
Essex is a pro - Growth County
: delivering a net zero development future
Introduction by Graham Thomas Head of Planning and Sustainable Development

# We still have 20% of Essex to deliver by 2050

We already have an economy: larger than Birmingham or Merseyside

c.200,000 new homes: planned over the next 30 years including

four Garden Communities

c.200,000 new jobs: greatest growth in our major economic centres - Chelmsford, Colchester, Basildon

c.£25b+ of social infrastructure including 70 new schools

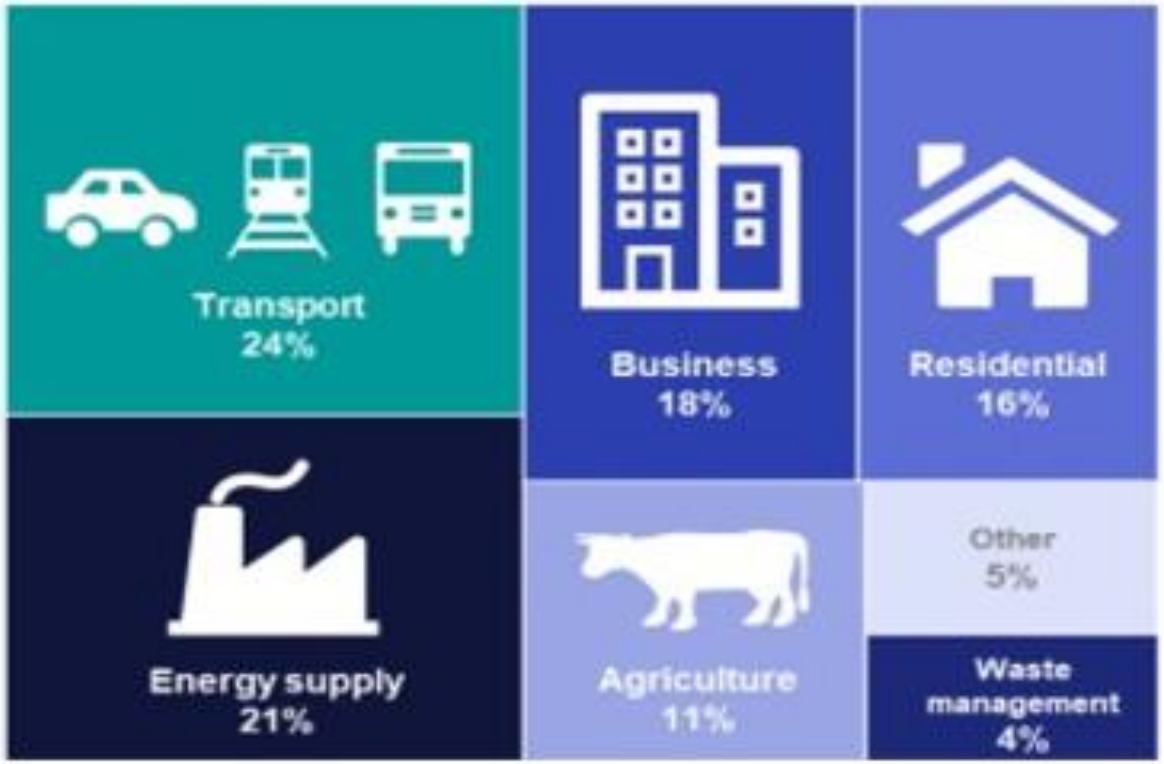
What is the value of this growth and investment to Essex? c.£200bn+

Delivery of Nationally Significant Infrastructure Projects

# Built Environment – New Build and Retrofit

## Climate Challenge

UK Domestic Green House Gas Emissions (GHG) by Sector 2020
Source: BEIS, HMG




Others include Public, Industrial Processes and the Land Use, Land Use Change and Forestry (LULUCF) sectors. The percentages may not sum to 100% due to rounding.

Final UK greenhouse gas emissions national statistics: 1990 GOV.UK (www.gov.uk)

Our Built Environment in Essex is broadly in line with the national average with 39% of carbon coming from the Built Environment which covers residential, business and elements of others including schools.

# BUILT ENVIRONMENT

*Built Environment*

**NEW BUILD**

**RETROFITTING**

**PUBLIC ESTATE**

**COVID-19 → as driven Changes in Society**

# CLIMATE COMMISSION
# BUILT ENVIRONMENT

**Existing Schools**

50% of schools to be retrofitted to net zero standards by 2025. 100% by 2030

**Anchors**

All Anchor Institutions to be retrofitted to net zero by 2030

**Renewable Revolution**

Essex self sufficient in renewable energy by 2040,

**Commercial**

One Third of commercial buildings to be retrofitted with renewable energy by 2030.

**Residential**

Two thirds all dwellings to be retrofitted as far as possible to net zero carbon standards by 2030.

**Residential**

Existing residential buildings- carbon emissions reduction of 50% by 2030. Carbon Zero by 2040.

**New Schools**

All New Schools commissioned to by Carbon Zero by 2022

**New Homes**

All New Homes Consented to be Carbon Zero by 2025

**New Commercial**

All New Commercial Buildings to be Carbon Zero by 2025

**New Schools**

All New Schools Commissioned to be Carbon Positive by 2030

**Carbon +++**

All New Homes and non-domestics buildings consented to be Carbon Positive by 2030

Essex County Council
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# Net zero carbon: New Build

Graham Thomas
Head of Planning and Sustainable Development, and

Matthew Thomas
Growth and Development Team Manager


# Net Zero Carbon New Homes

# Building a Net Zero Evidence Base

- To secure net zero policies into local plans is a challenging task. Underpinning success is a **robust, sound evidence base**.
- Significant work has been done elsewhere - several local authorities are progressing **strong net zero policies through the local plan process now**.
- In Essex, we are ambitious and **want to be part of these front runner authorities** – we need to be to deliver the ECAC target of net zero homes in 2025.
- The first 'Essex specific' evidence published is the **Net zero carbon viability Study** (by Three dragons). Commissioned with ECAC funding. Available here:

https://www.essexdesignguide.co.uk/climate-change/net-zero-evidence

- We have established a '**net zero evidence' webpage** on the Essex Design Guide

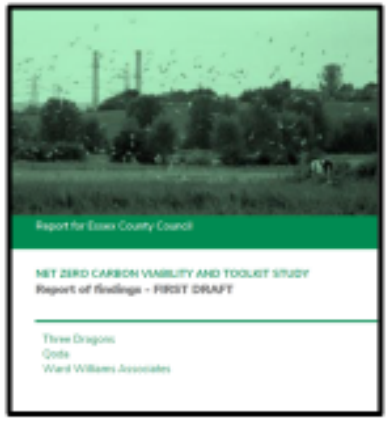
**The Essex Design Guide**

# Climate and Planning Unit (CaPU)

## Developing Consistent Policy

Consistent Policy

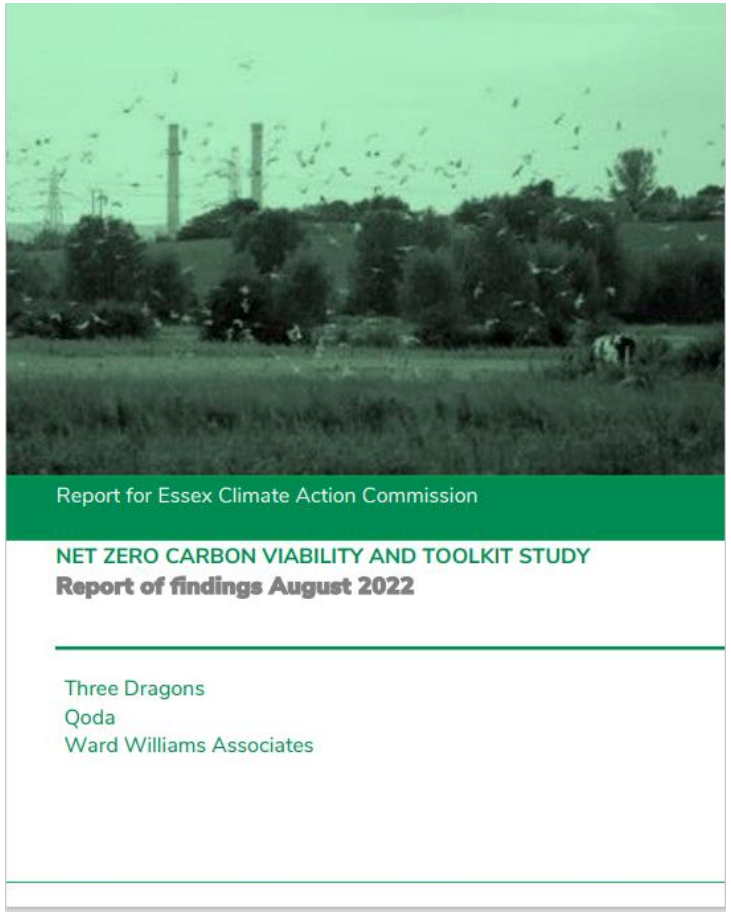
- Policy formation – recruited professional expertise in energy and carbon reduction building to help draft climate change policies and comment on developer proposals.
- Commissioning robust Viability Evidence




NZ Homes are viable in most house typologies and most place in Essex.

The difference between FHS (2025) and NZ new build is marginal (between £2,000-£3,000).

# Essex Net Zero Viability Study: Key Findings



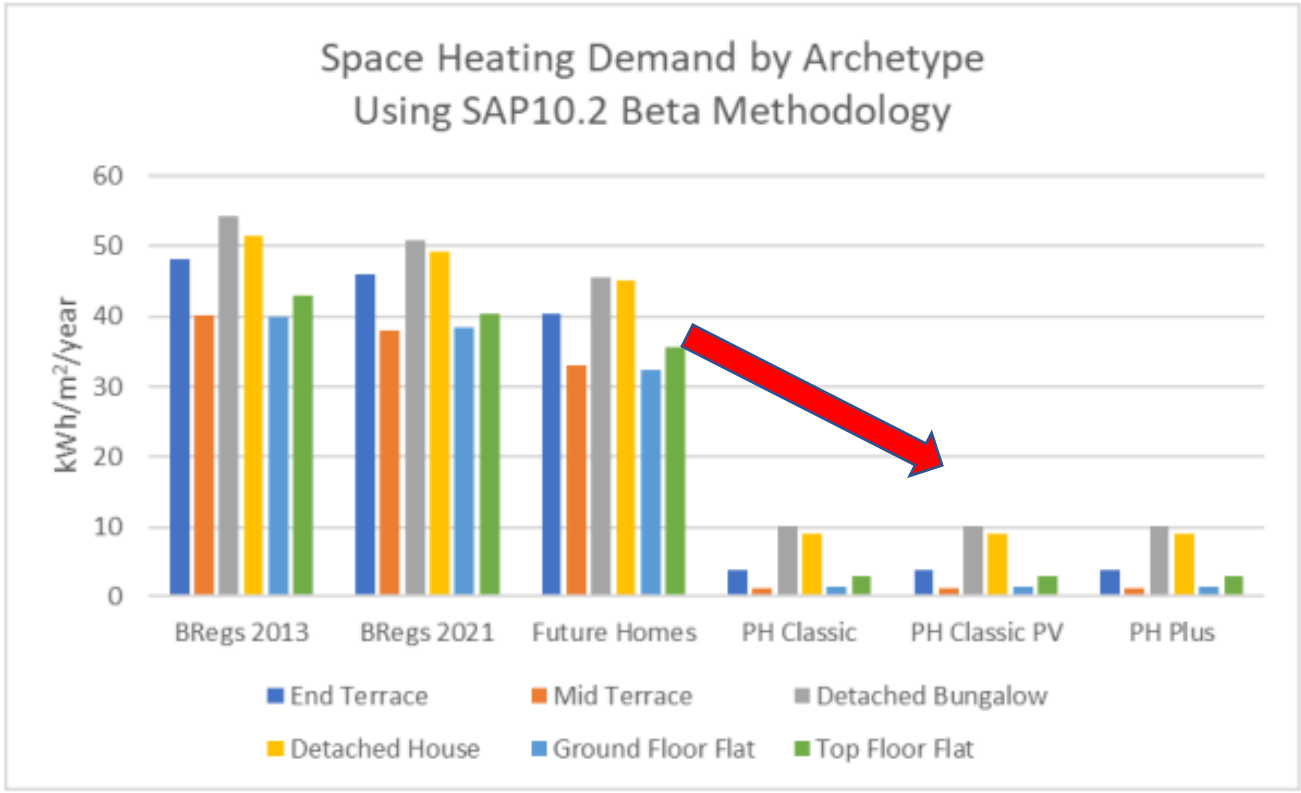

- **Majority of residential development** can absorb the costs of both Future Homes 2025 and the 'net zero' standard
- Net zero (regulated) carbon in operation homes **are viable in most residential typologies and in most places in Essex**.
- **Building homes to Passivhaus 'classic' fabric standards,** with a heat pump and solar pv is recommended as **a basis for achieving net zero (regulated)** carbon buildings now.
- The difference between FHS (2025) and net zero (regulated) new build is **marginal (between £2,000-£3,000**).

# Why go beyond the Building Regulations?

- Building to Passivhaus fabric standards **reduces space heating energy demand by over 70%**

- **Costs are marginal** to move from Future Homes Standard to recommended Passive House type approach.

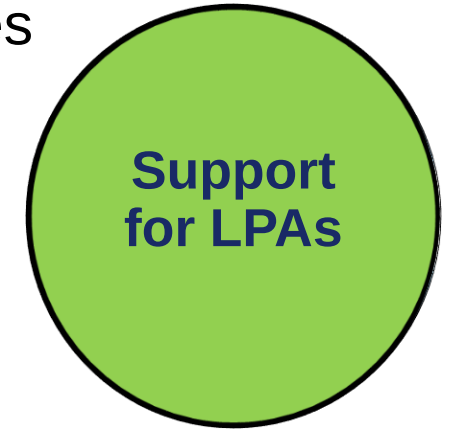
**Figure 9.6 Space heating demand by archetypes using SAP 10.2 method**



# Supporting Essex deliver 'net zero' development

Established **Climate planning policy support group** for Essex authorities

- Review, develop and interpret evidence
- Work on model policy / common key principles
- Develop monitoring system to aid policy implementation




Updated the **Essex Design Guide,** including:

- **Climate Change Compendium** – completed
- Guidance on **Solar Gain (& overheating**) – completed
- Guidance on **Historical Buildings** – near completion
- **Walkable Neighbourhoods**' Part 1 – final stages


Essex Developers Climate Change Charter & Action Plan – published

Initiating with partners 'net zero' demonstrator projects

# Working with the Construction Sector

Knowledge & talking the same language

## We have worked closely with the Essex Developers Group

- To Commission research -

- To initiate positive action – including Essex Developers Climate Action Charter


**Developers Charter Climate Action Plan.**

This Charter has identified a series of joint Actions with developers, including:

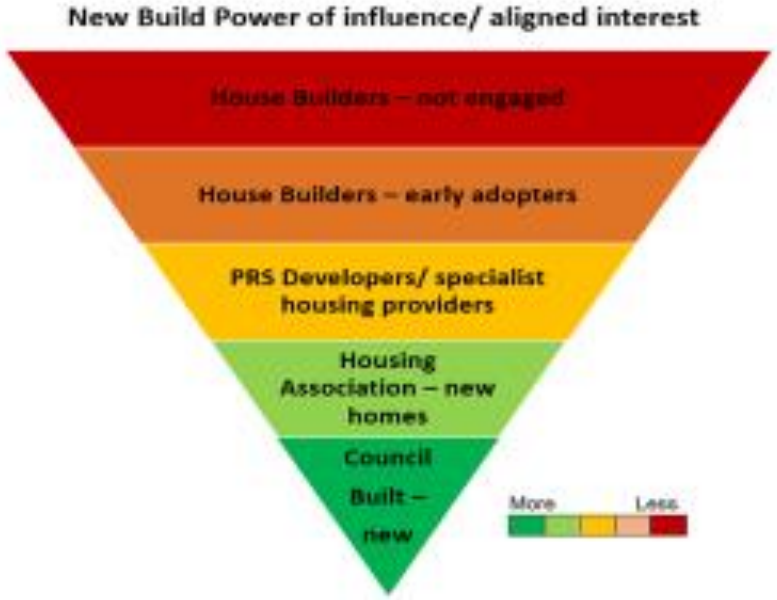
- Net Zero Show Homes
- A Directory of Case Studies
- Sponsorship of Apprenticeships in Design and Green Construction Skills
- Essex Housing Awards starting in 2022 introducing NZ categories.

**Next Step: Work through questionnaire responses with the Essex Developers' Group to understand the barriers to implementing net-zero and what help/support would be beneficial**

# Providing choice for and informing the Customer

The Customer

- System Leadership – demonstrator projects




- Net Zero Show Homes
- A next step is to develop information to include with any new build land search to encourage the pubic to consider energy efficiencies.

# Looking Ahead - Next Steps

- Secured ECAC funding for 2 pieces of work now underway:

**Net Zero** Policy Development Study - to develop detailed policy approach to deliver net-zero development in operation. **It will** take forward the latest, innovative, adopted policy approaches elsewhere that align with climate targets and apply these to Essex, supported by detailed costs and energy and carbon calculations.

**Legal Advice** – to give districts confidence to go beyond Building Regulations in setting local plan policy and understand the level of evidence required, and to also establish the opportunities that may exist to accelerate policy requirements and require higher standards from developments prior to the adoption of a local plan policy.

- Focus in 2023 will be on:
  - developing evidence to support local plan policy on embodied carbon emissions
  - Demonstrating deliverability of policy by addressing Skills and Supply Chain

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# Net zero carbon: New school buildings

Joe Chell
Head of School Organisation & Place Planning

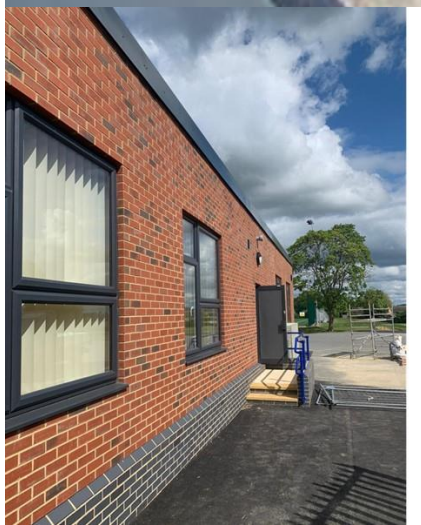
06th February 2023

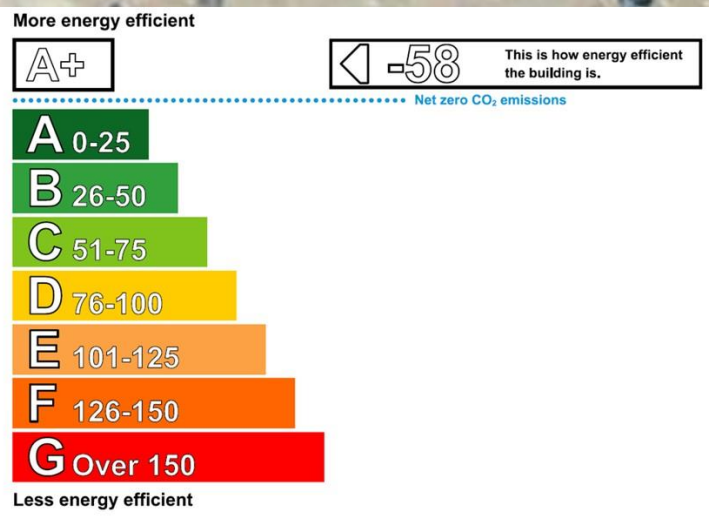
# Challenge Accepted

By 2022, all new school buildings should be commissioned as net-zero carbon

*Climate Action Commission*

The team had already been investigating net-zero in pilot schemes we'd commissioned across the county, so had confidence in saying we could deliver net-zero within available budgets.





# Modular Innovation Project
# Net zero in operation

### Modern Methods of Construction (MMC)

An off-site volumetric solution was chosen to provide quality control and cost-efficiency (no extra budget sought or needed for this enhanced solution).

### Highly Energy Efficient

Better insulated walls to reduce heat loss.

High-performance MVHR (mechanical ventilation with heat recovery) fresh air ventilation and heating.

Enhanced LED lighting.

### Renewable Energy

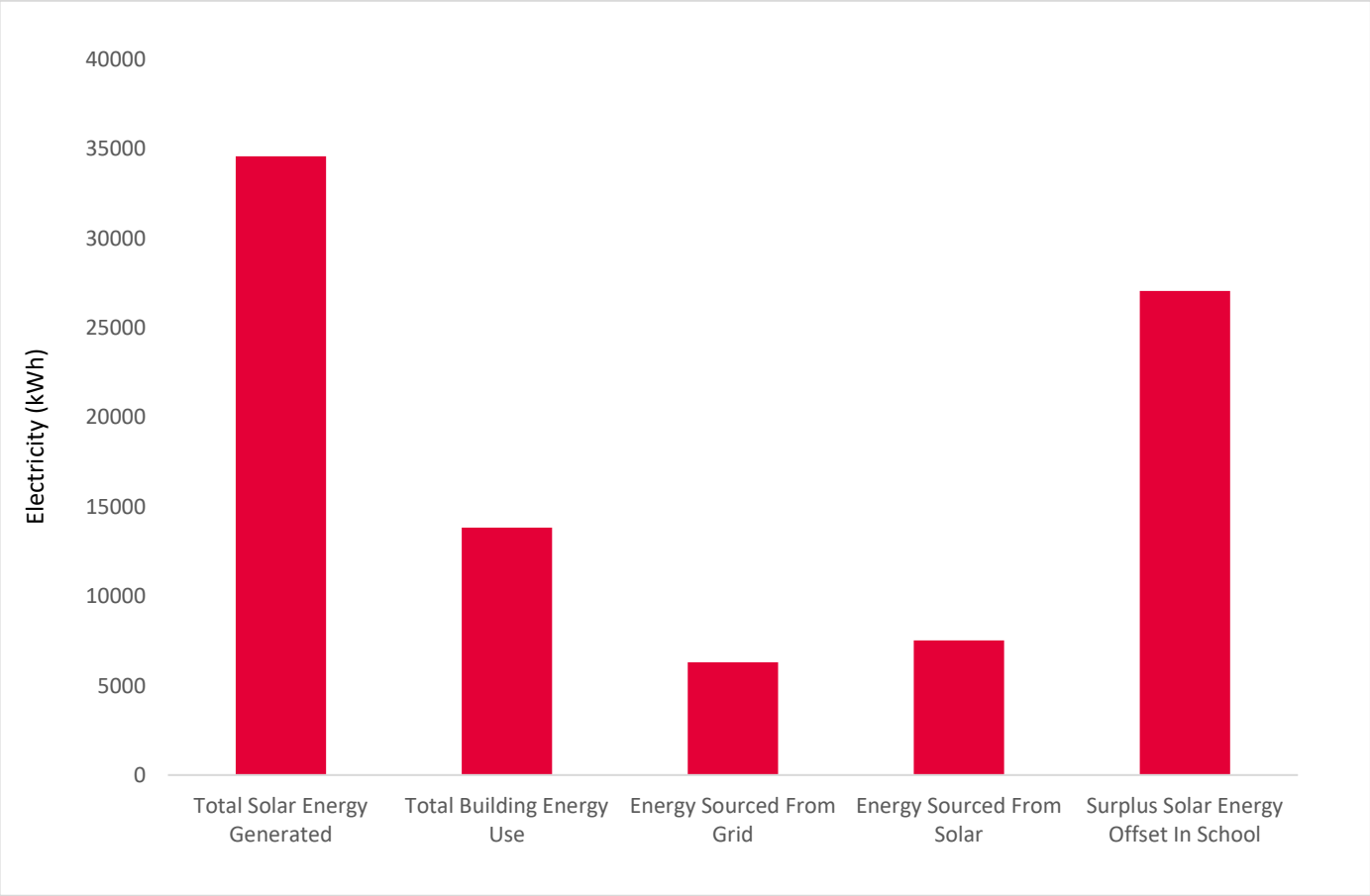
Heating and hot water provided using an air source heat pump, coupled with renewable energy from maximum PV coverage of the roof.

No fossil fuels in this building.

### Monitoring

Performance information on energy consumption and generation, heating, ventilation and $CO_2$ levels all feed into our learning, and improving the way the building can be operated.

# Sweyne Park School: Data for Apr-Nov 22




**Winter**

We still don't have a full data set, but data so far suggests we're well on track for net zero in operation.

**Evaluation**

The post-occupancy evaluation will provide further advice and opportunities to the school to reduce energy consumption.

**Learning**

Data and insight from this building form will add to our understanding of the best value ways to achieve net-zero carbon in operation.

# In the pipeline

**3 New Primary Schools for 2024**

New primary school buildings at Dry Street in Basildon, Limebrook Way in Maldon, and Beaulieu in Chelmsford are being designed for net-zero carbon.  Two of them are also testing out LETI principles to further enhance the energy efficiency of the buildings.

**Further pilot schemes**

We will continue to test out new design methods and technologies to increase or knowledge on the best way to deliver our net zero ambitions.

# Not to forget

**Embodied Carbon**

We haven't forgotten about this, but it was important not to let perfection (whole life carbon) get in the way of doing something great (net-zero carbon in operation)

**Active Travel**

Providing the right number of school places in the right place, at the right time, reduces car journeys and increases the ability to use active travel methods to get to school.  Great for the environment and for health.

**Generating maximum value from renewables**

We're also working on ways to maximise the value of the renewable energy at our new school buildings, particularly during the holidays and weekends in the warmer months when there will be a significant energy surplus.

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# Retrofit: making our homes energy efficient

Thomas Day
Head of Energy and Low Carbon

06th February 2023

# The Challenge

**Challenge:**

- The UK has very poor housing stock in terms of energy efficiency
- 630,000 homes in Essex; approx. 60% have an EPC of D or below
- Approximately 75% built before building regulations require insulation
- >98% of homes will require some form of retrofit pre2050
- Cost of living crises and fuel poverty

**UK carbon emissions: 23% of emissions are due to heating buildings with the largest proportion of this stemming from homes**

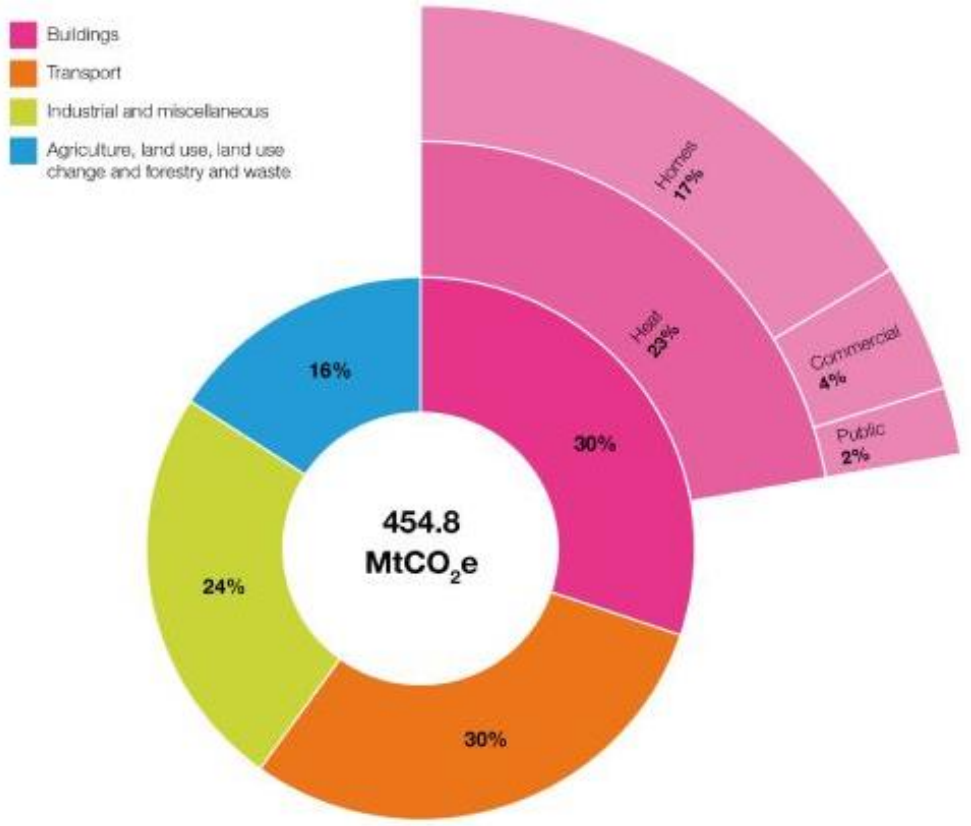
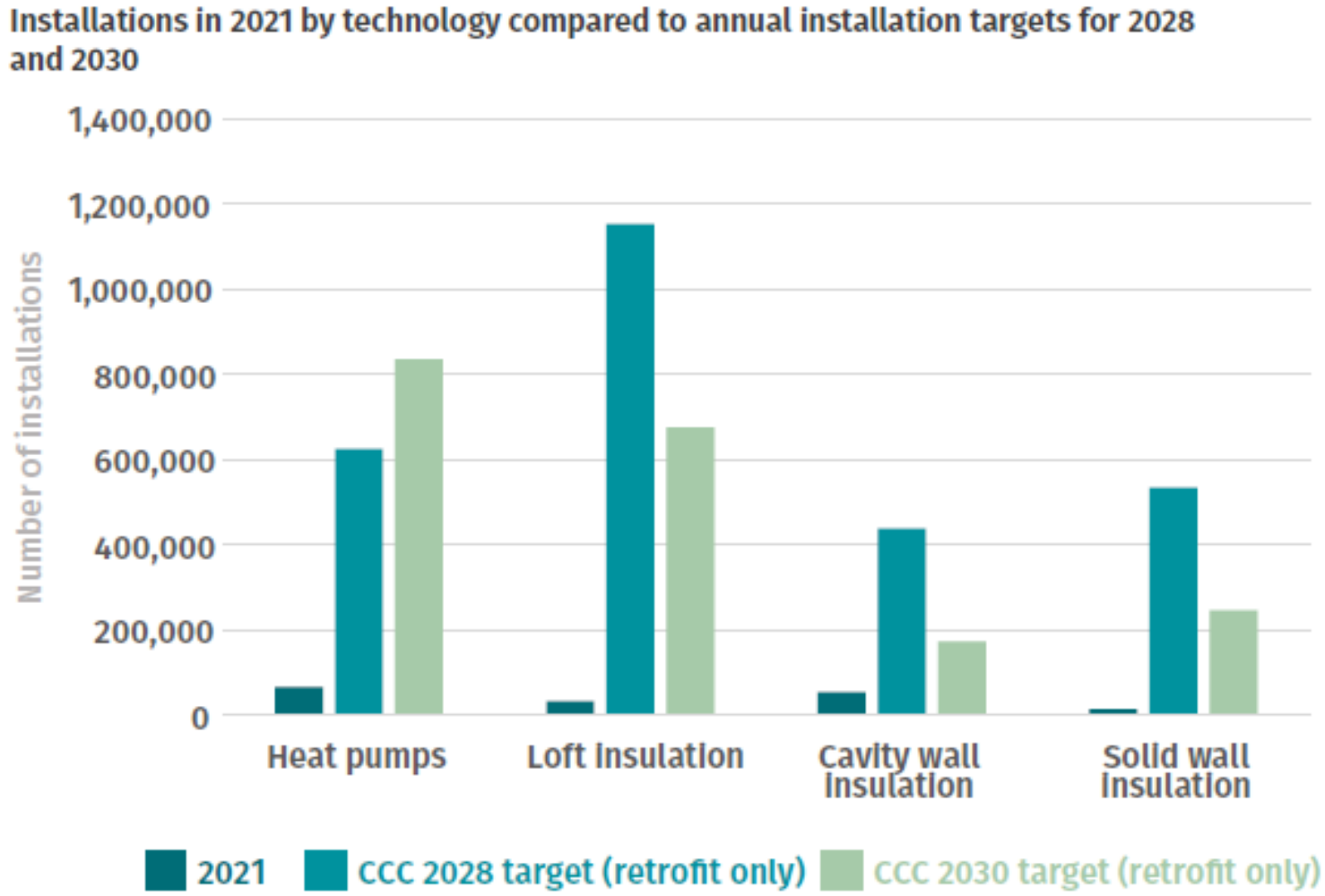



Figure 2 shows the proportion of emissions in 2019 from buildings to the nearest whole number; of the 454.8 mega tonnes of carbon dioxide equivalent ($MtCO_2e$) total emissions, 23% were due to heating buildings, with the largest proportion of this stemming from homes.[35]

# The UK is behind the pace needed to keep track with net zero targets



# The benefits of energy efficiency and clean heat

- **Cutting energy bills permanently -** investing in retrofitting homes with **energy efficiency measures** like insulation and replacing gas boilers with low-carbon heating and by **generating renewable energy generation on site** e.g. roof top solar photovoltaics

- **Energy security** - retrofitting and long-term economic security

- **Economic growth** and **Levelling Up**
  - c.455,000 jobs UK wide, 12,800 jobs in Essex
  - economic opportunity in Essex est. £10.8bn - £13.8bn
  - Retrofit will benefit our levelling up priority areas

- Essential to **health and well-being**

# Fuel poverty

| | Types of households most affected | Fuel Poverty projections | | | |
|---|---|---|---|---|---|
| | | 2021 | April 2022 | October 2022 | October 2022 Revised |
|  | Elderly people with limited pension income, mostly living alone | 52% | 86% | 97% | 77% |
|  | Urban residents renting high density housing from social landlords | 23% | 40% | 89% | 37% |
|  | Elderly people with assets who are enjoying a comfortable retirement | 13% | 39% | 87% | 43% |

# Essex Climate Action Commission

- Two-thirds of all dwellings 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 percent 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.

# Action in Essex

- Housing stock analysis pan-Essex
- Grant funded programmes for low income households- Help to Heat schemes - £25m
  - Local Authority Delivery Scheme
  - Sustainable Warmth / Home Upgrade Grant (HUG)
  - Social Housing Decarbonisation Fund,
  - Energy Company Obligation (ECO 4 / ECO+)
- Warm Homes Essex website and funding for Warm Homes advisory service / fuel poverty alleviation - Citizens Advice Essex & Cadent Gas partnership
- Business support programmes and retrofit professional skills training in Harlow and Tendring – now extended to Castle Point and
- Solar Together Essex

# Looking ahead

- Community engagement and community led retrofit and renewable energy projects
- Community energy groups & other local groups / Parishes leading the way – e.g. Tollesbury Climate Partnership
- Communipower – scaling up community decarbonisation
- Innovate UK Pioneering Places projects
- Retrofit for able to pay / self-funded households


SAFFRON WALDEN COMMUNITY ENERGY

https://www.swce.co.uk/

Community Energy Colchester

https://www.colchestercommunityenergy.com/

TOLLESBURY CLIMATE PARTNERSHIP
OUR VILLAGE OUR FUTURE

https://www.facebook.com/tollesburyclimatepartnership/

SUSTAINABLE DANBURY

https://sustainabledanbury.org/

# Thank you for listening

**Any further questions and comments**

# Appendix

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# Net Zero Carbon: Retrofit work

Elliot Smith
Head of Infrastructure Delivery & Facilities Management

06th February 2023

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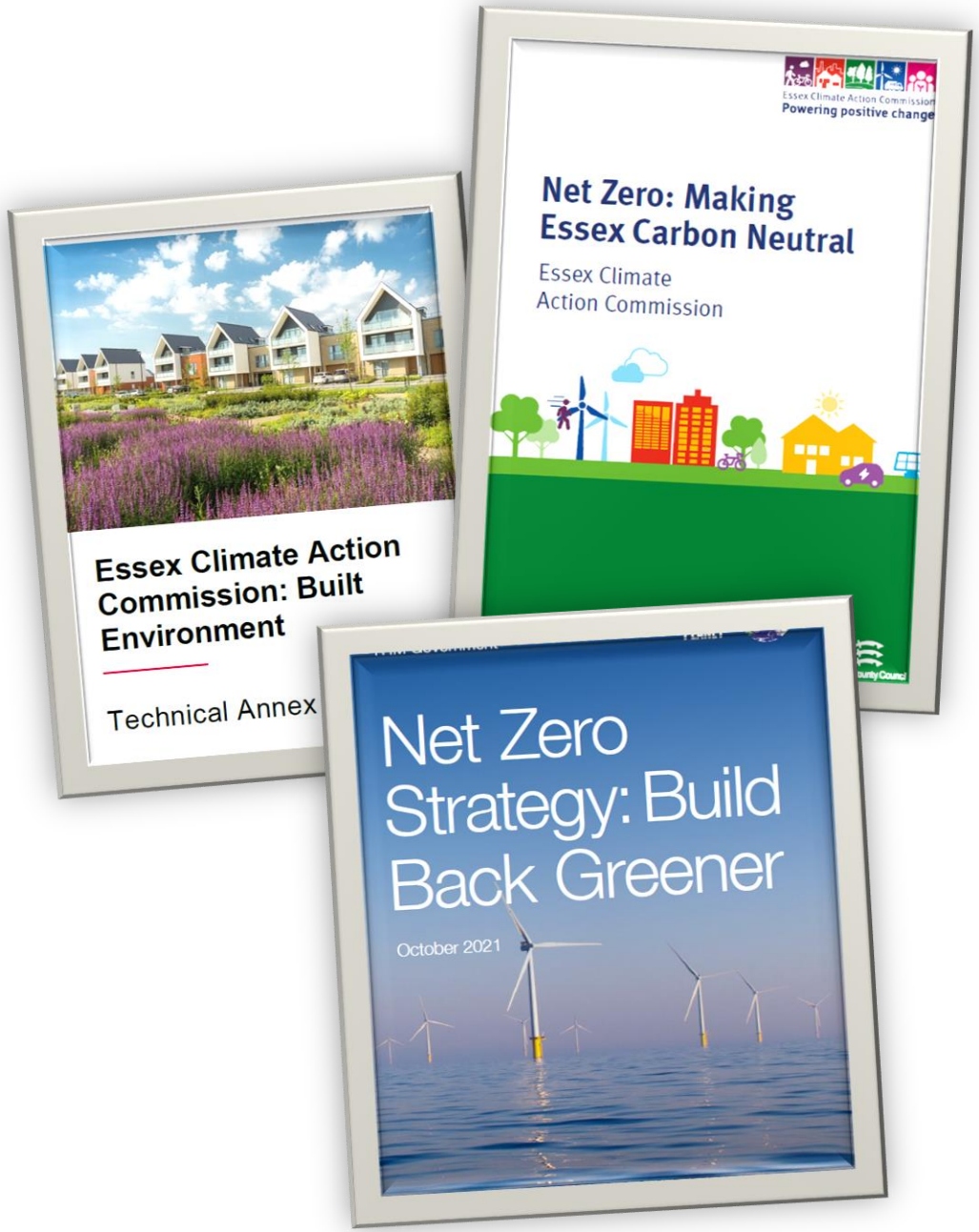
# Annual Budget

- The ECC budget for retrofitting decarbonisation work is set at £750k per annum. This has been slightly reduced to £500k per annum in 2023/24 due to budget pressures.  Budget covers all core estate (almost 300 buildings) and ECC schools

- Ambitious targets to achieve Net Zero by 2030 (50% of schools by 2025)

- Public Sector Decarbonisation grants from Salix and funding from ECC building maintenance is used to replace end of life items with cleaner and more efficient solutions



# Public Sector Decarbonisation Scheme 1 – Solar and Double-Glazing projects

£4.5 million invested across our school and core estate, increasing thermal efficiency and preparing sites for new low carbon heating systems.

This follows the “fabric first” principals recommended by CIBSE / LETI / best practice

- 20 core solar installs – 460mWh generation
- 31 school solar installs – 552mWh generation
- At 50p/kWh average rate - £276k saving annually
- 14 core DG windows installations - £750k invested
- 14 school DG windows installations - £3m invested

# Public Sector Decarbonisation Scheme 1 – Core estate, Goodman House, ERO & Great Notley

£3 million invested across three core sites, increasing building efficiency and reducing reliance on grid supplied electricity.

With renewable electric contracts, these three sites are now virtually Zero Carbon in operation.

- ERO and Goodman House ASHP installation – completion due March 2023.
- Solar Array at ERO produced 110,000kWh of energy in 2022- 15% of the site energy use.
- This is equivalent to the energy used by 39 UK homes in a year.
- ERO lighting expected to save 150,000kwh of energy annually.
- Great Notley Park ASHP installation – completing full complement of low carbon technology on site.
- LEDs, solar thermal, solar PV, reed bed filtration and low carbon ASHP installation all now live at the Discovery Centre.

# Brightlingsea Library


- Retrofit of solar panels
- Expect to generate 13,000 kWh annually
- Approximately £24,203 savings based upon 14.2p per kWh

# Sible Hedingham Library

- Retrofit of solar panels
- 64% self sufficient from the solar installation
- Installation completed on 4th August 2022

# Milldene Primary School

- 18,000 kWh of energy exported
- Swimming pool means that the school has a very high usage
- Other behavioural measures to supplement

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# Challenges to retrofit

- Replacement of gas boilers is not always easy.  The switch to ASHP may require larger radiators or significant work to the existing heating system
- PSDS grants don't cover all elements of the retrofit. The bulk of the grant is for Air Source Heat Pumps, rather than the fabric first approach.  The costs are not fully covered by the grants, but help towards the work
- Design is required. This is not sitting on the shelf ready for the grant applications
- Currently most of the work is through the Mitie Contract. Lessons learnt over the last 2 years
- Work on a new framework to enable schools to access a designer/contractor for items such as LED lighting