private-rented-property-minimum-energy-efficiency-standard-landlord-guidance

21 assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/945899/201216_BEIS_EWP_Command_Paper_Accessible.pdf

Where are we now?

Retrofitting: Two of the most energy-consuming sites in Essex County Council's core estate have both begun a refit programme to help reduce their carbon emissions. Essex Records Office and Goodman House will benefit from LED lighting and control upgrades, to decarbonisation of their gas heating with installation of two air source heat pumps, and 100kw of roof-mounted Solar PV combined battery storage.

Despite Essex's relative prosperity, it also has some of the most deprived areas in the East and South East of England. These areas are also most vulnerable to flooding. Housing here tends to be of lower quality with poor energy efficiency performance and consequently, have higher heating and lighting costs perpetuating wealth inequality[22].

In Essex, 72,054 (8.9 per cent) of households live in fuel poverty where they cannot afford to heat their homes properly. This has significant impacts on their health and the educational outcomes of their children. 10 per cent of excess winter deaths are directly attributable to fuel poverty, and an estimated 9,700 winter deaths are directly related to living in a cold home, with the majority (6,900) linked to the coldest 25 per cent of homes in the UK[23]. Cold homes also contribute to respiratory illnesses and circulatory problems, as well as mental health issues such as stress, anxiety and depression in both adults and children. The costs to the NHS are estimated to be £848 million per year attributed to excessively cold homes.

Two developer-led schemes working with a developer and District Councils: a new medium-sized developer in Uttlesford and a national house-builder at Beaulieu Park are working to achieve a portion of net zero homes in their developments. These will be designed and costed, with viability assessments, and the information used to scale up and extend the project elsewhere. They will inform emerging Local Plan policy and future planning guidance.

The domestic boilers heating our homes, contribute to air pollution. Gas boilers generate 19 per cent of Nitrogen Oxides (NOx) emissions – a key air pollutant, which affects human health – in urban areas. In addition, domestic wood burning and coal for heat contribute 38 per cent of particulate matter – another air pollutant that affects human health, in the UK.

22 Essex Built Environment study – Element Energy

23 Cold homes and excess winter deaths: a preventable public health epidemic - E3G

Where are we now?

However, it is not just our homes which are the problem. Non-domestic buildings such as hospitals, schools, hospitality premises, offices, retail, storage, and community and leisure facilities contribute to carbon emissions on multiple levels and present us with a real challenge for the future. These buildings also perform poorly with the majority of businesses operating in buildings with poor EPC ratings (EPC D or below). Our businesses and public sector all need to reduce their energy demand by improving their energy efficiency, alongside moving to renewable energy. The Government's Energy white paper confirmed that all rented non-domestic buildings will need to be EPC B by 2030[24].

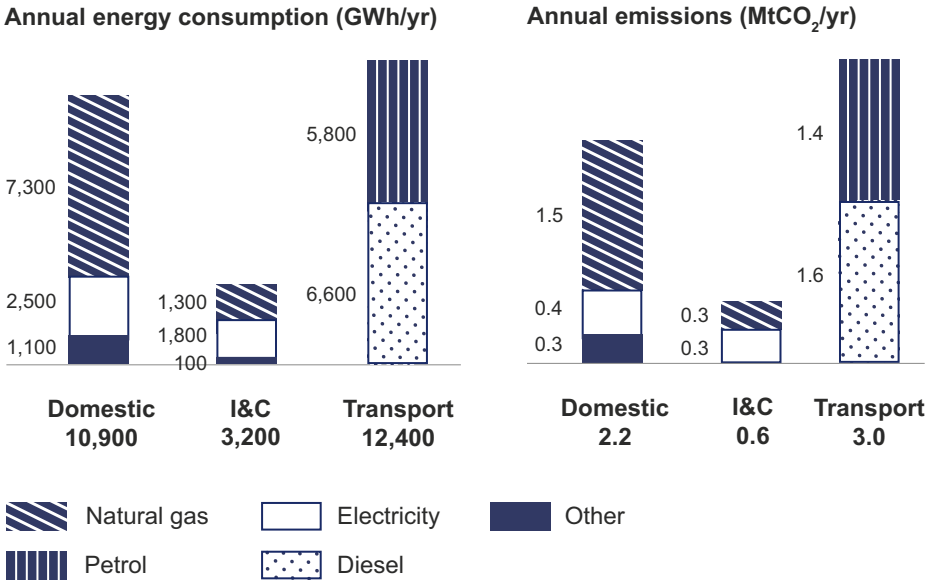


Figure 3. Energy consumption (left) and emissions (right) in building's in Essex in 2019, broken down by sector: Domestic, and Industrial & Commercial (I&C), Essex Climate Action Commission Interim Report, 2020

Government has set ambitious targets for around 160,000-180,000 new homes in Essex to be built by 2040. This will be reflected in the local plans across the county either adopted or in preparation. Building homes means we need to provide the associated facilities for employment, health, and schools. It is critical we minimise the carbon emissions of these buildings. The County has responded to this in setting ambitious targets to achieve net zero emissions in its new schools by 2022 and to be carbon positive by 2030.

Our buildings are also facing new challenges from our changing weather. 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[25].

[24] assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/945899/201216_BEIS_EWP_Command_Paper_Accessible.pdf

[25] www.theccc.org.uk/2019/02/21/uk-homes-unfit-for-the-challenges-of-climate-change-ccc-says/ www.theccc.org.uk/publication/uk-housing-fit-for-the-future

Where are we now?

Here in Essex, hotter, drier summers brings water shortages – we are already one of the areas with the highest pressure on our water supplies in the summer[26]. We are also seeing increased risks of subsidence[27]. Essex is identified as one of the areas most affected as clay in the county is vulnerable to losing moisture leading to ground cracking and shrinking. At the same time we are experiencing increased risks for flooding from warmer, wetter winters and coastal erosion, with the number of homes at risk of flooding expected to double between now and 2050[28].

Retrofitting: University of Essex

The University is planning to install additional roof-mounted solar panels across the University's Colchester campus. This will give them the potential to generate circa 720,000kWh of their own electricity, reducing our carbon emissions by over 270 tonnes per year.

26 www.theccc.org.uk/publication/climate-change-risk-assessment-ii-updated-projections-for-water-availability-for-the-uk

27 www.bgs.ac.uk/datasets/geoclimate-ukcp09-and-ukcp18

28 www.theccc.org.uk/wp-content/uploads/2015/10/CCRA-Future-Flooding-Main-Report-Final-06Oct2015.pdf.pdf

Why is this important?

Essex – in common with areas across the UK – is still building new homes, schools, offices, and shops to meet the current building regulation standards which are not net zero. The UK Government has brought in a new Future Homes Standard and from 2025 new build homes will be required to have low carbon heating such as heat pumps, and much higher levels of energy efficiency. However, every building we build today that is not net zero will need to be updated and retrofitted before 2050. Each new building added below a net zero standard is adding to the retrofit challenge and increasing costs for future residents and business owners. When we do renovate our existing buildings, we are missing the opportunity to move them to net zero, we will only have to go back and do more work to make these changes we have missed.

Local authorities need to work together to drive up standards in our local plans, by promoting and requiring standards which deliver on net zero and improve climate resilience by building with nature. We can utilise the planning system and embed climate change in local plan-making, planning policy, negotiations, and decisions. Policy makers and development managers, as well as portfolio holders and other key Planning Committee members are critical to securing real change in new developments and the places we will be creating for our future. The effective use of the planning system in Essex can help deliver the future we aspire to.

Local authorities, universities and businesses must work together to drive innovation and support skill development to ensure Essex can benefit from the economic opportunities that moving to net zero brings. The Construction Industry Training Board notes that to achieve net zero by 2050, the UK will need 350,000 new roles to be created by 2028[29].

Partners across Essex can band together to ensure all regeneration and investment schemes put climate resilience and net zero at the heart of all new and regeneration plans of any scale across the county. This will unlock a significant pipeline of investment in the construction sector in Essex.

All new developments: homes, schools, offices, retail, and leisure should all be built to a much higher standard. The aim should be for greener, climate resilient, net carbon zero developments which provide balanced communities, with easy walking access to work, shops, and a good quality environment.

New build: Chelmsford, Colchester, and Uttlesford Councils

The three local councils will be joining forces to encourage developers to build to zero-carbon standard, retrofit existing buildings and, where possible, encourage renewable energy measures.

[29] www.citb.co.uk/about-citb/news-events-and-blogs/net-zero-350-000-new-construction-roles-to-be-created-by-2028

Recommendations for all new buildings

Our new developments can showcase the best in new design. We can build homes that will not flood in wet winters but have been designed in a landscape that can manage increased rainfall, do not overheat, and can keep us warm without using gas or oil. New developments have the potential to showcase the future today: to help us see what a net zero future looks like and help us think about how to adapt our existing towns and villages. We need to deliver healthy places with a focus on walkable neighbourhoods not reliant on car journeys to access local shops and services. We aim to:

- Create healthy communities, places, and buildings that both, promote good health and wellbeing and, address health inequalities and climate changes through, for example reducing the use of energy and water, using more renewable energy, and increasing more and better sustainable transport choices include; walking and cycling.
- Build new net zero energy-efficient housing.

All new schools commissioned to be carbon zero by 2022 and carbon positive by 2030.

All new homes and all new commercial buildings granted planning permissions to be carbon zero by 2025.

All new homes and non-domestic buildings granted planning permission to be carbon positive by 2030.

District Local Plans should reflect the Government's 25-year Environment Plan and incorporate green infrastructure, including making sustainable drainage (SuDs) as a default requirement on all new developments, supported by the developer contribution.

New homes should provide space for high levels of recycling to support a new circular economy (see chapter Waste).

Recommendations for all new buildings

- Essex Design Guide (essexdesignguide.co.uk) to be updated to reflect best environmental practice in net zero and resilience.
- Essex to set goals for reversing the national decline in urban greenspace.
- Support local planning officers, by providing training and building expertise in responding to the climate crisis.
- Review of the Essex employment, training, skills, procurement, and business operations to deliver the ambitions of the ECAC and partners in relation to innovative and green construction for a carbon zero future. We need to support the housing sector – which is a key employer in Essex – to develop new opportunities and skills and make sure we can be part of green construction sector growth.
- Essex seeks to lead the way, working with our universities, buildings industry and local planners to be at the forefront of building innovation, with a clear focus on building with nature.
- Essex should bring forward net zero developments urgently to showcase these new approaches, with a major scheme under construction by 2023.
- The industry needs to secure sustainable building materials with an urgent focus on green procurement standards in place by end of 2022.
- The Essex Developers Group should establish a Climate Change Charter and ‘demonstrator’ projects.

Recommendations for all new buildings

New developments (buildings and infrastructure) should have SuDS as the default option and only be given the right to connect to the sewer system once national SuDS standards have been met.

Local Plan policies and transportation policies must support active travel and prioritise walking and cycling, promoting them as the natural choice, particularly for shorter journeys.

Recommendations for existing buildings

Updating our buildings and moving away from oil and gas to heat our homes and workplaces is critical in moving to a net zero country and county. We need to invest in our homes, our public buildings and our commercial buildings, shops, factories, and offices: they all need to be tackled.

Our buildings are expensive to run we have too many that leak heat in winter and overheat in summer. We are wasting too much water and increasing pressure on our water supplies. Our buildings may also not help us to make lower impact choices by, for example, homes that have adequate space to dry clothes naturally.

Of course, some of our homes can be more difficult or expensive to bring up to date. Some homes are built with solid walls which can only be fitted with solid wall insulation or have glazing which is not cost effective to improve. There is also a significant number of heritage buildings which require specialised treatments. There are challenges, but we need to take urgent action to improve the energy efficiency of our housing. This will cut our energy bills and make our homes more comfortable.

Alongside reducing our energy demand, we need to reduce the greenhouse gas emissions of the energy we use. We need to move away from fossil fuels (coal, oil, or gas) for lighting, heating, and cooling systems and replace these systems. This transition opens new opportunities and the Government's 10-point plan for a green industrial revolution notes that action on retrofit and a move towards heat pumps will support 50,000 new jobs by 2030[30].

Our buildings and urban landscape also need to be able to cope with the new realities of changing weather - heavier rainfall and hotter summers bring challenges such as flood risks, overheating and water shortages. We need to give more space in our towns and villages to trees and core planting to manage water flows, cool our streets and buildings and improve our air quality (see chapter on Land Use & Green Infrastructure).

[30] www.gov.uk/government/publications/the-ten-point-plan-for-a-green-industrial-revolution/title

Recommendations for existing buildings

All schools should have smart meters by the end of 2021. 50 per cent of Essex schools to be retrofitted to net zero standards by 2025 and 100 per cent by 2030.

All anchor institutions estates – that is buildings owned by the public sector in Essex, and all local authorities, NHS, police, fire, schools, and universities - to be retrofitted to net zero carbon standards by 2030. We need to develop adaptation and mitigation plans for these estates including care homes, hospitals, schools, and prisons.

Two-thirds of all homes to be retrofitted as far as possible to net zero carbon standards by 2030 and all by 2040 with incentives introduced to accelerate the shift to low carbon heating solutions.

Existing homes – carbon emissions reduction of 50 per cent by 2030 and carbon zero by 2040.

100 per cent of fuel poor homes to be retrofitted and supplied with affordable energy by 2030.

All retrofit schemes should include water efficiency alongside energy efficiency.

Prioritise using waste heat where possible – usually in urban areas where there is a high demand for heating and cooling.

Rural homes that are hard to decarbonise with electric heating, will be supported to move to more sustainable fuel sources such as bioenergy.

Bring forward a programme to implement 10 walkable neighbourhoods by 2021 and then 20 schemes each year between 2022-2030.

Recommendations for existing buildings

- Existing towns and villages must seek to support and provide for more adaptation measures. This should include green space to be retrofitted in local areas, which includes measures such as tree planting, and green roofs and walls (see chapter Land Use and Green Infrastructure)
- Introduce a stronger policy on sustainable drainage (SuDS) which will replicate natural water drainage. There must be clarity on who is adopting and maintaining the SuDS systems.
- Transportation policies must support active travel and prioritise walking and cycling, promoting them as the natural choice, particularly for shorter journeys.
- Optimise energy use in the public estate by 25 per cent by 2025 and 50 per cent by 2030.
- Essex should invest in green construction training for a zero carbon future by 2021.

We have historic and listed buildings in Essex and while much can be done to reduce their carbon footprint now, it is important to explore innovative techniques, approaches, and funding options to reduce their carbon impact over time. Although many of these buildings may not get to zero carbon emissions: the carbon positive new builds by 2030 will go some way to off setting these buildings and other offsets e.g. tree planting and reducing the energy use in the public estate by 25 per cent by 2025 and 50 per cent by 2030, will help.

We recognise that this scale of ambition will require significant investment and the Government should support the retrofit challenge – especially for more challenging heritage and listed buildings – alongside private investments. There should be an incentive to move to low carbon heating.

These substantial changes required in our buildings, towns and villages present a huge economic opportunity. Essex should invest in construction training to unlock green employment opportunities by ensuring we have the right skills in our workforce. Manufacturing sector and supply chains will benefit from the new jobs created in the county. The opportunity presented by the scale of new developments and improvements to the existing environment is enormous.

Carbon Reduction Projects

Merrylands Primary, Earls Colne Primary and Beauchamps Secondary Schools

Essex County Council has recently added new capacity to three schools in the county. These new buildings were all awarded an EPC rating of A plus and will produce an average of -75kg CO_2/m^2/year compared to the industry benchmark of 66kg CO_2/m^2/year: a net impact of -141kg CO_2/m^2/year.

The expansion projects at Merrylands, Earls Colne Primary and Beauchamps Secondary have used a mix of new technologies and high energy efficiency standards.

The buildings used an innovative modular form of construction where most of the work was undertaken in a controlled factory setting, meaning that:

- Waste is significantly reduced, and wood off-cuts can be used as biomass fuel to provide space heating in manufacturing facilities.
- Materials are received without packaging that saves time and more waste.
- Deliveries are minimised because products arrive in bulk, rather than individually to disparate sites. There are up to 90 per cent fewer vehicle movements to site, further reducing disruption, congestion, and carbon emissions.

The walls delivered by this system are twice as energy efficient as current Building Regulations requirements and ensured an air-tight construction. This means the heat demand for these buildings is already low. Mechanical Ventilation and Heat Recovery systems have been installed, combining comfort with economy. Heat is removed from the stale air before it is expelled and used to pre-warm the fresh air as it is supplied – recycling over 90 per cent of the heat in the building during the colder seasons. Energy consumption is further reduced through LED lighting and is closely monitored alongside renewable energy generation from the solar PV panels on the roofs.

Carbon Reduction Projects

Delivering 62 Carbon Zero Homes – Brookfield Close, Brentwood

In December 2020, Brentwood Borough Council submitted innovative plans to redevelop Brookfield Close in Hutton, an area of underused and derelict housing and multi-use garages, which is in urgent need of improvement and regeneration. This will deliver much needed new affordable housing in the area for local people and transform the site completely. These homes will be built to be net zero carbon set in a beautiful, landscaped green space.

Brookfield Close currently has 47 homes, some owned and some socially rented. The proposed plan will create 62 new homes – 16 houses (2, 3 and 4 bedrooms including detached, semi-detached, and terraced) and 46 apartments (1 and 2 bedrooms). Most of the properties will have their own private external space in the form of a either a rear garden or a balcony, or easy access to nearby communal gardens. 70 per cent of the new homes will be affordable[31] with the remainder for private sale. Three are designed to wheelchair user home standards.

The existing homes will be demolished except for the three-story Courage Court comprising 15 flats. This building will be stripped back and retrofitted to zero carbon fabric standards. Residents will enjoy warmer, better ventilated, and more comfortable environments to live in. This forward-thinking approach will give Brentwood Council the chance to assess the impact and benefits of new build versus retrofitted zero carbon products for its future programmes.

Figure 4. Brookfield Close, Hutton – Design & Access Statement December 2020

[31] Affordable housing includes social rented, affordable rented and intermediate housing, provided to specified eligible households whose needs are not met by the market. It can be a new-build property or a private sector property that has been purchased for use as an affordable home. Source: gov.uk

Carbon Reduction Projects

The site will have huge benefits for all its residents. Each home will be net zero carbon and designed to use solar power for heating, reducing energy bills to around £40 per year. The homes have been designed to maximise natural daylighting and create a comfortable, healthy environment.

Outside, the landscape will be redrawn and will include a new play area and outdoor gym. The site is set within a walkable neighbourhood – where walking and cycling are safe, secure and routes well-lit. There will also be communal gardens, outdoor seating, and community allotments, all by their nature designed to prompt residents to spend greater time outside, collectively, and communally managing the space.

Residents' parking will include at least four disabled spaces and an electric charging station to encourage the switch to electric vehicle (EV). There will be cycle storage for 69 bikes and storage space for waste and recycling.

Although flood risk is not deemed high here, the development will include a Sustainable Drainage System (SuDS) – using planting to ensure any surface water is managed effectively.

A significant level of community engagement has taken place during the pandemic via Zoom. The residents have been consulted as both part of the planning process and on one-to-one basis to gauge opinions and understand their aspirations for their area and the scheme.

This is one of the first net zero housing schemes in Essex and we hope it will be the first of many. The Commissioners of Essex Climate Action Commission have wholeheartedly endorsed the innovation and measures taken with the quality and design of these new homes.

The planning committee was held in June 2021 and had a successful outcome.

Image: Greater Anglia

Transport

Where are we now?

We depend on fast, efficient transport to keep us connected and move goods and people around to fulfil our needs and keep our economy growing. However, transport is also the largest source of greenhouse gas emissions and is responsible for over quarter of greenhouse gas emissions in the UK[32]. Our transport emissions are higher than the national average (see Carbon emissions in Essex chapter). Many current forms of transport are also a major source of toxic air pollution – notably nitrogen oxides and particulate matter – which are seriously damaging our environment and our health.

The cars, vans and lorries on our roads are an integral part of our daily lives but are increasing air and noise pollution, and significantly contributing to the climate crisis. We need to challenge the status quo and find new, sustainable, and less harmful ways for our transport systems to operate.

For a county like Essex with landscape that is 72 per cent rural, this presents specific challenges for our more rurally located residents and businesses. Around a quarter (354,669) of our 1.4 million population live in rural areas and, due to the increased distances to key services and main transport links, they are more inclined to commute by car and travel 53 per cent further each year than the majority of people living in urban areas. We have made urgent recommendations for ways Essex can help provide specific and appropriate approaches to decarbonisation for our rural population[33].

Across the county, we know that a lack of reliable, fast, and efficient public transport alternatives and, in the case of walking and cycling the perception of road danger and lack of safe infrastructure mean people are reluctant to switch from their cars. In 2018/19 under 10 per cent[34] of residents cycled at least once a week. We know, too, that more and more children are being driven to school than before the COVID-19 pandemic[35]. The number of children cycling to school is low[36] – around 5 per cent and 49 per cent of UK school children expressed concern about pollution levels around their school[37].

32 assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/957687/2019_Final_emissions_statistics_one_page_summary.pdf

33 www.essexruralpartnership.org.uk/Docs/Strategy%202016%20etc/Rural%20Data%20Briefing%20V1.pdf

34 www.gov.uk/government/statistical-data-sets/walking-and-cycling-statistics-cw

35 Essex Highways Covid Traffic Counts

36 Trips to and from school by main mode, region and Rural-Urban Classification: England
www.gov.uk/government/statistical-data-sets/nts99-travel-by-region-and-area-type-of-residence

37 Increase in children's concerns over air pollution - Sustrans.org.uk

Where are we now?

Buses are, by far, the largest provider of public transport in Great Britain[38]. In 2018/19[39] Essex residents caught the bus 43 million times. We use the bus to go shopping and make trips to cinemas, pubs, theatres, restaurants, and leisure centres, contributing an estimated £660 million to the local economy across Essex every year[40].

Almost half, (42 per cent) of bus users are travelling to or from work or education, 29 per cent are going shopping, 13 per cent are visiting friends or relatives, 5 per cent are on a leisure trip and 10 per cent are doing something else. Just under half of those who use buses (49 per cent) are choosing to do so because it is either cheaper or more convenient than other methods of travel and 51 per cent have no choice[41] – the bus is their sole means of getting around. Satisfaction rates for bus travel in Essex is good at 83 per cent,[42] but this is still relatively low compared to other local authorities who were surveyed.

Where journeys cannot be made by more sustainable forms of transport, we need to encourage ways to move around that run on alternative fuels such as electricity. In 2020, Essex County Council introduced six e-scooter pilot schemes across the county, offering an electric alternative to the car. From 2030, the UK will no longer sell new petrol and diesel cars and from 2025 companies such as Jaguar, VW and Volvo will withdraw their sale too. There are currently 5,970 plug-in cars and light good vehicles[43] in Essex but only 60 public charging points, which is below the national average, so we have recommended that Essex County Council urgently increases the number of EV charging points. However, Essex is moving quickly on this agenda. Braintree is now home to the UK's first private developer's electronic charging station (see case study *The UK's first electric car charging forecourt opens in Essex*). A target of 196,000 electric cars by 2030 is an achievable goal. Many organisations including Essex County Council and Essex Police are introducing EVs into fleets this year.

Harlow and Uttlesford District Councils

Harlow and Uttlesford are working towards installing more electric car charging points and improving digital connectivity to reduce the demand to travel for/to work.

38 www.essexhighways.org/getting-around/bus/bus-strategy

39 Essex County Council Passenger Transport Team, 2021 - Latest pre-COVID figures

40 www.essexhighways.org/getting-around/bus/bus-strategy

41 www.essexhighways.org/getting-around/bus/bus-strategy

42 https://nhtnetwork.org/nht_product/public-satisfaction-survey/

43 Dft Vehicle Licensing Statistics Table VEH0131 - All vehicles (VEH01) - GOV.UK (www.gov.uk)

Where are we now?

It is also important that the road network is maintained in a way that minimises carbon emissions. Essex Highways will be updating its Highways and Transportation Policies in 2021 but is already exploring several low carbon innovations, such as using survey drones and artificial intelligence (AI) road inspections. Drones are used to get to difficult to access areas, such as bridges and tunnels and in-car artificial intelligence is used to identify damage and defects, like potholes and surface cracking, keeping service cars and vans off the road until they are required to carry out repairs. The team is adapting their road scheme design processes to account for carbon impact in the operation, maintenance, and construction of roads, using Highway England's carbon emissions calculation tool. Essex Highways is also trialling warm tarmac, which is hoped will become the standard material for inlay surfacing. This form of asphalt is better for the environment because it uses less energy when it is being mixed and laid. This one simple switch is expected to significantly reduce carbon emissions and work is underway to quantify this saving.

'Warm' Asphalt: Eurovia's 'Tempera' driving low carbon, local asphalt solutions. Eurovia has been supporting Essex Highways road resurfacing operations by supplying a 'warm mix' asphalt solution, which has been trialled on some of the repair work on our roads. This form of asphalt is better for the environment because it uses less energy when it is being mixed and laid. Coupled with the supplier's production facilities in Dagenham and Thurrock, it also offers transportation cost savings resulting in a cut in carbon emissions of over 25 per cent.

Why is this important?

Transport is responsible for 27 per cent of the UK's greenhouse gas emissions[44] and is the largest, single contributor to the climate crisis. It is essential that travel is decarbonised if we are to meet the UK's climate commitments.

Congestion on Essex roads is an environmental disaster and economically is costing local businesses billions. In 2017, more than £37.7bn in the UK was lost, directly and indirectly, through traffic congestion. This amounts to an average of £1,168 per driver.[45]

We know that residents can be highly dependent on their cars - many of the things we do in our daily lives assume the use of a car for everyday travel. Alternatives to the car need to be better so that we can change assumptions about car ownership and use and build awareness and understanding of possible alternatives to car use. In rural areas, life without a car is particularly challenging and alternatives such as cheap, reliable bus services, often do not exist.

The real alternatives to the car – walking, cycling, bus and train travel – need to be more widely available. These need to be more attractive options for residents which means safer roads for walkers and cyclists, cost effective public transports and all these options easy and convenient to use. We are recommending Essex County Council find ways to encourage residents to change their behaviour to make sustainable travel their default choice.

It's important for everyone's health and wellbeing that we find ways to encourage and excite everyone about the benefits of 'active' travel, such as walking and cycling. Someone who cycles regularly lives a year longer than someone who doesn't and takes 0.5 day a year less off work[46].

Stop. Swap. GO!: Essex County Council's modal shift campaign to help residents out of cars and into active travel has reached over one million people. It is part of an overreaching Safer Greener Healthier campaign which aims to transform sustainable transport in Essex.

[44] Final UK greenhouse gas emissions national statistics: 1990 to 2019 - GOV.UK (www.gov.uk)

[45] www.highwaysmagazine.co.uk/Congestion-costs-UK-nearly-40bn-a-year-report-finds/3854

[46] www.sustrans.org.uk/our-blog/get-active/2019/everyday-walking-and-cycling/the-benefits-of-being-a-cycle-friendly-employer

Why is this important?

For Essex to achieve net zero carbon transport emissions by 2050, we need to adopt an Avoid, Shift, and Improve strategy.

Avoid: We need to encourage residents to avoid or reduce unnecessary private car journeys. One way is through 'destination shifting', e.g. working from home or using local shops rather than driving to out of town retail parks. It requires residents to change their behaviour and address not only the way we travel, but also question why we are travelling.

Shift: We need to embrace a shift in attitude towards active and sustainable modes of transport such as walking, cycling, and taking the bus or train to encourage their use and reduce pollution and congestion.

Improve: Where road journeys are essential, we want to improve vehicle efficiency by making alternatively fuelled options, such as electric vehicles (EVs), easier to run for both personal and professional use. That said, it's important we don't simply replace carbon-emitting cars with electric – this doesn't solve the congestion problem, so we still have to make it easier for people to take alternative methods of transport, and improve their reliability and quality.

Greater Anglia: The train company has invested £1million over the last 12 months in creating over 700 extra bicycle parking spaces in Essex to make it easier and more attractive for people to cycle to their local station. Greater Anglia is also replacing all its old trains with new, longer trains with better environmental performance.

Our recommendations

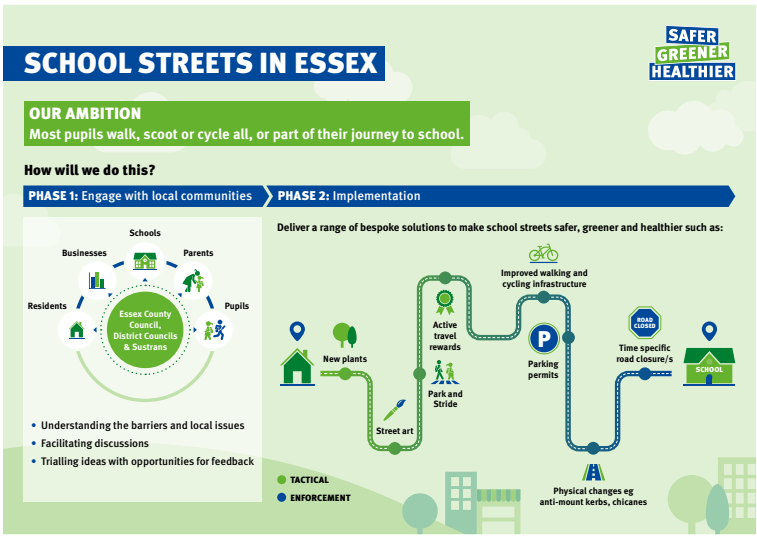
The Transport recommendations focus on increasing active and sustainable travel provision within the county; reducing reliance on the car; and creating new cycling, walking and bus routes from/to key destinations for residents and visitors, while supporting the shift to alternative fuels. Here are our key recommendations:

Essex Highways to update its Highways and Transportation Policies in 2021.

To minimise the need for travel, all new developments (residential, business, tourist etc.) need to be built in the right place, designed around sustainability – designing out the need to travel. Where this isn't possible sustainable and active travel should be embedded in full, from the start.

By the end of 2021 introduce 10 Walkable Neighbourhoods across Essex and further 20 every year to 2030, where all key amenities, such as shops, are available within a 20-minute radius, reducing rat running and pollution, and returning streets back to their communities.

By 2022: introduce School Streets for 25 schools across the county and an additional 20 every year to 2050. This can be done using current walking and cycling infrastructure, speed restrictions and traffic management systems to promoting safer, greener, and healthier streets. We also need to encourage bus and train travel over cars for longer journeys to school.



Our recommendations

By 2030 reduce city centre and town car congestion by:

- Introducing dedicated, well-planned cycling and walking routes across all urban and rural locations and to all railway stations.
- Upgrading and expanding the National Cycle Network and integrate with existing local routes.
- Working with businesses to improve onsite facilities and develop routes.
- Promoting bus travel. Introduce three new subsidy-free Park & Choose (pedal, scoot, stride) sites.
- Using Park and Ride as a stepping stone to more widespread public transport use.

Explore options to create car-free town centres by:

- incentivising the pedestrianisation of key centres and rural locations.
- introducing road tolling and multi-occupancy lanes.
- introducing charges for car use in city centres.
- reducing the availability of city centre parking.
- launching a county-wide Car-Free Day.

Encourage both formal and informal car-sharing options and car-sharing clubs, and introduce five workplace levies, with local anchor institutions to encourage car-sharing.

Expand 3PR (a school parking initiative) and school zones projects.

Our recommendations

Work with local businesses to introduce new delivery hubs and greener delivery vehicles

- Introduce 10 local delivery hubs by 2022 followed by the wide adoption of local delivery hubs.
- Introduce e-cargo bike pilots in five locations by 2022, leading to wider introduction through 2030.
- Explore other delivery vehicle types including autonomous options.
- Explore complementary solutions e.g. retiming delivery.

Essex County Council to develop a detailed EV strategy including the charge point business models to help businesses and the public sector electrify their current fleet.

- Expand the charging network beyond the UK national average, focusing particularly on rural locations.
- Electrify the Essex County Council fleet.
- Explore options for alternative fuelling of vans.
- Comprehensive trial and roll out of e-bikes.

Essex County Council will embrace new technology

- Embed micro-mobility solutions. Expand e-scooter and e-bikes schemes to new developments / Park and Ride and explore rural options.
- Kickstart innovative solutions such as electric demand responsive transport with a clear pathway to commerciality.

It is vital to publicly commit to rebuilding public transport post-COVID and funding our bus and rapid transit network effectively. Ringfence income from other initiatives, e.g. parking levies, to improve sustainable, low carbon bus travel.

Build behaviour change strategy and education campaign focussing on active travel, public transport and discouraging unnecessary car use. This underpins all other recommendations.

Our recommendations

There is still more work to do in this area to encourage future developments, reduce emissions and harness the latest technologies. Key areas are:

- **Freight**: to work with Transport East, the freight and logistics industry, maritime and Freeports to reduce the high levels of emissions from road freight by using al-ternative fuels, full truckload shipping, and increased use of rail and sea routes.
- **Construction**: to work to net zero on highways construction.
- **Smart Parking bay sensors:** to help people know where free car park spaces are located and stop them driving around searching somewhere to park.
- **Carbon credit schemes:** to encourage car scrappage in exchange for free bus travel or an e-bike. With a ban on sales of ICE (internal combustion engine) vehicles from 2030, a car bought then could still be on the road in 2050 without such car scrappage initiatives.
- **Mobility hubs:** to create centralised hubs in new housing, business and retail developments where bikes, cars and e-scooters can be hired for a specific amount of time.
- **Future funding of highway and transport networks:** looking at public attitudes to and consultation on how this will be funded in the future as an alternative funding model will be required as we switch to modes of transport like electric cars with no fuel taxes. Road travel is currently funded indirectly via the £40bn (approximately) raised from Vehicle Excise Duty (VED) and fuel taxes.
- **The impact COVID-19:** recovery from the pandemic will have an effect on working patterns, lifestyles, and transport choices. It's much more complex than 'more remote working' and this will need time to settle down.
- **Understand how to effectively disincentivise unnecessary car travel:** people want to travel for a wide variety of reasons, the challenge is to find ways to disincentivise the most damaging travel and nudge people towards more sustainable choices.

GRIDSERVE

The UK's first electric car charging forecourt opens in Essex

In December 2020, GRIDSERVE unveiled the UK's first Electric Forecourt® in Braintree. It is designed to make charging your electric vehicle (EV) as simple as using a petrol station.

This first-of-a-kind project was delivered by GRIDSERVE, whose mission is to deliver net zero carbon energy and help move the needle on climate change. It was financed by Hitachi Capital (UK) PLC with a substantial grant through Innovate UK, funded by The Office for Zero Emission Vehicles. Several partners worked together on the Innovate UK project including Essex County Council.

The project removes range and charging anxiety for electric vehicle drivers, irrespective of whether people have the ability to charge an electric vehicle at home or are one of the more than 40 per cent of UK households that can't. Any type of electric vehicle can be charged from the 36 chargers at the Electric Forecourt®, 30 of which are high power DC chargers, 6 of which are Tesla Superchargers, and 6 are AC chargers to cater for legacy electric vehicles. GRIDSERVE's highest power chargers can deliver up to 350kW of power – which theoretically can deliver over 200 miles of charge in around ten minutes, however initially charging sessions typically last 20-30 minutes.

The energy for the chargers is provided from both 'zero carbon', and 'net zero carbon' sources. The zero carbon energy is provided from the 206kWp solar power canopy above the chargers as well as a solar roof, which is expected to generate enough energy to drive around 800,000 miles every year in electric vehicles. The balance of the net zero carbon energy is provided from a 9.84MWp hybrid solar farm 44-miles from the facility that is virtually connected to the project through the national grid and generates around 10GWh of energy every year. This is enough energy to drive 5,000 electric vehicles 8,000 miles each, every year. Every kWh of energy that is taken from the grid through the 5MW(AC) grid connection is netted off against a zero carbon kWh of solar energy that is put on to the grid from the hybrid solar farm.

As well as using the grid connection for electric vehicle charging, a 5MW(AC) 6MWh battery provides grid services. The battery stores electricity from renewable sources: we may not need the electricity when the sun is shining but it can be stored for when it is needed. It also helps smooth out peaks in electricity demand which lessens pressure on the supply from the electricity grid and reduces pressure to upgrade the electricity distribution grid in the local area which is very costly.

While their vehicles are charging, drivers and their families can shop at the onsite retail stores such as Costa Coffee, WH Smith, The Post Office, Booths, and Gourmade, plus the first floor has a waiting lounge, exercise bikes, a kids' area, and meeting room pods. The entire facility is designed to help showcase electric vehicles, book test drives and help you learn more about EVs. GRIDSERVE is supporting the uptake of electric vehicles in the earliest possible timeframes.

Waste

Where are we now?

A staggering 700,000[47] tonnes of household waste are being collected every year by Essex County Council and the 12 Essex city, district, and borough councils, with even more being picked up by commercial waste companies from our homes, businesses, and industry[48].

BLUEPRINT to a Circular Economy

Essex County Council is leading an innovative cross-border project to help local authorities in England and France move to a circular economy. The project will see partners in England and France collaborate to increase recycling rates, reduce waste, and encourage lasting behaviour change across multiple sectors and train people to help them secure employment in the green economy. Through the development and delivery of a circular economy toolkit, local authorities both here and across the Channel will be able to establish a policy framework which will enable them to embrace a circular economy.

Around the world, one million plastic drinking bottles are purchased every minute[49], while five trillion single-use plastic bags are used worldwide every year. In total, half of all plastic produced is designed to be used only once — and then thrown away[50]. The average Essex household throws away more than a tonne of waste every year[51]. Managing this waste is impacting on our climate and, it contributes to the pollution of our local environment and represents an unsustainable use of natural resources – this environmental disaster can't go on.

The good news is we are recycling more than ever, with over 54 per cent[52] of our household waste being reused, composted, or recycled into new products but progress has slowed over the last decade. We continue to generate too much waste, use things that cannot be easily recycled and send thousands of tonnes of recyclable waste to landfill every year by not always using the recycling services that already exist.

Although more products are being designed that minimise the use of our precious resources and make recycling and reuse easier, we continue to use too much difficult-to-recycle plastic and too many single-use disposable items.

47 Essex County Council Integrated Waste Data Management System (iWDMS)

48 Essex and Southend-on-Sea Waste Local Plan (Adopted July 2017)

49 www.unep.org/interactive/beat-plastic-pollution

50 www.unep.org/interactive/beat-plastic-pollution

51 assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/966042/LA_and_Regional_Spreadsheet_1920_rev.ods

52 Recycling, Composting and Reuse of Local Authority Collected Waste in Essex [Essex County Council and the 12 Essex city, district and borough Councils] April 2020 – March 2021

Where are we now?

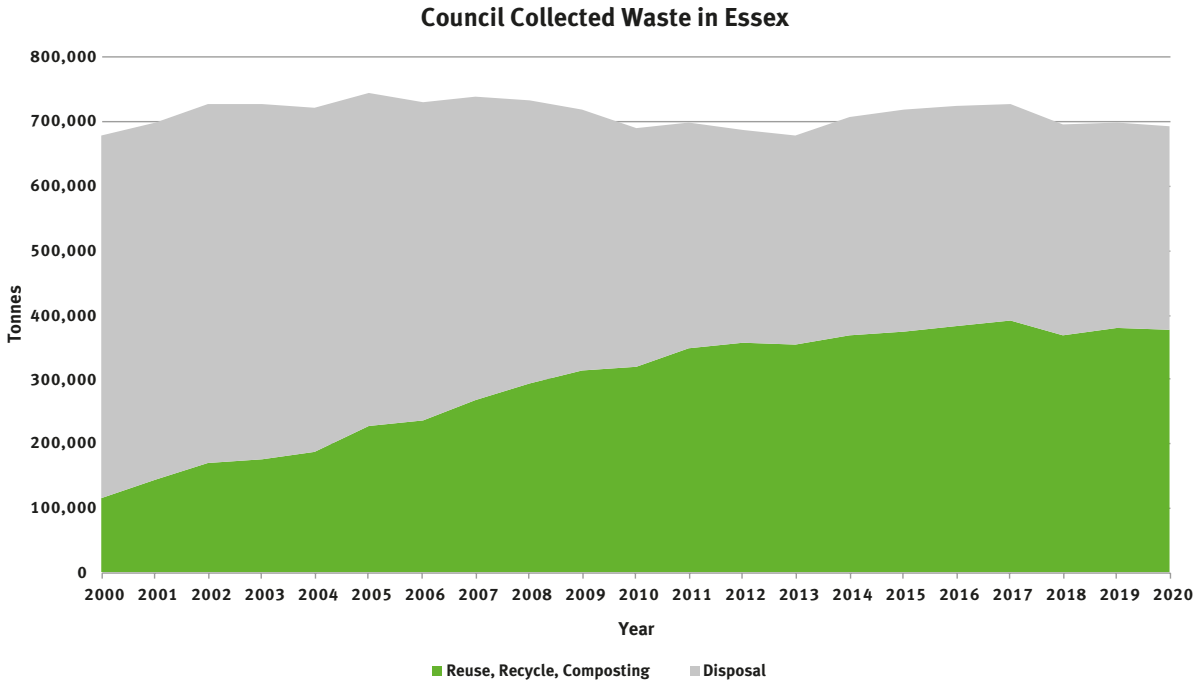


Figure 5. Essex County Council – Waste collected by Essex County Council (the Waste Disposal Authority) and the twelve Essex city, district, and boroughs councils (the Waste Collection Authorities). Essex County Council

This chart shows that great strides have been made in the amount we have recycled, reused, and composted in Essex over the last 20 years but recently improvements have levelled off and, in some areas, fallen. It shows, too, that the level of waste generated has largely remained static over the last 20 years despite an increasing population[53].

Anglia Ruskin University

By 2022, Anglia Ruskin University will ban all sales of single-use plastics on campus and by 2026 increase its recycling rate by 60 per cent.

[53] Essex County Council Integrated Waste Data Management System (iWDMS)

Why is this important?

Waste management directly contributes four per cent to UK greenhouse gas emissions. Although this doesn't sound a lot, the choices we make can have a big impact on how resources are used, and the amount of waste produced.

All waste treatment methods, such as landfill, incineration, recycling, or composting have negative impacts on emissions and will likely be a net contributor to our carbon emissions output. Reducing waste at source is therefore key to tackling the challenges we face.

We all need to push for more efficient manufacturing processes and make smart choices about what we buy, avoiding single-use items, fast-fashion, and over packaged products. Only then, can we avoid resources being used and waste being generated in the first place. This will help reduce greenhouse gas emissions in other sectors, such as manufacturing, extraction, and transport.

For the waste we cannot avoid producing, we need to recycle and compost as much as possible as these treatment methods have lower emissions compared to disposal, such as landfill.

We need to accelerate our move to a circular economy. This is where we:

- Work together to 'design out' waste and pollution from products and services.
- Keep items in use for as long as possible.
- Recycle and compost as much as we can (see Waste Technical Annex).

This will require manufacturers and retailers to use resources more efficiently and improve the recyclability of their products, and for us to change our behaviour when making choices about what to buy. We need to encourage innovation and seek investment in solutions and technology that help us recycle more types of waste. It is also important everyone has access to easy to use recycling services.

Waste reduction remains our primary focus, coupled with treating and disposing of waste through technologies which minimise emissions.

Colchester Borough Council

In 2021, Colchester will explore the trial of smart waste technology to improve waste monitoring and collection in the borough.

Our recommendations

As a Commission, we've been working on ideas and policy suggestions over six interconnected key areas. How we manage our waste is one of them.

We've looked at how we can reduce the amount of waste we create in Essex and ways it can be disposed of in a way that's less damaging to our environment. We've created targets which, although challenging, we believe are achievable if we all work together.

One of our targets is to increase the current recycling rate in Essex from 54 per cent to 70 per cent. We also believe it should it be a relatively 'easy fix' for us all to reduce the amount of waste we produce by just 10 per cent over the next few years. If we work collaboratively and commit to this, we can help Essex become a net zero county by 2050.

Some great partnership work is already going on in the county delivering high-quality services and encouraging behaviour change. We would like to develop this further through the existing Essex Waste Partnership and fully engage with manufacturers, industry, and the community sector to help reduce waste at source and maximise community benefits.

We'd also like to establish an Essex Innovation Fund to identify and develop solutions to deal with problematic materials in waste. We are suggesting an initial focus on this should be to reduce plastic waste and encourage local reprocessing capacity.

Our recommendations

Our waste recommendations are:

Reduce and recycle

We need to make it easier for local people, businesses, and industry to recycle and help people make good choices. We recommend:

By 2025: all Essex residents and businesses will have access to kerbside recycling services. We know the service currently varies greatly within the county and we want to see a commitment to make sure a minimum standard of kerbside recycling is consistently available to all properties. With at least the core materials being collected for our residents to encourage them to adopt the habit of recycling.

By 2030: at least 70 per cent of the waste the Council collects is reused, recycled, or composted.

By 2030: everyone in Essex to have reduced their waste by 10 per cent of 2020 levels.

Establish an Essex Waste Innovation Fund with an early focus on plastic substitution opportunities and enhancing local reprocessing capacity.

Develop the Essex Waste Partnership to fully engage with producers, industry, and research bodies to support the circular economy and unlock opportunities.

Provide support to residents and businesses so they can make the right choices.

Landfill

Essex sent over 320,000 tonnes of waste to landfill last year. We want to see this reduced. We recommend:

By 2030: Essex should commit to send zero waste to landfill sites.

Our recommendations

Reuse and repair hubs

The popularity of BBC1's Repair Shop shows that there is a will to stop buying more goods and repair and reuse the items we have. We recommend:

By 2024: a network of community-based reuse and repair hubs to be established across Essex to help people fix what they already have or donate items for others to reuse.

Biodegradable waste

This means food, garden waste, paper, and cardboard. This can be composted or recycled. We recommend:

By 2025: systems are in place so all biodegradable waste in the county is put to beneficial use through composting, recycling, or energy generation.

Life-cycle analysis

Resource and waste systems are complex, and the greenhouse gas emissions associated with them are impacted by many factors. We recommend:

The adoption of life-cycle analysis so the greenhouse gas emissions from the products and services bought, and the waste system, service design and treatment technologies used, can be measured and fully considered to ensure choices that minimise impacts.

The development of a strategic vision for waste shared by the local authorities in Essex, which has principles of the circular economy at its core.

A blueprint to a circular economy

Our planet's natural resources are becoming scarcer due to years of over-exploitation in the rush for economic growth and development. It has had a devastating effect on the environment.

It is important now, that we stop and question how we act as consumers. We need to reuse and recycle so much more than we do already and take part fully in what is known as the 'circular economy' – a economic system where we strive to eliminate waste and the over exploitation of our natural resources.

Essex County Council is at the forefront of this, leading an innovative new cross-border project called 'Blueprint to a Circular Economy' which is helping local authorities in the UK and France transition to a circular economy.

The project will see partners in England and France collaborate to increase recycling rates, reduce waste, and encourage lasting behaviour change across multiple sectors. Through the development and delivery of a circular economy toolkit, local authorities will be able to establish a policy framework which will enable a circular economy to flourish.

A switch to a more circular economy will have many benefits for Essex residents by, for example, saving money from more efficient waste management services, higher recycling, and waste reduction.

Figure 6. Circular Economy – Ellen MacArthur Foundation

Source: Ellen MacArthur Foundation

Creating Climate Focus Areas

Creating Climate Focus Areas for accelerated action on climate change is a key recommendation of the Commission. To drive innovation and change across Essex, we are recommending the formation of two climate focus areas which will spearhead change for the whole county.

Creating Climate Focus Areas (CFAs) will serve as pathfinders and pilot areas for demonstrating best practice. We believe that by establishing a CFA we can achieve change faster and trial and test new approaches that can act as pilots to roll out in other areas. We will collaborate with public authorities, charities, residents, landowners, and businesses to accelerate action and improve the natural and urban environments.

The two recommended areas are the river catchments of the **Blackwater and Colne** and the **Harlow and Gilston Garden Town**.

Blackwater and Colne catchments – CFA

We recognise that the land use and green infrastructure proposals for the whole of Essex are challenging but achievable. In order to demonstrate this achievability, we are proposing the concept of a CFA, as a demonstration site for best practice in sustainable land use management.

The Commission is suggesting that the Blackwater and Colne river catchments should be the CFA – approx. 30 per cent of Essex and going from coast to headwaters right through the middle of the county. These river catchments provide natural corridors, are rich in history as well as diversity of landscapes, and include both rural and urban areas.

The Commission is also recommending that the CFA targets should be more ambitious than for the rest of Essex, with the following targets recommended by 2030: all farmland to adopt sustainable land stewardship practices, 30 per cent of rural and urban land cover to be Natural Green Infrastructure, native tree cover to increase by 30 per cent, and every parish to have a climate and biodiversity action plan.

Targeting a designated area within the county allows for more focused, ambitious, and intensive action within shorter time frames where learning and acquired new knowledge of positive impacts can quickly be disseminated across the county. In order to implement this, we have chosen a representative area of Essex, the catchments of the Blackwater and Colne rivers, where a focused effort can be made to combat climate change, leading the way for the rest of Essex to follow.

This area comprises 930km^2 or 27 per cent of the area of Essex. It forms part of the Northern Thames Basin and Greater Thames Estuary National Character areas.

The area is rich in geodiversity, archaeology and history and has diverse landscapes ranging from ancient woods, open arable areas, heathlands, and areas of urbanisation. It also includes coastland of shallow creeks, drowned estuaries, low-lying islands, mud flats and broad tracts of tidal salt marsh and reclaimed grazing marsh.

Creating Climate Focus Areas

This CFA includes parts of the boroughs and districts of Uttlesford, Braintree, Colchester, Maldon and Tendring which have a combined natural green infrastructure of 296km2 or 13 per cent of the combined area of the five local authority areas.

The recommendations for the Blackwater and Colne CFA

The Commission is also recommending that the CFA targets should be more ambitious than for the rest of Essex, with the following targets recommended by 2030: all farmland to adopt sustainable land stewardship practices, 30 per cent of rural and urban land cover to be Natural Green Infrastructure, native tree cover to increase by 30 per cent, and every parish to have a climate and biodiversity action plan.

Recommendations for Blackwater and Colne CFA by 2030:

All farmland to adopt sustainable land stewardship practices.

30 per cent of land cover to be managed as natural green infrastructure.

30 per cent of urban areas under natural green infrastructure.

Native tree cover to double from five to ten per cent.

Every parish to have a biodiversity action plan.

Every parish to have a climate emergency strategy.

Creating Climate Focus Areas

Harlow and Gilston Garden Town project

Harlow and Gilston was designated a Garden Town[54] by the Ministry of Housing, Communities and Local Government in 2017, and is one of the most exciting growth opportunities of any place in the UK. The project will create over 23,000 new homes of mixed sizes including 30-40 per cent affordable homes, in and around Harlow.

Since it was created as a New Town 70 years ago, Harlow has grown in both size and ambitions. Its location at the heart of the burgeoning UK Innovation Corridor between Cambridge and London, means the time is ripe for expansion and sustainable development to boost the local economy with a wide range of jobs in easy access.

In consultation with local people, the project will see new, high-quality sustainable homes, new schools, health facilities, a new state-of-the-art hospital, new community facilities and vast areas of green, public spaces. Transport services, such as buses, will be fast, frequent, affordable, and comfortable with designated cycle and walking routes and e-bike schemes are all designed to make car driving less attractive. The aim is to enhance the natural environment by attracting wildlife and making sure the area is climate resilient.

This Garden Town development will seek to reflect all the recommendations for new build developments as set out in section 'Built Environment – New Build' above.

The proposed standards for the new town have been agreed between Essex and Hertfordshire County Councils, East Herts, Epping Forest and Harlow District Councils. As a Garden Town this is being delivered to meet the Town and Country Planning Association Garden City principles. The Garden Town also has vision which sets the overarching principles. This vision is articulated in Our vision - Harlow and Gilston Garden Town.

54 (SOURCE: harlowandgilstongardentown.co.uk)

Community Engagement

Where are we now?

The recommendations in our report are designed to be embraced by everyone and we want people and organisations across Essex to be involved, including:

- All local authorities including Essex County Council and parish, town, city, district, and borough councils across Essex
- NHS, police, and fire services
- Universities and colleges
- Schools
- Industry and businesses
- Landowners and farmers
- Community and charity groups
- Residents and visitors

We recognise that many areas need national action. We have set out how Essex can lead by example and stakeholders across the county have already started pledging what they are going to do to tackle this climate crisis.

Image David Claydon

Where are we now?

Since our first meeting in May 2020, the Commission has started to engage with the Essex community, including our residents, businesses, public sector including local authorities, universities, and hospitals across the county. We began to develop a communications strategy and plan.

In the Interim Report, we outlined a three-pronged approach to our communications, focusing on **formal communications**, **community-led action**, and **stakeholder engagement**.

Formal communications

This strand of work has been progressing, with our meetings being live streamed and press releases being issued afterwards to inform residents of the Commission's findings throughout the year. A newsletter for residents was also set up and is proving very popular as a way for residents to keep up to date.

Figure 7. Social media advertising to promote the Green Homes Grant Local Authority Delivery Scheme

Following a successful bid for Government funding made by Essex County Council and seven city, district, and borough councils in the county, in January 2021 a campaign was launched to inform residents about the Green Homes Grant Local Authority Delivery Scheme. As well as a campaign at county level, toolkits were produced for local councils to communicate to their own residents. The scheme helps residents on low incomes access government funding to have energy efficiency measures, such as heat pumps and insulation, installed in their homes. Not only does this help reduce the county's emissions but saves residents money through reduced energy bills. This is a good example of local authorities joint working to promote the Green Homes Grant Local Authority Delivery Scheme which has seen residents benefit from up to £10,000 worth of funding to make energy efficiency improvements to their homes.

A plan is in development to raise awareness about future coastal change and the risks to local people and property from climate change and flooding. We need a communications strategy to engage and manage the impact, by sharing knowledge and building community partnerships.

Where are we now?

We are launching a website for the Commission which will feature biographies of the Commissioners, host the Commission's reports, provide details of upcoming events and feature pledges for climate action made by other partners. The website will also signpost visitors to further helpful information on acting on climate issues.

Green Influencers Scheme

The Wilderness Foundation UK is a host organisation for the Green Influencers Scheme. The pioneering Green Influencers Scheme is a project match-funded through the #iwill Fund which is funded by The National Lottery Community Fund and Department of Culture, Media & Sport. The Scheme has been created to help young people aged 10-14 years old to realise their potential to positively impact the environment and communities through youth social action. Young environmental activists will be at the forefront of youth social action projects and follow in Greta Thunberg's footsteps.

Community-led action

As part of the community-led action approach, in July 2020, a collaboration was established between Essex County Council, the Essex Climate Action Commission and local Facebook, Twitter and Instagram administrators to create a suite of social media channels under the 'Essex is Green' banner. Through these channels, the Essex is Green team began to actively engage with Essex residents across the county.

The Essex is Green Facebook page was the first channel to be established which now has over 7000 followers. This was followed by a Facebook discussion group – a smaller, private group of over 700 members where climate matters are discussed in greater detail.

Also, on Facebook, a Changemakers group was opened where over 100 Essex admins or local community group leaders could meet to work and learn together to achieve their shared goals of fighting climate change and improving the environment.

The group is both for those looking to start or grow Facebook or other community groups and those who already have established groups. It is a safe space for everyone to reach out, find common ground and work together to share, learn, discuss, and collaborate.

The group includes a section called 'Units' in which members can find information about climate change, the environment and building communities to increase their knowledge.

Essex is Green also has Twitter and Instagram accounts with over 2000 followers on Twitter and over 1000 on Instagram.

Where are we now?

Love Essex

Love Essex is an initiative developed and shared by the Essex Waste Partnership that is made up of Essex County Council, our 12 city, district and borough councils and the unitary authority of Southend-on-Sea Borough Council to collaborate consistently and county-wide on waste projects with residents, businesses and schools.

The aim of the Love Essex team is to inspire behaviour change and encourage residents to reduce waste and litter. The team use social media platforms and the Love Essex website. Love Essex also sends out a successful e-newsletter that reaches over 18,000 people.

Freegle

The Love Essex team runs campaigns including reducing single-use plastics, promoting use of cloth nappies and home-composting, and encouraging sharing and re-use in partnership with Freegle. 'The Love Essex Fund' supports community-based projects, 43 so far, that promote repair, reuse, and recycling.

The Love Essex team has supported a network of volunteers that spread the message to residents and schools about reducing their waste and climate impact. They also manage the 'BLUEPRINT to a Circular Economy' (see page 60).

Freegle

Freegle is an online platform that allows you to give and receive items for free in your local area. Love Essex has a partnership with Freegle to support the online resource for local groups and promotional costs.

There are currently twenty local Freegle groups across Essex, with over 70,000 members. In the last 12 months, 164 tonnes of 'stuff' were reused via the platform, saving an estimated 83.8 tonnes of C02.

Where are we now?

Community Energy

Two community energy groups have recently been launched in Essex, making them the first ones of this kind in the county – Saffron Walden Community Energy group and Colchester Community Energy.

Saffron Walden Community Energy (SWCE) group is working with Essex County Council to explore solar on schools' projects in the Saffron Walden area, as well as other projects focusing on renewable energy and sustainable transport. They are currently looking for volunteers to help run the group, so residents local to Saffron Walden and Uttlesford can visit the SWCE website to find out more about joining.

Colchester Community Energy has completed its business plan and is considering a hydro scheme on the river Colne and an anaerobic digestion (AD) facility based on a local farm, which would take food waste from the surrounding area.

Who is already travelling with us on the journey to net zero?

Public Sector

Public organisations across Essex are meeting to work together on the climate challenge.

The Essex Association of Local Councils held its Climate Conference at the end of January 2021. Delegates heard from a range of speakers with Commissioner Jules Pretty setting the scene on the climate crisis to start the five-hour conference. The objective of the conference was to gain an overview of the climate crisis, gain practical advice on how to engage with the climate crisis and to get an understanding of the work already being actioned by our partners.

Essex County Council, city, district, and borough councils meet regularly across many settings including the District Climate Action Forum, which brings together climate leads across the county. More examples include the Essex Planning Officers Association (EPOA). The Association represents all 15 councils in Essex and is attended by Chief Planning Officers at a director level.

EPOA nominated three Chief Planners from Chelmsford, Uttlesford and Brentwood Councils to work with the Commission. These partner authorities have been vital in supporting and helping shape the work for those Commissioners who focused on the Built Environment and the recommendations that they have proposed (see Built Environment chapter).

Through this work, each of these three partner authorities have committed to bringing forward a pilot carbon zero housing scheme. The Brentwood carbon zero homes scheme is being referenced in the Essex Design guide as best practice. Not only is this net zero, it is bringing about regeneration and social value requirements.

Working with Uttlesford Council, Essex County Council has endorsed, and Uttlesford has since adopted, non-statutory planning policies to help influence the early consideration of climate change within the new development proposals coming forward. Uttlesford has also taken on the role of Climate Change Champion within the EPOA network and their peers.

Southend-On-Sea Borough Council

Southend will be prioritising action to enable schools in the borough to support net zero and climate positive aspirations and to ensure that young people in the borough are involved in the decision-making process on net zero and climate positive action.

Likewise, Chelmsford City Council, which in 2020 adopted its Local Plan, has committed to looking at and using all means to address the requirements and Commission's recommendations when it comes to new build, particularly in relation to its strategic sites and the Chelmsford Garden Community. Chelmsford City Council is looking to ensure each new show home is built to a carbon zero standard to allow future purchasers to understand what this looks like.

Who is already travelling with us on the journey to net zero?

The Chief Officers of EPOA are all looking at ways and means to bring about good quality, sustainable development that addresses climate mitigation measures as early as possible. The Chair of EPOA recently wrote in support of the Town and Country Planning Association's Healthy Homes Bill they are promoting.

The Essex Flood Board has been in partnership for 11 years involving all flood risk management authorities and local members, chaired by the Essex County Council cabinet member. Over the years, the board has developed and agreed local measures for flood management in Essex. As well as delivering that statutory role, Essex County Council has also seen many community-led, behaviour-change schemes be a success, such as the Community Flood Improvement Fund, Where Does Water Go? Property Flood Resilience Grant Initiatives. With one of the Commission's key recommendations being that organisations, partners and communities in Essex should be encouraged to develop and implement mechanisms for funding potential flood risk management and resilience schemes, there is plenty of good work already going on to build upon.

Colchester Borough Council

Colchester will continue to communicate frequently with residents to improve participation in recycling and waste minimisation initiatives taking an asset-based community development approach to discovering and enabling existing and new community led initiatives associated with repair, upcycle and reuse social movements.

Essex County Council published a Green Infrastructure Strategy in 2020. The Council worked with over 60 different partners from University of East Anglia, local planning authorities and Government public sectors, such as the Forestry Commission, Environment Agency and Natural England. Community groups and third sector organisations such as the RSPB, Essex Wildlife Trust and the Woodland Trust were also heavily involved. Each was able to contribute their different areas of expertise to help shape and structure the strategy.

The strategy is setting out a way to protect and improve the county's green infrastructure and green spaces and create a network of areas which could play a key role in residents' health and wellbeing, protect the environment and bring a host of economic benefits. The county has taken its first steps towards achieving its vision of a more climate resilient and greener Essex.

Essex Chambers of Commerce
Better for business

Businesses

The Commission has also been engaging with businesses via the South East Local Enterprise Partnership (SELEP), Success Essex and Opportunity Essex. In addition, it has been working with business intermediaries such as the Essex Chambers of Commerce and Federation of Small Businesses who are informing their members on green funding opportunities and about the work of the Commission.

Who is already travelling with us on the journey to net zero?

Working closely with the Essex Chambers of Commerce, the Commission has been helping to promote opportunities for Essex businesses to get involved in the journey to net zero, such as dedicated workshops run by Clean Growth South East showcasing opportunities for growing low carbon businesses in Essex. The Commission is also highly supportive of Chambers' plans for a climate action conference in the autumn of 2021, ahead of COP26.

One of the Commission's key recommendations from the Built Environment working group was to encourage and support Essex's small and medium enterprises (SMEs) to invest in: energy efficiency, including their own premises; climate resilience and renewable energy sources, such as solar energy.

There is already some good support for SMEs in this area. For example, the Council's Low Carbon Across the South East (LoCASE) programme provides free support to businesses in the South East. It aims to help businesses become more competitive, profitable, and resilient while protecting the environment and encouraging low-carbon solutions. LoCASE provides grants for businesses of up to £20,000 for energy efficiency measures to reduce their carbon emissions as well as funding to SMEs in the Low-Carbon sector to grow their business training workshops and fully funded events. Since the programme started in 2016, £2.6m has been awarded to 397 businesses with an estimated 2,902 tonnes greenhouse gases equivalent emissions reduction and £992,534 cost savings per annum within Greater Essex (including Southend and Thurrock).

Further funding has recently been secured for the partnership to extend the delivery of support to SMEs until June 2023, with an expected £1.3m of grants available to Greater Essex businesses.

We are also encouraging large businesses to disclose physical risks, using frameworks such as the Taskforce on Climate-related Financial Disclosure or the Adaptation Reporting Power. This will help our businesses assess climate-related risk for themselves, their suppliers, and competitors, allocate capital effectively and plan strategically to minimise climate-related risks in the short, medium, and long-term.

Swan Housing

In August 2020, the SELEP, which encompasses the local authority areas of Essex, East Sussex, Kent, Medway, Southend, and Thurrock was awarded £85m from the Ministry of Housing, Communities and Local Government's Getting Building Fund.

Essex County Council had supported Swan Housing Group to bid for £4.3m of this funding to help build a second factory to produce increased volumes of low carbon, modular housing. Swan was one of the first housing associations to move into modern methods of construction, and is committed to creating more high-quality, environmentally sustainable homes. It is expected the project will generate over 120 new jobs in Basildon and help to build over 1,000 new Low-Carbon homes a year when both factories are working at full capacity. Construction of the new factory is currently under way and it is due to come on stream early in 2022.

Who is already travelling with us on the journey to net zero?

Net Zero Innovation Network

In direct response to one of the Commission's Community Engagement recommendations, in March 2021, the inaugural meeting of the new Net Zero Innovation Network (NZIN) took place, designed to engage more directly with businesses. It will bring together individuals from a wide range of education and business sectors across Essex. The aim is to support partnerships and drive innovation, helping Essex achieve its target of being a net-zero carbon emissions county by 2050.

NZIN includes academics and some of the work the Commission is undertaking to focus on low-carbon solutions in the built environment may partner with appropriate academic institutions in the county, which would fit the Commission's recommendation for a partnership between University and Built Environment specialists.

Also, in the built environment-related recommendations, the Commission recommends the Essex Developers Group should establish a Climate Change Charter and 'demonstrator' projects. The group is run for, and with, developers across Essex to discuss development and planning issues. The Commission recommends the group work up a charter which developers could 'sign' and adhere to which will take on board the Commission's aspirations and provide an informal commitment to working towards a net zero county.

The Commission is also keen for Essex County Council to take a leadership role in supporting both industry and academia to explore what opportunities exist to reduce the use of plastic. We recommend that Essex County Council establishes an Essex Waste Innovation Fund for the provision of research grants, with an early focus on plastic substitution opportunities, and enhancing local reprocessing capacity.

Residents

In March 2021, the Commission launched a consultation on its proposed recommendations to understand the level of stakeholder support for what it suggests needs to happen for Essex to become a net zero county by 2050. Individuals, local councils, educational establishments, and businesses were invited to give the Commission their views on its recommendations. The consultation closed on 4 May 2021.

The vast majority of respondents indicated they were very concerned about climate change and general support for most of the recommendations was strong, particularly in the subject areas of adapting to an already changing climate, the built environment and energy and waste.

Among the recommendations which received the most support from respondents were two about improving recycling services and increasing the amount of waste we recycle. Recommendations which received the least support included those involving reducing parking availability in town centres or introducing emissions or parking charging.

Who is already travelling with us on the journey to net zero?

Just over three quarters of those taking part in the consultation agreed that recommendations were focused on the right issues however this did vary according to the age of the participant. When asked whether the recommendations were focused on the right areas and priorities a higher proportion of participants aged 44 and under agreed whereas in the 65 and over age group there was more disagreement or indifference.

Similarly, at 70 per cent, there was a higher proportion of respondents in the lower age group stating they strongly supported the Commission's recommendations. Around half of consultees felt that the Commission's recommendations were strong enough but over a third didn't consider them ambitious enough and wanted change to happen sooner and without delay, instilling a greater sense of urgency in the need to take action. Many of those who responded to the consultation clearly feel that now is the time to act.

The full results of the consultation can be found in the Community Engagement Technical Annex.

What respondents said

"There really isn't time to lose and urgency is of the essence. The plans could be a lot more ambitious too."

Basildon resident aged 35-44.

"Communication is key, and residents need to understand what their personal contribution can be to help achieve the goals. Climate change is one challenge where we are truly 'all in it together'."

Uttlesford resident aged 65-74

Who is already travelling with us on the journey to net zero?

Young people

Our two co-chairs from the Young Essex Assembly recognise the importance of engaging with young people in our work.

The Commission has been working with Ashden and schools in Essex to develop plans to help promote the Let's Go Zero 2030 campaign from the start of the new school year in September 2021. From a starting point of two schools, the Commission will work with Ashden to make sure many more Essex schools sign up to the campaign.

Encouragingly, young people across the county are starting to proactively engage with the Commission. There are students creating 'green groups' within their school or college, such as at Braintree Sixth Form College. The Commission has also engaged with groups of young people arranging litter picks and transforming barren land, including four 19-year-old friends who set up Clean Up Chelmsford to improve the city's environment for the benefit of the local community. It is clear that many of the younger generation are leading the way on climate action in Essex.

Essex Child and Family Wellbeing Service

Essex Child and Family Wellbeing Service (ECFWS) in Maldon has joined with Abberton Rural Training in offering horticultural qualifications and home growing kits to families, aiming to provide basic gardening skills including how to grow your own vegetables. Along with this course ECFWS will be linking with the tutors throughout the course so families are offered additional community services such as slow cookers, home cooking packs and vouchers etc.

Who is already travelling with us on the journey to net zero?

Danbury Park Community Primary School

Figure 8. Solar panel on the roof of Danbury Park Community Primary School

Danbury Park Community Primary School was one of two community buildings in Danbury to see the installation of solar panels completed in the October 2020 half term week. Panels were also installed at Essex Outdoors, Danbury.

Electricity produced by the solar panels across the two sites is equivalent to the amount of electricity needed to supply 22 average homes per year.

As well as energy savings, the installations will also save 15 tonnes of carbon in year one and over 375 tonnes over the lifetime of the systems installed.

The solar panels were delivered by Essex County Council's Energy and Low Carbon team as part of a project called "Empower" Enabling More People's OWnership in Energy tRansition which was funded by the European Commission (Interreg North Sea Region Programme).

Since the installation of the solar panels, Danbury Park school has embarked on a sustainability journey and lots of activities are being delivered - classes are doing research on sustainability and why it matters. There is also a plastic recycling project which involves working with the local community to collect crisp packets and children are participating in the Sustrans Big Pedal week. The school also marked Earth Day on 22 April 2021, assigning sustainability projects to each class.

Pupils at the school are also keen to learn more about the school's energy consumption. With the help of engineer, Gary Hicks, one of the pupil's grandparents and with the support of the headteacher, Carol Gooding, the school began to monitor its energy consumption with a view to trying to reduce it.

To achieve this, real-time energy metering was installed to develop a profile of how the school uses electricity and explore potential ways to reduce energy consumption. Pupils looked at ways they might be able to reduce the school's energy use such as limiting the number of photocopies produced or switching lights off sooner. A range of options was tried and tested and the school discovered that turning on the kitchen's oven just an hour later each morning resulted in a significant reduction in energy use, saving the school almost £2000 over the course of the school year.

As a result of his work with Danbury Park school, Mr Hicks created Points4Planet, a social enterprise which hopes to engage other schools in monitoring energy consumption and reducing their carbon footprint.

Who is already travelling with us on the journey to net zero?

Fingringhoe Primary School, Inspire Project, Colchester

Professor Stephen Heppell has dedicated his career to improving learning environments so that they inspire children to work better and achieve more.

In 2019, he was invited by Essex County Council to help Fingringhoe Primary School in Colchester improve their Year Six classroom.

The small school, housed in a Victorian building, was very dated and hadn't been changed for decades. The Professor, the teachers and children came together to put some of his ideas into practice and transform their classroom environment.

They started by having the whole classroom painted white, removing the false ceiling, changing the lighting, and monitoring the acoustics and CO_2 /Oxygen levels.

Professor Heppell's research has proved that learning, attention span and behaviour can be impacted by poor lighting, so a LED lighting control system was introduced with the light changing colour from morning to afternoon to replicate changes in natural daylight. Children's pictures were also taken down from the windows so that more natural light could flood into the classroom.

Noise level 'wardens' were selected from among the pupils, who were tasked with keeping an eye on the decibel application on the class iPad. Here, they could track whether the noise went over or under the recommended levels.

The children also each bought a plant into the classroom in a white pot to reflect light and absorb CO_2. New ergonomic chairs were introduced, and some tables and chairs were replaced with a 'Heppell Bench' - a set of benches at three different heights which help children's posture and concentration. All the surfaces of the benches have wipeable white boards.

A handheld device called a 'Gratnell's Learnometer' was used to measure the light, temperature, carbon dioxide and oxygen levels, noise, humidity, pollution, and dust levels within the classroom.

As a result, the children took ownership of their classroom environment and were very involved in the project. They began to understand the impact environment has on their learning and continued to monitor their surroundings by logging onto their Learnometer dashboard. They also appreciated the choices they could make about where to sit and write to make the most of their new environment.

Who is already travelling with us on the journey to net zero?

Charities and Voluntary Groups

We are keen to build on the work we have been doing with charities and voluntary groups. As well as the work with young people, Ashden and the Wilderness Trust, the Commission and Essex County Council have already been working with several charities.

Working in partnership with experts at the Woodland Trust, the Forestry Commission and Ground Control's Evergreen Fund, the Essex Forest Initiative has committed to invest £1million to benefit the county's environment over five years, starting last year. Essex County Council has exceeded the Essex Forest Initiative's first year planting target of 25,000 trees by 13,725 with a total of 38,725 trees now in the ground and growing across Essex. Essex County Council has also been working closely with the Essex Wildlife Trust (EWT) on setting up a Local Nature Partnership. EWT and Royal Society for the Protection of Birds, are also undertaking a mapping exercise to identify suitable Nature Recovery Networks that we expect will form part of an Essex-wide Nature Recovery Strategy.

We are also keen to build on the work we have been doing with voluntary groups. Our Essex is Green platforms recently shone a light on the work of Plastic Free Feering after Feering was awarded Plastic Free Communities status by Surfers Against Sewage – the first community in Essex to achieve this.

This achievement was only possible thanks to the involvement of local businesses, organisations and individuals including Feering Parish Council, Feering Community Centre, Kelvedon and Feering Cricket Club, Prested Hall, Eco Feering and Kelvedon & 1st Feering Rainbows.

Why it is important

Our vision is that all organisations and communities in Essex take action on climate change to drive down greenhouse gas emissions and build nature-based climate resilience. Essex is established as an exemplar, with the Commission and council empowering and supporting organisations and residents with the need for transitioning to a sustainable green economy by 2050.

The Commission aims to reach out to all members of society across Essex to establish a strong foundation of trust and integrity through honest, impartial and evidence-based dialogue and communication and to inspire, motivate and engage people to take action against the challenge of climate change.

Developing specific community engagement programmes to co-create large scale change in communities in specific geographical areas such as in the proposed Climate Focus Area or coastal areas at risk of flooding should be a priority.

The Commission has observed that people can see the climate is changing and many want to act – they simply do not have good information on steps to take. Therefore, many of the Community Engagement group's recommendations focus on making sure everyone – residents, educational establishments, anchor institutions and businesses – can access the information they need to do something to help.

Our recommendations

The Commission has made far reaching recommendations to help further engage with everyone in Essex:

Provide an online resource that provides key information to enable action for individuals and households with associated carbon impacts; amplified by social media and other communications tools; signposting to apps and good advice that already exists.

We would like to see the Community Engagement work build on the wealth and plethora of information about climate change that already exist rather than attempting to reinvent the wheel. Perhaps its most important recommendation is that it should signpost Essex residents, schools and businesses to good advice, toolkits and apps that already exist. It suggests doing this via an online resource that provides key information to enable action for individuals and households, detailing their associated carbon impacts so that individuals and households can take the most appropriate action with the greatest impact.

Invest in research to identify Essex audience groups and develop more targeted communications.

The Commission recommends investment in research to develop more targeted communications. Research to underpin future engagement and communication began in February 2021, looking into the attitudes to and perceptions of Essex residents on climate change. The research also sought to understand residents' willingness and ability to act on climate change and play a role in reducing the county's emissions. This will allow future communications and engagement to be tailored and more effective.

Public bodies and local authorities across Essex – parish, town, city, district, and borough councils – should align on key public messaging around climate.

Provide additional toolkits to enable effective action at a local level whilst providing links to possible funding opportunities.

We recognise the need to support other local authorities at parish, town, city, district, and borough level by giving access to toolkits and information on funding opportunities to help them engage with residents at a more local level.

Our recommendations

Establish Essex as a centre of excellence for innovation in addressing the climate crisis. Small and medium enterprises should be encouraged and supported to invest in energy efficiency including their own premises, climate resilience and renewable energy source, such as solar energy. Support should be provided to help land managers transition to alternative land uses. This includes help with skills, training, and information to implement new uses of land, and support with high upfront costs and long-term paybacks of investing in alternative uses.

A Net Zero Innovation Network should build on excellent networks across the County, to deliver this ambition. There is potential to partner with universities, colleges, specialists and businesses to develop innovation hubs across multiple industries including the energy sector to support the transition to renewables; the construction sector where the Essex Developer Group should develop a climate change charter and demonstrator projects; and the waste sector where a waste innovation fund should focus on plastic substitution opportunities, and enhancing local reprocessing capacity.

A climate recognition scheme for businesses should be developed where businesses are awarded a logo or badge in recognition of climate action taken. Anchor institutions should investigate if this could support green procurement practices. The Commission advises that reward and recognition schemes should also be used within the county, whether that be for individuals, households, schools to recognise good practice in climate action within the community.

The business and green growth opportunities arising from Commission recommendations should be modelled and communicated to Essex businesses and investors both inside and outside the county. Organisations should also be made aware of the benefits of switching to greener procurement practices as well as the opportunities for green growth as we build back following the impact of the pandemic.

Essex is Green should continue to be supported. Essex is Green should be used as an overarching brand for climate action in Essex, widely seen across the County. Essex is Green awards for community action should be developed.

Our recommendations

There should be a specific community engagement programme to co-create large scale change in communities. Community engagement is critically important for the implementation of all Commission recommendations. We believe this is vital to the success of the full suite of recommendations to improve local knowledge and gain widespread support for change

There are recommendations across the report that can only be done in conjunction with communities including: developing a network of community-based reuse and repair hubs by 2024; and a network of community energy neighbourhoods across by 2035

Delivering the ambitions of the Climate Focus Area (CFA) will require wide ranging collaboration and engagement through participatory community processes. We will need to work with communities to catalyse action in the CFA and then whole of Essex. This should be done by consulting with local people and communities, whether they live in rural areas, villages, or towns.

There should be public consultation on the full suite of Commission recommendations

A regular review of the communications approach to ensure it is responsive and relevant.

Carbon emissions in Essex

Our modelling shows Essex emitted 6.96 million tonnes of carbon dioxide and other greenhouse gas emissions in 2019[55]. Essex is home to 1.5m people and contributes 1.7% of the total greenhouse gas emission in the UK. The majority of our greenhouse gas emissions come from three sectors: transport, housing and businesses. Waste and farming also make smaller but still significant contributions. Trees, soils and natural landscapes store significant amounts of carbon and creating new green infrastructure absorbs more carbon.

As we do not host heavy industrial clusters in Essex our business and commercial emissions are relatively low per capita.

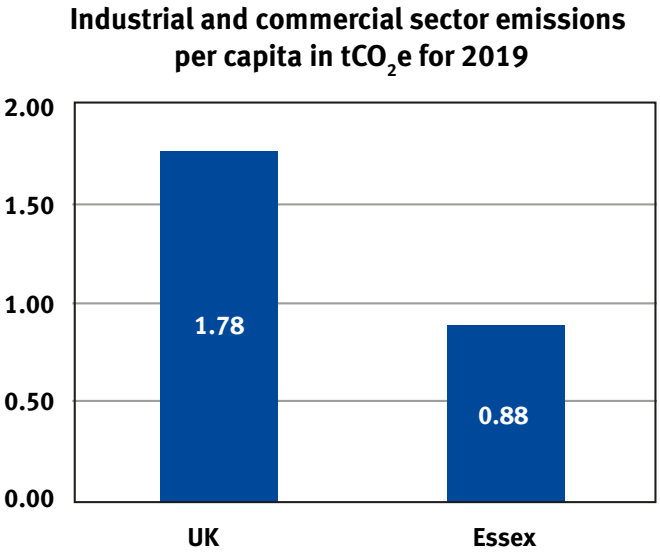


Figure 9: Industrial and commercial sector emissions per capita.

We have found that our transport emissions are higher than the national average. Travel on our roads which includes passenger cars, vans, taxis, buses and goods vehicles, in Essex produces 2.06 tCO_2e per capita against the UK's[56] 1.84 tCO_2e, or 12 per cent more per annum, as shown in Figure 9. This difference is consistent with the higher levels of road traffic observed in the East of England when compared to elsewhere in the UK.

[55] ONS local authority population data – https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/datasets/populationestimatesforukenglandandwalesscotlandandnorthernireland

[56] National average value for road transport calculated from BEIS "Emissions of carbon dioxide for Local Authority areas", available from https://data.gov.uk/dataset/723c243d-2f1a-4d27-8b61-cdb93e5b10ff/emissions-of-carbon-dioxide-for-local-authority-areas

Carbon emissions in Essex

The greenhouse gas emissions from our homes are broadly similar to the national average. These include energy consumed for heating as well as electricity for appliances. The average emissions per household in Essex and the UK are similar. Essex emits on average 3.56 tonnes of CO_2e per annum per home compared to the UK average[57] of 3.48 tonnes of CO_2e, as shown in Figure 10.

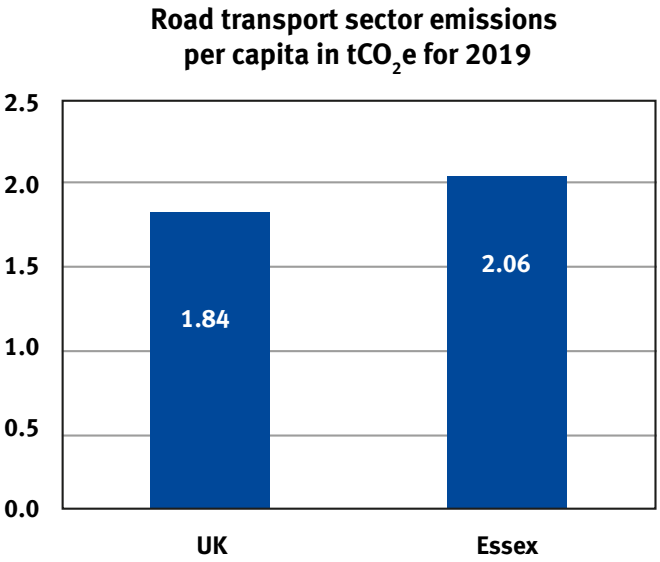


Figure 10. Road transport emissions per capita

Emissions from household waste treatment in Essex is slightly higher than the average in England[58], at 0.075 tCO_2e versus 0.065 tCO_2e respectively per capita per annum. The difference is driven by two factors: Essex produces slightly more waste than the English average, and a higher proportion of Essex's waste is sent to landfill. Landfill is the waste treatment type with the highest emissions intensity per tonne of waste produced.

We have modelled the impact of the Climate Commission recommendation across road transport, housing, business and household waste and are confident the recommendations outlined in this report, if implemented, will deliver net zero emission in these sectors by 2050 and as early as 2045 in the housing sector (assuming that a reasonable level of negative emissions is allocated to Essex to offset any residual emissions, such as those from waste treatment). Further work is needed to fully model more complex interactions on land use. These actions deliver a 40 per cent cut in total emissions from the road transport, housing, business and household waste sectors by 2030.

[57] National average value for domestic homes calculated from National Statistics' "Digest of UK Energy Statistics", available from https://www.gov.uk/government/statistics/energy-chapter-1-digest-of-united-kingdom-energy-statistics-dukes and "Sub-national residual fuel consumption", available from: https://www.gov.uk/government/statistics/sub-national-residual-fuel-consumption-2005-to-2018

[58] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/966114/Statistics_on_waste_managed_by_local_authorities_in_England_in_2019v3_accessible.pdf

Monitoring and Evaluating Climate Change Interventions across Essex

Monitoring and data

Equally important for the implementation of all Commission recommendations is monitoring and evaluation of progress, and data and knowledge platforms to make information widely available and accessible.

Monitoring and evaluation systems are vital for the sustainability and viability of any project. Both play an important part in identifying the most efficient use of resources; providing data for informed decision making and strategic planning; gathering evidence to make sure goals are fulfilled; and influencing best practice by tuning into successes and learnings.

Monitoring and evaluation ensure projects stay on track and continue to perform well. It is also important for catching any problems early and establishing quick interventions and solutions; for making sure resources are used efficiently, e.g. identifying gaps or issues which need resources to be addressed and making priorities clearer; for providing data on what went right and pinpointing specific failures; for giving essential information to influence future learnings; and helping organisations to develop good methods for collecting, distributing and analysing data and thus increasing transparency and accountability among stakeholders.

One of the Commission's key recommendations is that robust monitoring and evaluation on climate change interventions – both mitigation and adaptation – are undertaken across Essex to understand the best way to deliver actions on climate change and measure their impact.

Our recommendations

An annual report on progress against the Commission recommendations, to celebrate progress and show how far Essex is on track towards a net zero, climate resilient county.

This should include an integrated Sustainability Appraisal Framework, an Essex Climate Observatory and a Knowledge and Decision Support Framework to support the ambitions in changing land use across the county.

Public Authority Investment Decisions

Public authorities have a key role in ensuring they are building climate considerations into key planning decisions. The Commission recommends:

Evaluate emission impacts in all future procurement decisions and develop a framework that can be adopted by others.

Adopt life-cycle analysis so emission impacts are fully considered in waste system and service design.

Support schools in monitoring their energy use in and exploring innovative approaches to energy consumption.

What we are going to do

Essex County Council is committed to monitoring and evaluation processes and agreed to track progress against the net-zero targets by producing annual reports sharing progress and tackling greenhouse gas emissions and building resilience across Essex. This will help track how the county is moving towards a climate-resilient, net zero future in line with the Commission's recommendations.

Essex County Council intends to use a combination of quantitative (e.g. measuring carbon savings) and qualitative (e.g. using narratives of behaviours and attitudes to climate action among our residents) techniques to understand whether and how well Essex's interventions for achieving carbon neutrality are working. The framework includes a plan to report progress (e.g. annually) which could feed into a process of continuous revision of the delivery of Essex's climate change interventions.

Our recommendations

A central approach of the monitoring strategy should be to use a 'theory of change' (logic model) to understand what is intended by each action and determine the best way to monitor and evaluate progress. The following questions will help Essex understand what change was intended through each action:

- What are the outputs from the proposed action?
- What is the desired outcome and impact/change resulting from the action?
- How does the action reduce climate risk/vulnerability?
- What indicator, baseline, narrative or measure best monitors and evaluates progress for each action?

The Commission recognises that an annual report is critical but does not give an immediate view of progress day to day. Therefore, the Commission also recommends that Essex:

Develop an online dashboard that brings together annual carbon figures alongside more readily available proxies for progress e.g. numbers of trees planted, air pollution levels, numbers of car-free streets, numbers of electric vehicles, traffic volumes, renewables capacity, tonnes of waste etc.

What is next for the Commission?

As we go forward into the second year of the Commission, we will provide regular updates on the status of the Year One recommendations and will monitor their implementation, report on the progress made and continue to make further recommendations for future action.

We will work on delivery plans with partners across Essex to drive the recommendations from Year One forward.

We will meet four times during the second year and consider two new key areas for discussion:

- **Green growth for the future:** we will look at ways we can embrace a greener economy where we not only care about business, but we care about our planet too. This will un-lock new opportunities for businesses, but also for residents in the form of more sustainable homes and jobs.

- **Green finance:** we want Essex to be a place where we can attract green investment to create a resilient and net carbon zero Essex by 2050. If we manage our resources sustainably, we will be attractive to businesses that want to invest and this, in turn. will reap social, economic, and environmental benefits for everyone.

As well as:

- Updating the Commission with a report at the end of our second year.

In summary, we feel there is the will to drive forward and make the fundamental structural changes needed, both in our local area of Essex and across the world, to meet the goal of net zero carbon emissions by 2050, if not before.

Our working groups have spent many hours debating and discussing what our recommendations to Essex County Council should be across all the interlinking areas. We know there is no easy solution to the climate crisis and there are many things to fix – some easier than others.

But we believe our recommendations are achievable. We have the expertise and tools to do it and utilise that knowledge now. If the Coronavirus pandemic has taught us anything, it's that we can respond rapidly and make big changes. Climate change is part of our future, we made it, we must fix it. As David Attenborough has said 'What happens next is up to us all.[59]' We hope the people, families and businesses of Essex will come on board with us and make change happen.

[59] BBC Climate Change – The Facts www.bbc.co.uk/programmes/m00049b1

Glossary

We understand that conversations around climate change and the environment can become very technical, which in turn can lead to lower levels of engagement. We have provided a comprehensive list of the definitions of key terms and phrases that we believe will help to break the barrier and provide clarity on the topic of climate change for absolutely anyone.

Key term / Phrase	Definition
Adaptation	(see **Climate Change Adaptation**)
Anaerobic Digestion	A natural process by which organic matter is broken down by micro-organisms in the absence of oxygen. This is one process to manage waste and/or to produce fuels (biogas).
Anchor Institutions	The term Anchor institutions refer to large, typically public sector or non-profit organisations like hospitals, local councils, and universities whose long-term sustainability is tied to the wellbeing of the populations they serve. Anchors get their name because they have 'sticky capital' (i.e. are unlikely to move given their connection to the local population) and have a significant influence on the health and wellbeing of a local community through their sizeable assets. It is from this vantage point, that Anchor Institutions can make an important contribution to the local economy and local communities.
Atlantic Meridional Overturning Circulation (AMOC)	A large system of surface and deep currents in the Atlantic Ocean which plays a crucial role in regulating Earth's climate system. This system carries warm, salty water in the upper layers of the ocean from the tropics to the North Atlantic, whilst colder, deep waters are travelling southwards. The AMOC is vulnerable to climate change. Climate models suggest that the AMOC will weaken over the 21st century as a result of an increase of greenhouse gases.
Biodegradable Waste	Any organic matter in waste which can be broken down naturally into carbon dioxide, water, methane, or simple organic molecules, with the help of natural agents such as sunlight, microorganisms, and water, by composting, aerobic or anaerobic digestion and similar processes. Biodegradable waste also includes some inorganic materials such as gypsum which can be decomposed by bacteria and produce plasterboard.

Glossary

Key term / Phrase	Definition
Biodiversity	The variability among living organisms from all sources, including terrestrial, marine, and other aquatic ecosystems and the ecological complexes of which they are a part; this includes diversity within species, between species and of ecosystems. The term also means, the variety of life at every hierarchical level and spatial scale of biological organisations: genes within populations, populations within species, species within communities, communities within landscapes, landscapes within biomes, and biomes within the biosphere.
Bioenergy	Energy generated from organic matter which comes from plants and animals and is known as biomass.
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 Footprint	The total greenhouse gases emissions generated directly and indirectly by human activities, which are expressed as carbon dioxide equivalent during the period of a year.
Carbon Emissions Baseline	The total scope 1 and 2 greenhouse gases emissions for the year 2019. These are expressed as carbon dioxide equivalent emissions during the period of a year and are based on the most recently publicly available data sets. Sectors in scope: domestic homes, industrial and commercial electricity and space heating, road transport, waste, land use and green infrastructure.
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.

Glossary

Key term / Phrase	Definition
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. For example, carbon zero homes are those which do not produce any greenhouse gas emission in their operation (note, some material used in construction may have produced greenhouse gas emission which are not included).
Catchment Area	Catchment areas (or drainage basins), are locations in low lying regions where water from higher areas collects when it rains, into a single water body, which finds its way into streams, rivers, and lakes.
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).
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 seeks to reduce the risks from and the impact of expected changes weather patterns.
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 Crisis / Climate Emergency	The term refers to the severe adverse effects of climate change because of human activity, posing a threat to the biosphere and humanity. This terminology reflects the urgency of action required to reduce or halt climate change and avoid potentially irreversible environmental damage.

Glossary

Key term / Phrase	Definition
Climate Focus Area (CFA)	Areas selected to pilot and showcase best practise and accelerated action on climate change, in collaboration with public authorities, charities, residents, landowners and businesses. Targeting a designated area within the county allows for more focused, ambitious, and intensive action within shorter time frames where learning and acquired knew knowledge of positive impacts can quickly be disseminated across the county.
Coastal Flooding	A situation when dry and low-lying coastal land is submerged by seawater because of waves, tides, storm surge, or heavy rainfall from coastal storms.
Closed Loop System	The term refers to the product life cycle of the Circular Economy system where products are recycled and reused to produce additional products without degradation of properties. This system aims at waste elimination by converting the used product back to the raw material.
Colonising Species	Colonisation (in biology) is the process whereby a species succeeds in spreading to and become established in new areas or habitats.
Commercial Waste	Any waste produced from premises used for the purposes of a trade or business, including sport, recreation, education, or entertainment.
Community Energy	The term refers to community-led projects that aim to reduce, purchase, manage and generate energy, whereby the local community benefits collectively from the outcomes. These projects can be wholly owned and/or controlled by communities or through partnership with commercial or public sector partners.
Composting	The biological process of decomposing organic solid materials into simple organic and inorganic compounds. The process involves organic matter, e.g. plant materials and animal manures, moisture, oxygen, and bacteria. The product, a humus-like material, is a good plant fertilizer.
Decarbonisation	The process of removing carbon from a product or to reduce the amount of gaseous carbon compounds released in or because of a process.

Glossary

Key term / Phrase	Definition
Decibel (dB)	The unit of measuring sound intensity.
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.
Electric Forecourt	An all-electric car charging facility.
Electric Vehicle	A vehicle which runs either partially or fully on electricity through an electric motor, as opposed to using fossil fuels.
Electrification	The process of converting a machine or system to the use of electricity as a source of energy, replacing technologies that use fossil fuels.
Electrolysis	A non-spontaneous chemical reaction effected by use of electric current whereby substances are decomposed into simpler ones through losing or gaining an electron.
Energy Performance Certificate (EPC)	A rating that measures the energy performance of buildings. The Energy Performance Certificate (EPC) is graded on a scale of A (most efficient) to G (least efficient) and have two metrics: a fuel cost-based energy performance rating and a rating relating to CO_2 emissions.
Environment Land Management Schemes (or Environmental Land Management System)	A set of three new schemes announced by the government in March 2021 that will reward environmental land management. These schemes are: Sustainable Farming Incentive, Local Nature Recovery and Landscape Recovery. Farmers and other land managers may be paid for delivering the following public goods: clean air; clean and plentiful water; thriving plants and wildlife; protection from environmental hazards; beauty, heritage and engagement with the environment; reduction of and adaptation to climate change.
Erosion	The geological process by which soil, rock, or dissolved earthen materials are worn away and transported from one location to another by natural forces such as wind or water.

Glossary

Key term / Phrase	Definition
Essex Design Guide	This is a reference guide that was established in 1973 by Essex County Council to help create high quality places with an identity specific to its Essex context. There was a 2005 publication and a 2018 edition which seeks to address the evolution of socio-economic impacts on place-making.
Essex Waste Partnership	The collaboration of Essex County Council with the 12 city, district, borough councils and the unitary authority of Southend-on-Sea Borough Council. This was set up to ensure cost-efficient and sustainable waste management across the county and Southend, with the aim to reduce and reuse as much waste as possible.
Fertiliser	A natural or synthetic substance which is added to the soil to promote plant growth.
Fossil Fuels	Fuels such as coal, petroleum, and natural gas, which contain carbon and release energy in combustion. Fossil fuels were formed because 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's, tar sands, and heavy oils.
Freeports	Secure customs zones located at maritime ports or airports, where business can be carried out inside a country's land border, and different customs rules apply. Freeports can reduce administrative burdens and tariff controls, provide relief from duties, and import taxes, and ease tax and planning regulations.
Fuel Cell	A device that converts the chemical energy of a fuel into electricity.
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. www.gov.uk/government/collections/fuel-poverty-statistics

Glossary

Key term / Phrase	Definition
Garden Town	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, 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".
Gas Network	The network of transmission and distribution pipes that transports gas to homes and businesses.
Geodiversity	The term refers to the variety of earth materials, (rocks, minerals, fossils), natural processes and structures, landforms, and soils that that compose and shape the physical landscape and environment. Together with biodiversity, geodiversity constitutes the natural diversity of planet Earth.
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 Finance	Financial activity that employs financial instruments and services promoting the development of sustainable business models and mobilise investment that ensure a clean and resilient growth with environmentally positive outcome.
Green Growth	A model of economic development that promotes environmental sustainability and synergies between environment and economy.
Green Hydrogen	A form of clean fuel, produced by the electrolysis of water that is powered by renewable forms of energy (e.g. Solar PV or a wind turbine). In this form, hydrogen has significant potential to provide a clean energy source for manufacturing, transportation, and more.

Glossary

Key term / Phrase	Definition
Green Industries	Economic activity which continuously seeks to reduce environmental impacts as a result of their processes and products, through environmentally responsible practices, efficient use of resources, green investments, use of renewable energy sources, and elimination of risks to the environment, climate, and people.
Green Infrastructure	(see **Natural Green Infrastructure**).
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.
Green Retrofits	(see **Retrofits**)
Greenhouse Gas (GHG)	Gases that trap heat in the atmosphere and contribute to climate change. This causes the greenhouse effect. Water vapour (H_2O), carbon dioxide (CO_2), nitrous oxide (N_2O), methane (CH_4) and ozone (O_3) are the primary greenhouse gases in the atmosphere.
Habitat	The home environment for plants, animals, or other organisms; a place that meets all the environmental conditions this organism needs to survive, e.g. shelter, water, food, and space.
Heat Pump	A device which can be used to cool or heat a building. It works by pumping or transferring heat from one place to another, by using a compressor and a circulating structure of liquid or gas refrigerant, through which heat is extracted from outside sources and pumped indoors.
Incineration	A waste treatment method which involves the combustion of the organic substances contained in waste materials. The volume of the original waste can be reduced by 95-96 per cent and the solid mass by around 80-85 per cent; however, this method creates pollutants.
Industrial Revolution	The transition from primarily agrarian and handicraft economies, to economies based on mechanized manufacturing of goods and large-scale industry. This transformation of agriculture, industry, transport, and communications were enabled by the use of steam technology, and a series of inventions and technological innovations, that took place between mid-18th to mid-19th century.

Glossary

Key term / Phrase	Definition
Integrated Water Management	A model of collaborative process for planning and management of water, land, and related resources, to minimise damage to life and property, and to maximise the economic and social welfare without compromising the sustainability of vital ecosystems.
Land Management	The process of managing the use and development of land resources including farming, greenspace management, wildlife areas, woodlands etc.
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.
Landfill	A common form of waste disposal, through burying in a landfill site.
Life-cycle Analysis	A method used to evaluate the environmental impacts associated with a product, through its life cycle from the extraction and processing of the raw materials, to its final disposal.
Mechanical Ventilation Heat Recovery	A ventilation system that continuously extracts stale and moisture-laden air from habitable rooms whilst supplying fresh, filtered air, to ensure good indoor air quality, and avoid condensation.
Mitigation	(see **Climate Change Mitigation**)
Mudflats (also Tidal flats)	Level tracts lying below the surface of water, in sheltered coastal environments such as estuaries, creek systems and lagoons, created by sedimentary deposition. Mudflats may form the largest part of the intertidal area and they play an important role in coastal defence, dissipating wave energy. Mudflats are habitats with high ecological value as they support large numbers of birds and fish.
Natural Flood Management	A system whereby natural processes are used to reduce the risk of flooding and coastal erosion, for example: restoring bends in rivers, changing the way land is managed so soil can absorb more water and creating saltmarshes on the coast to absorb wave energy.

Glossary

Key term / Phrase	Definition
Natural Green Infrastructure	(also **Green Infrastructure**) – A strategically planned and delivered network of green spaces in an area which conserves wildlife, natural ecosystem values and functions, sustains clean water and air, and provides a wide array of benefits to people and wildlife. This includes parks, open spaces, woodlands, rivers, and allotments.
Nature Recovery Networks	A joined-up system of places important for wild plants and animals, on land and at sea. It allows plants, animals, seeds, nutrients, and water to move from place to place and enables the natural world to adapt to change. It provides plants and animals with places to live, feed and breed.
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.
Overheating (in buildings)	A state where conditions in a building cause an accumulation of heat which can make occupants feel uncomfortable or heat stressed. The definition of "overheating" varies as it depends on local and regional climatic conditions. According to the World Health Organisation, ideally the room temperature should be kept below 32°C during the day and 24°C during the night.
Paris Agreement	A legally binding international agreement on climate change, adopted in 2015 at the Paris Climate Conference (Conference of the Parties – COP21). It aims at reducing greenhouse gases emissions to limit global temperature rise and support countries' adaptation to climate change catastrophic events.
Photovoltaics (or Photovoltaic Systems)	Panels made of certain types of materials called semiconductors, such as silicon, which are used to collect solar energy and convert it directly into electricity.
Renewable Energy	Energy collected from renewable sources which are infinite and constantly replenished, e.g. solar energy and wind energy.
Resilience	The capacity of a natural system to recover from disturbance.

Glossary

Key term / Phrase	Definition
Restoration	The process of assisting the recovery of an ecosystem that has been degraded, damaged, or destroyed. An ecosystem has recovered when it contains sufficient biotic and abiotic resources to continue its development without further assistance or subsidy. It would sustain itself structurally and functionally, demonstrate resilience to normal ranges of environmental stress and disturbance, and interact with contiguous ecosystems in terms of biotic and abiotic flows and cultural interactions.
Retrofitting	The addition of new components, technology, or features to a product or a system, to reduce carbon emissions and increase its efficiency.
Ringfence Income	To place restrictions on grants or funds so they can only be used for a specific purpose.
Salt Marsh	An area of low and flat coastal grassland between land and saltwater or brackish water, that is covered with grasses and grass like plants and is regularly flooded by seawater.
Solar Farm	(also **Solar Park**) – A large-scale installation where photovoltaic panels are used to collect solar energy, which is a form of renewable energy. Solar energy is converted into electricity which feeds into the power grid for distribution to the consumers.
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.
Sustainable Farming Practices	See **Sustainable Land Stewardship**

Glossary

Key term / Phrase	Definition
Sustainable Land Stewardship	A range of farm systems and strategies applied to agriculture and land use, and have a positive environmental effect lowering global carbon emissions. Sustainable agricultural systems exhibit key attributes such as: Use of efficient crop and animal varieties; Limit external inputs; Exploit natural biological processes; Minimise physical and chemical technologies that have adverse impacts on the environment and human health; Use local human resources, and Lower use of valuable resources and production of damaging resources.
Urban Heat Island (UHI)	This effect occurs when an urban area is significantly warmer than its nearby rural areas due to human activities. This is related to how well the surfaces in each environment absorb and retain heat. UHI is most noticeable during the summer and winter.
Warm Tarmac (or Warm Asphalt)	A 'warm mix' asphalt solution, which has been trialled on road repair work in Essex. This form of asphalt uses less energy when it is being mixed and laid so it is more environmentally friendly. Transportation cost savings can be achieved as the supply source is within Essex. The overall reduction of carbon emissions from the use of this material is estimated to exceed 25 per cent.
Walkable Neighbourhood	A neighbourhood where active and sustainable ways of transportation, such as walking and cycling area increased and motor vehicle traffic reduced. The objective is to design neighbourhoods where all key facilities are with a 15-20-minute walk.
Waste Treatment	Activities carried out on waste to ensure that it has the least detrimental impact on the environment.
Natural Corridors (also Wildlife or Habitat Corridors)	Wildlife areas in the landscape designed to keep connected local wildlife populations which would otherwise be fragmented by human activities.
Washland	Areas of land adjacent to rivers which are used as flood storage areas when the rivers are high, to reduce flooding in residential or agricultural areas. Several washlands include important nature reserves.

Glossary

Key term / Phrase	Definition
Wind Farm	(also, **Wind Park** or **Wind Power Station**) – An installation of wind turbines in the same location, used to "harvest" wind energy turning this into electricity. Wind farms can be either onshore or offshore.
World Economic Forum	International Organisation for Public-Private Cooperation.

Acronym / abbreviation	Definition
3PR	The 3 Parking Rules: Care Consideration and Caution. The 3PR initiative promotes a set of guidelines for parents to improve car-parking safety around schools.
AMOC	Atlantic Meridional Overturning Circulation.
CO_2 e	Carbon dioxide equivalent. A unit for measuring the impact on global warming of any quantity and type of different greenhouse gases, in terms of the amount of CO^2 that would create the equivalent global warming impact.
COP26	The 26th United Nations' Climate Change Conference of Parties, which will be hosted in Glasgow, UK, on 01-12 November 2021. The aim of the summit is to accelerate action towards the ambitions of the Paris Agreement and the UN Framework Convention on Climate Change.
EF	Electric Forecourt.
EV	Electric Vehicle.
EPC	Energy Performance Certificate.
KWh	Kilowatt-hour: a unit of energy which measures how much energy is being used.
LED	Light-emitting diode: energy-saving light source.
LU&GI	Land Use & Green Infrastructure.
MHCLG	Ministry of Housing, Communities & Local Government.

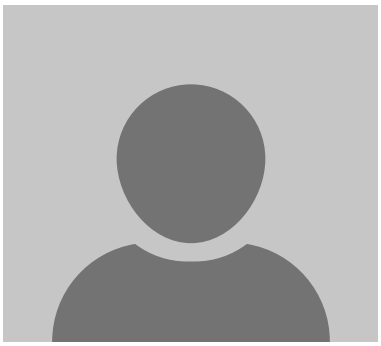
Glossary

Acronym / abbreviation	Definition
$MTCO_2$ Eq	Metric tons of carbon dioxide equivalent. A metric measure used to compare the emissions from different greenhouse gases based upon their global warming potential (GWP).
NOx	Nitrogen Oxides. Compounds of nitrogen and oxygen produced during combustion.
SuDS	Sustainable drainage systems.
PV	Photovoltaics.

Full list of Commissioners

Our Commissioners are:

Lord Randall of Uxbridge
(Chair)



Prajwal
(co-chair)*

Daniel
(co-chair)*

Prof. Jules Pretty
University of Essex

Prof. Graham Underwood
University of Essex

Prof. Aled Jones
Anglia Ruskin University

Prof. Peter Hobson
Writtle University College

Dr Simon Lyster
Northumbrian/Essex & Suffolk Water

Prof. Jacqueline McGlade
Institute for Global Prosperity, University College London

*Our co-chairs cannot be identified in full for safeguarding reasons.

Our Commissioners are:

Dr Adam Read
Chartered Institution of Wastes Management and SUEZ Recycling & Recovery UK Ltd

Toddington Harper
Gridserve

Ian Davidson
Tendring District Council

Jonathan Stephenson
Brentwood Borough Council

John Lippe
Ford Motor Company

Right Rev. Roger Morris
Church of England

Rob Pilley
BBC

Natalie Chapman
Logistics UK

John Henry
Mid and South Essex NHS Foundation Trust

Rob Wise
National Farmers Union

Our Commissioners are:

Jake Richards
National Farmers Union

Catherine Cameron
Agulhas Applied Knowledge

Dr Laura Mansel-Thomas
Ingleton Wood

Jo Roberts
Wilderness Foundation

Heather Hilburn
Thames Estuary Partnership

Dr Poone Yazdanpanah
Writtle University College

Peta Denham
Environment Agency

Chloe Rose
RSPB

Victoria Hills
The Royal Town Planning Institute

Cllr. Peter Davey
Essex Association of Local Councils

Our Commissioners are:

Simon Walsh (former Cllr)
Essex County Council (Conservative)

Robert Mitchell (former Cllr)
Essex County Council (Conservative)

Cllr. Sue Lissimore
Essex County Council (Conservative)

James Abbott (former Cllr)
Essex County Council (Green Party and representing the non-aligned group)

Cllr. Ivan Henderson
Essex County Council (Labour)

Mark Carroll
Essex County Council

Julia Crear
Living Streets

Jillian Anable
University of Leeds

Technical Annex

We recognise we could not include everything in this report, so we have created detailed documents (technical annexes) consisting of in-depth scientific information and diagrams. They explain how they are contributing to climate change and helping us to achieve net zero.

For more information on the core themes please click the following links:

Land Use & Green Infrastructure

Energy

Built Environment

Waste

Transport

Community Engagement

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